

ALUCO ECOLOGY LTD

LAND AT BONHAMS, YAPTON

**ECOLOGY UPDATE SURVEY &
MITIGATION STRATEGY**

AUGUST 2021

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LAND AT BONHAMS, YAPTON ECOLOGY MITIGATION STRATEGY

AUGUST 2021

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LAND AT BONHAMS, YAPTON ECOLOGY MITIGATION STRATEGY

JUNE 2021

1.0 INTRODUCTION

1.1 Background

1.1.1 The site has Planning Permission for the erection of 56 No. dwellings and associated open space and creation of new access. A detailed ecological assessment was provided with the Outline Application (see Aluco Ecology, 2016) and a mitigation method statement for a Reserved Matters Application (see Aluco Ecology, 2019, 2020). This new application is for an increase from 56 to 63 dwellings.

1.1.2 The existing outline planning permission for the site contains a condition directly related to the site's ecology:

7 Prior to the commencement of development or any preparatory works, an Ecological Enhancement and Management Scheme shall be submitted to the Local Planning Authority for approval and is to be based on the recommendations within the supporting Ecological Assessment dated November 2016, as appropriate. All approved details shall then be implemented in full in accordance with the agreed timings and details.

Reason: To protect and retain the biodiversity value of the site, in particular the perimeter hedgerows and trees before any works commence on site in accordance with policy GEN29 of the Arun District Local Plan.

1.1.3 A detailed scheme for the site has been developed, and this is reproduced at **Figure 1** below. This document provides updated baseline survey work and evaluation, consideration of potential impacts from an increase in units, and mitigation method statements and management prescriptions for ensuring biodiversity features are not affected through recommendations of suitable pre-construction and construction measures to be put in place on site, and providing mitigation and habitat creation for new habitats in public open space, providing necessary information for the planning condition.

1.2 Previous Survey Work

Summary of Previous Survey

1.2.1 A number of species are protected under legislation and policy; namely the Conservation of Habitats & Species Regulations 2010 in relation to the European protected species (eg bats, dormouse, great crested newts) and the Wildlife & Countryside Act 1981 (as amended) and Countryside & Rights of Way Act (CROW) 2000 for protected species and

the designation and protection of SSSIs (**Technical Appendix 1**). The Protection of Badgers Act 1992 gives protection to Badgers *Meles meles*.

1.2.2 Aluco Ecology has undertaken ecological survey work on the site for all protected species groups (see Aluco Ecology 2016, 2019 & 2020). The results have identified the following ecological features potentially affected by the works and construction area and are therefore covered in this mitigation statement:

- Vegetation and habitats, including habitats within the construction zone to be impacted, as well as retained woody vegetation, hedges and trees and improved/semi-improved agricultural grassland;
- Nesting birds are present on site;
- A number of bat species have been recorded foraging and commuting around the site and local area;
- Badgers *Meles meles* are likely to be present in the wider area, but no direct evidence was noted on site, Fox *Vulpes vulpes* has been recorded;
- Populations of a single species of reptile, Slow Worm *Anguis fragilis*, in low numbers has been recorded on site.

2.0 DETAILS OF DEVELOPMENT

2.1 Introduction

2.1.1 **Figure 1** below shows the detailed Masterplan. The development has been increased from 56 to 63 units. The proposed development footprint is broadly the same area as that from the Outline Planning Permission and the open and green space provision is also similar to the permitted scheme.

2.2 Biophysical Changes associated with the Development Scheme

Pre-Construction Site Clearance

2.2.1 Existing vegetation within the construction zone will be required to be removed and the ground re-profiled within the development area.

Construction

2.2.2 The construction of the development has the potential to affect protected species and ecological features, some of which are afforded protection under the legislation and policy outlined in Section 1 above. The following sections provide details for each relevant protected species group, to ensure that pre-construction works follows best practice and protected species are taken into account.

- 2.2.3 A detailed Landscape Strategy has been prepared for the site (see ACD Landscape Plans). This provides for formal and informal habitat creation and landscaping both around the main development footprint and new public open space habitats south of the main development area. This has been informed by the ecology mitigation and prescriptions.

Operation

- 2.2.4 The retained public open space areas of the site are designed to fulfil a multi-purpose role of biodiversity gain, landscaping and public open space. Additional planting has been provided in the ACD Landscape Plan (ACD, 2021).

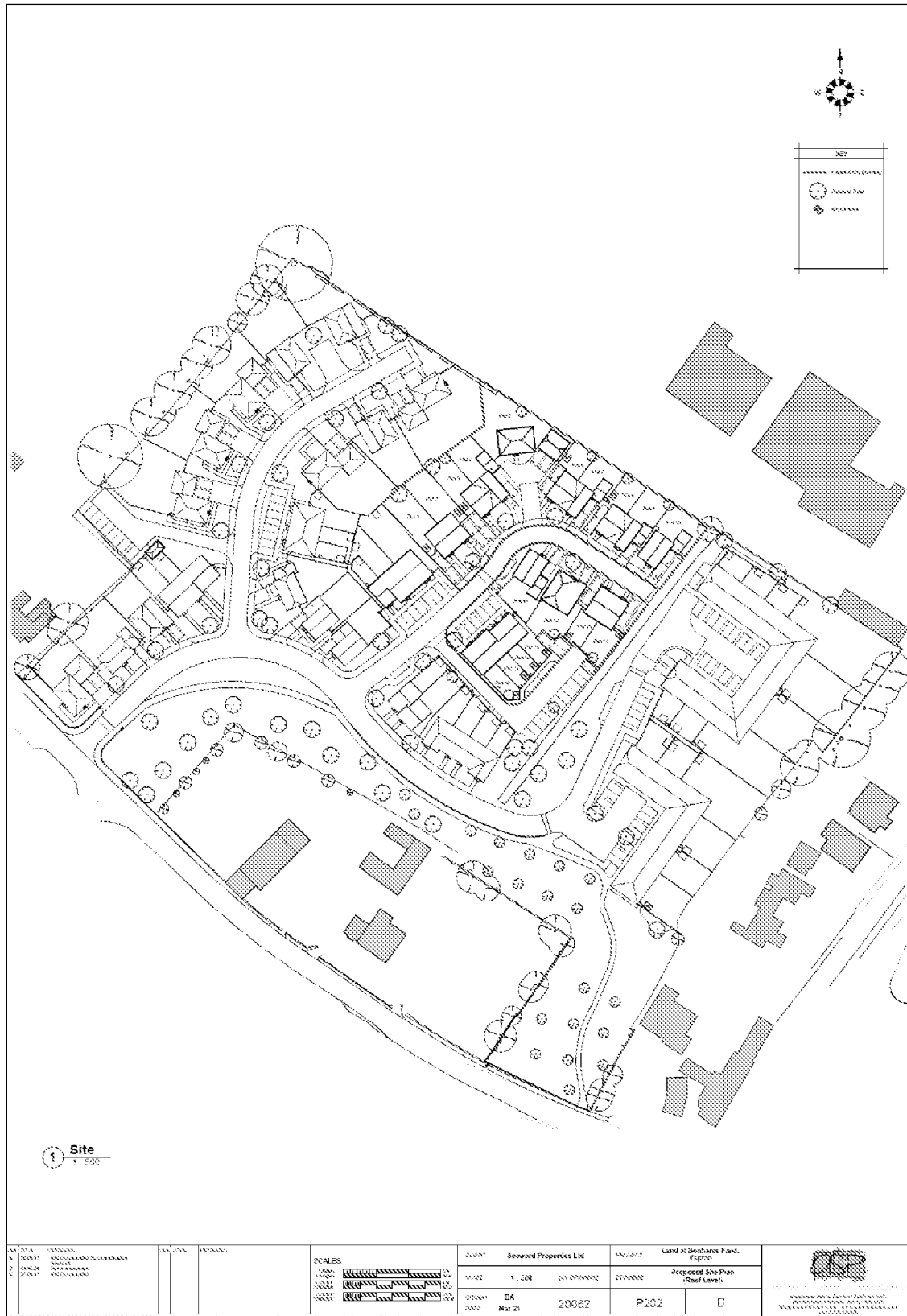


Figure 1: Masterplan and Red Line Boundary (OSP, 2021)

3.0 SURVEY UPDATE & ASSESSMENT

3.1 Update Survey Appraisal

- 3.1.1 Survey work has been updated in August-September 2020 to cover all species groups with walkover updates to inspect potential for changes in habitats using the methodology in **Technical Appendix 3**. An additional update walkover survey has also been undertaken during June 2021.
- 3.1.2 An updated protected species search with the Sussex Biodiversity Records Centre has also been undertaken in September 2020. No additional significant protected species/European Protected Species records have been provided from the previous 2016 & 2019 survey work, which would have an impact on the site and mitigation recommendations, as set out in the ecology assessment (see Aluco Ecology, 2016).
- 3.1.3 The habitats on site are broadly similar to those from the previous survey work (Aluco Ecology, 2016). There have been no significant changes in management or nature of the grasslands on site, including survey work in June 2021. Overall, the habitats for ecology features outlined in the original assessment remain similar and these assessments remain valid. The adjoining land uses in the zone of influence also remain broadly the same.
- 3.1.4 Additional phase 2 survey work has however been updated in summer/autumn 2020, and this includes updated survey work on the key species/groups recorded on site or from the initial assessment; Badgers *Meles meles*, Bats and Reptiles. The results of these update surveys are set out below.
- 3.1.5 Update photos of the site from 2020 survey work and additional update survey in June 2021 are provided at **Technical Appendix 2**.

3.2 Badger Survey

- 3.2.1 A survey visit in was undertaken in August 2020 using the methodology for the survey is provided in **Technical Appendix 2**). There was no evidence of any active Setts on site, and evidence of Rabbit and Fox *Vulpes vulpes* was recorded on the survey. The update survey recorded a small amount of evidence of Badgers using the western field at the northern end (see **Figure 3**), via a footprint on a mammal track on the northern edge of the site. Badgers in the wider local countryside therefore use the site on occasion. The walkover survey in June 2021 included searches for potential signs of additional Badger use of the site, with no additional signs noted.

3.3 Bat Survey

- 3.3.1 Update Bat emergence and static remote survey work was undertaken during August – September 2020 using the methodology set out in **Technical Appendix 4**. The results of the survey work are set out in **Table 1** below and on **Figure 2**. This included a re-assessment of the potential for roost features on site. The development proposals will retain all boundary trees, including a pine tree on the north west corner of the site that is has potential bat roost features (see Photo in **Technical Appendix 2**).
- 3.3.2 The survey results are similar to the previous survey effort in 2016. No confirmed emergence from the Pine tree from emergence survey work, with bats entering the site from likely roosts in buildings off site. The transect and remote monitoring work recorded similar use of the site, with 6+ species recorded and similar patterns of foraging/commuting distribution along the woody site boundaries. Serotine bats appear to likely be roosting locally, with frequent records on the western and other boundaries during survey work, and during breezy weather where utilising the west boundary. Previous survey (Aluco Ecology, 2016) they were favouring north eastern areas of the site. Myotis species, considered likely to be Whiskered/Brandt's/Alcathoe and Daubenton's were also recorded using the north western hedge boundary, with low numbers of passes of Whiskered type Myotis also recorded on the central and eastern boundaries of the site during monitoring. It is estimated that 1-2 individuals are involved for Serotine and Myotis, based on emergence, transect survey work and data analysis of the remote detector recordings.

3.4 Reptile Survey

- 3.4.1 Update reptile survey work has been undertaken on site during August-September 2020. The results of the survey work are set out in **Table 2** below and on **Figure 3**.
- 3.4.2 The results of the reptile survey are similar to the previous survey in 2016. The reptile habitats are restricted to the very margins of the field, and are generally of lower quality as a result of the farming operations on site (with hay cutting and grazing over part of the year). A single species, Slow Worm has been recorded in low numbers in the south eastern corner of the eastern field.
- 3.4.3 As part of the implementation of the existing planning permission, reptile survey, mitigation including a destructive search were undertaken on the site entrance in September 2020 according to the agreed mitigation methodology. No reptiles were recorded during the supervised destructive search of the site entrance.

3.5 Assessment of Impacts on New Development Scheme

- 3.5.1 The new scheme (see **Figure 1** above) provides a similar layout to the previous scheme, but with an increase from 56 to 63 units (an additional 7 units in the area of the masterplan highlighted). The new layout and proposals have been considered looking at the 2016 ecology assessment and update survey effort and ecology feature evaluation in 2019 and 2020. The previous ecology impact assessment remains valid and therefore a number of mitigation measures are recommended to ensure that the new scheme complies with relevant legislation and policy (as summarised in **Technical Appendix 1**).
- 3.5.2 The remaining sections of the report set out mitigation method statements to ensure that relevant ecology legislation and policy is complied with during both construction and operation. These measures have been integrated as far as possible within other disciplines, including detailed site landscaping and hydrology, to produce an integrated open space and retained boundary feature treatment.

Table 1: Emergence Survey and Remote Monitoring Data, 2020

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Date	Survey (see Figure 2)	Weather	Results Summary																																																																																																																																	
17/08/2020	Evening Emergence Pine on site boundary	Cloud 100 Wind SW1 Temp 16c Precip 0	Nil emergence. First bat on NW boundary PP at 20:42 then foraging along NW and NE boundary of field edge 1-2PP until 20:53, then occ. foraging for remainder. PS x 2 passes at 21:09; ES x 2 passes at 21:20. <table><tr><th>Transect</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>Total</th></tr><tr><td>PP</td><td></td><td>2</td><td>1</td><td>3</td><td>1</td><td></td><td></td><td></td><td></td><td>2</td><td>5</td><td></td><td>7</td><td>4</td><td>1</td><td>26</td></tr><tr><td>PS</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td><td></td><td></td><td></td><td>2</td></tr><tr><td>ES</td><td></td><td></td><td></td><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td>3</td><td></td><td></td><td></td><td></td><td>6</td></tr><tr><td>NN</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td></tr><tr><td>My</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td></tr><tr><td>Total</td><td>0</td><td>2</td><td>1</td><td>6</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>2</td><td>8</td><td>2</td><td>7</td><td>4</td><td>1</td><td>34</td></tr></table>	Transect	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total	PP		2	1	3	1					2	5		7	4	1	26	PS												2				2	ES				3							3					6	NN																0	My																0	Total	0	2	1	6	1	0	0	0	0	2	8	2	7	4	1	34										
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20-24/08/2020	Remote Monitoring North Western Boundary	Mostly dry spells during survey temp lows to 16c. SW winds moderate. Rain on final eve.	<table><tr><td></td><td>Total</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="3">Notes</td></tr><tr><td>Date</td><td>Passes</td><td>PP</td><td>PS</td><td>PN</td><td>My</td><td>ES</td><td>PA</td><td>NN</td><td>1st</td><td>1st</td><td colspan="5"></td></tr><tr><td>20/08/2020</td><td>60</td><td>33</td><td>2</td><td>0</td><td>0</td><td>23</td><td>0</td><td>2</td><td>20:29</td><td>01:17</td><td colspan="5">Survey on same night 1-2 ES feeding on sheltered side of hedge</td></tr><tr><td>21/08/2020</td><td>95</td><td>67</td><td>2</td><td>0</td><td>9</td><td>15</td><td>0</td><td>2</td><td>20:38</td><td>04:44</td><td colspan="5">MyM /MyA (prob 1 foraging bat) MyD 1x 04:33</td></tr><tr><td>22/08/2020</td><td>178</td><td>93</td><td>10</td><td>0</td><td>48</td><td>25</td><td>0</td><td>2</td><td>20:28</td><td>05:08</td><td colspan="5">MyM /MyA (prob 1-2 foraging bats) MyD 4x</td></tr><tr><td>23/08/2020</td><td>121</td><td>57</td><td>10</td><td>0</td><td>29</td><td>22</td><td>0</td><td>3</td><td>20:27</td><td>05:28</td><td colspan="5">MyM /MyA MyD 3x</td></tr><tr><td>24/08/2020</td><td>11</td><td>3</td><td>0</td><td>0</td><td>0</td><td>7</td><td>0</td><td>1</td><td>20:28</td><td>21:38</td><td colspan="5">1st bat ES, overnight rain</td></tr><tr><td>AVG</td><td>114</td><td>51</td><td>5</td><td>0</td><td>17</td><td>18</td><td>0</td><td>2</td><td></td><td></td><td colspan="5"></td></tr></table>		Total													Notes			Date	Passes	PP	PS	PN	My	ES	PA	NN	1st	1st						20/08/2020	60	33	2	0	0	23	0	2	20:29	01:17	Survey on same night 1-2 ES feeding on sheltered side of hedge					21/08/2020	95	67	2	0	9	15	0	2	20:38	04:44	MyM /MyA (prob 1 foraging bat) MyD 1x 04:33					22/08/2020	178	93	10	0	48	25	0	2	20:28	05:08	MyM /MyA (prob 1-2 foraging bats) MyD 4x					23/08/2020	121	57	10	0	29	22	0	3	20:27	05:28	MyM /MyA MyD 3x					24/08/2020	11	3	0	0	0	7	0	1	20:28	21:38	1st bat ES, overnight rain					AVG	114	51	5	0	17	18	0	2							
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31/08/2020	Evening Emergence Pine on site boundary	Cloud 100 WindSW2-3 Temp 21-19 Precip 0	Nil emergence. First bat on NW boundary PP at 20:13 then regular foraging for next 45mins of 1 and occ. 2 PP; 20:32 ESx1 foraging along same boundary on and off for remainder of survey. M7 pass at 20:36. SE boundary of eastern field first bat NN at 20:08; ES at 20:17 (6 passes in total during survey), first PP at 20:30 (6 passes in total during survey); Middle boundary S end – first bat NN at 20:07; PP at 20:13 (14 passes in total); 20:23 ES pass; 20:38 PS pass. <table><tr><th>Transect</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>Total</th></tr><tr><td>PP</td><td></td><td></td><td></td><td>8</td><td>3</td><td></td><td>1</td><td>1</td><td></td><td>3</td><td>6</td><td>4</td><td></td><td></td><td></td><td>26</td></tr><tr><td>PS</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td></tr><tr><td>ES</td><td></td><td>5</td><td>1</td><td>6</td><td>1</td><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td>14</td></tr><tr><td>NN</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td>1</td></tr><tr><td>My</td><td></td><td></td><td></td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td></tr><tr><td>Total</td><td>0</td><td>5</td><td>1</td><td>16</td><td>4</td><td>0</td><td>1</td><td>1</td><td>0</td><td>4</td><td>6</td><td>4</td><td>0</td><td>0</td><td>1</td><td>43</td></tr></table>	Transect	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total	PP				8	3		1	1		3	6	4				26	PS																0	ES		5	1	6	1					1						14	NN															1	1	My				2												2	Total	0	5	1	16	4	0	1	1	0	4	6	4	0	0	1	43										
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08-12/09/2020	Remote Monitoring Middle Boundary	Dry and warm through survey lows to 9c		Total	Species												
			Date	Passes	PP	PS	My	ES	NN	1st	Lst	Notes					
			09/09/2020	42	21	0	14	3	4	19:41	05:47	MyM/My A (prob 1 foraging bat c1.5hrs after sunset)					
			10/09/2020	8	2	1	3	1	1	19:42	03:24	MyM/My A					
			11/09/2020	17	16	0	1	0	0	20:09	02:10	MyM/My A					
			12/09/2020	11	6	1	2	2	0	19:48	04:43	MyM/My A					
			13/09/2020	8	1	2	1	2	2	19:49	04:58	MyM/My A					
			AVG	17	9	1	4	2	1								

29/09/2020	Dawn Re-entry Pine on site boundary	Cloud 100 Wind SW1 Temp 16c Precip 0	Nil re-entry along western boundary. Regular PS & PP foraging along this boundary until 06:24 PP and 06:21 PS. Estimated 2PS and 1-2PP during the hour before sunrise. PA recorded heading south along boundary at 06:23.																
			Transect	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
			PP	1	3	2	1				1	2		4	1				15
			PS		1	5	4		1	2							2		15
			ES																0
			NN																0
			My											2					2
			Total	1	4	7	5	0	1	2	1	2	0	6	1	0	2	0	32

29/09/2020 – 05/10/2020	Remote Monitoring South Eastern Boundary	Rain and stormy weather in bands on 3 of the nights survey, SW winds Mod. lows to 8c		Date	Passes	PP	PS	My	ES	1st	Lst	Notes	
			29/09/2020	29	14	4	8	3	19:13	05:40	MyM/My A		
			30/09/2020	3	3				21:10	06:30			
			01/10/2020	27	24	2		1	19:06	22:03			
			02/10/2020	15	11		4		19:14	20:53			
			03/10/2020	10	4	2	4		19:00	20:09			
			04/10/2020	3	1		2		00:08	06:42			
			AVG	15	10	3	5	2					

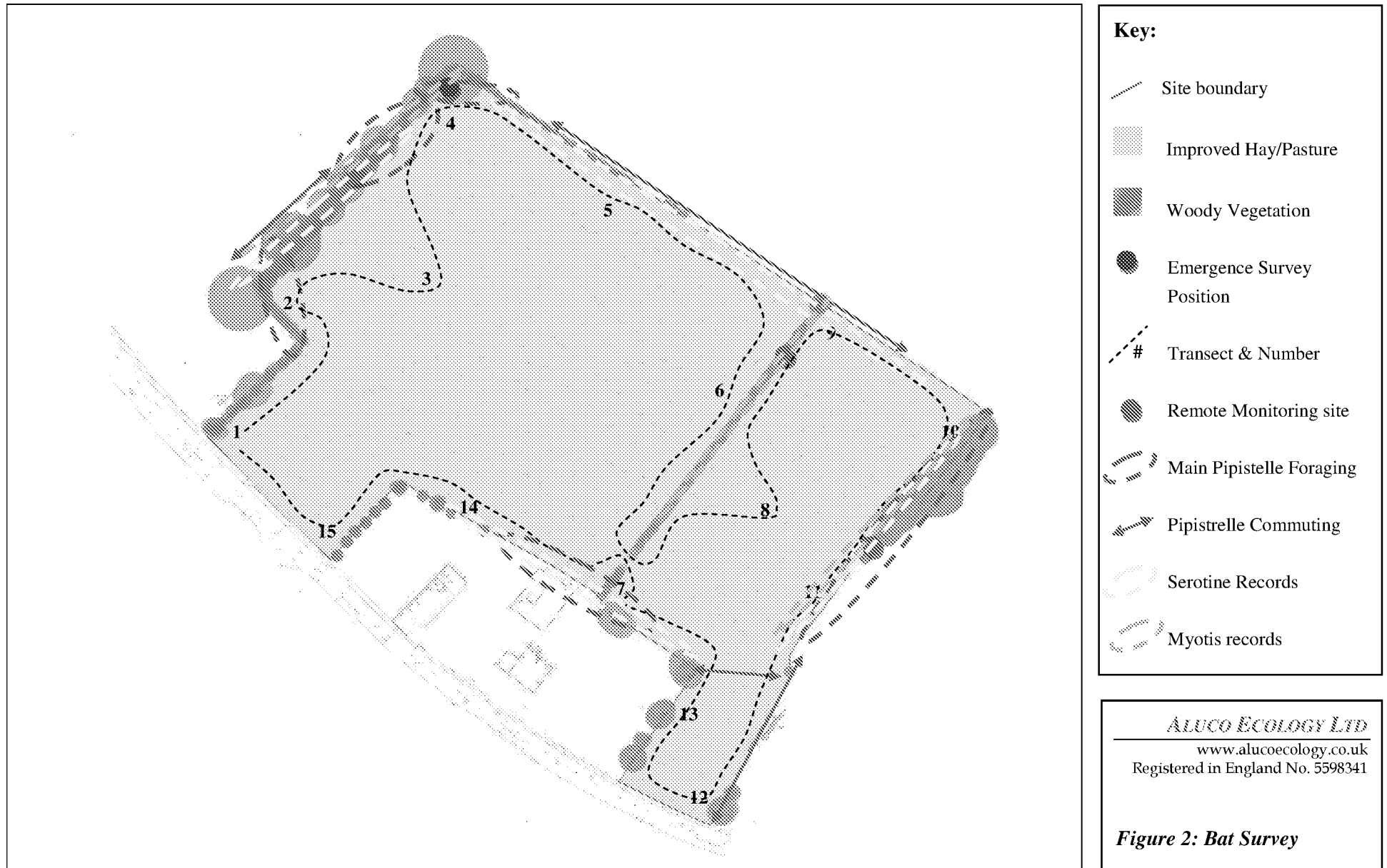
Key: PP = Common Pipistrelle, PS = Soprano Pipistrelle, My = Myotis, MyD = Daubenton's Bat, MyM = Whiskered/Brandts Bat, MyA = Alcaethoe's Bat, ES = Serotine, NN = Noctule, PA = Long-eared Bat

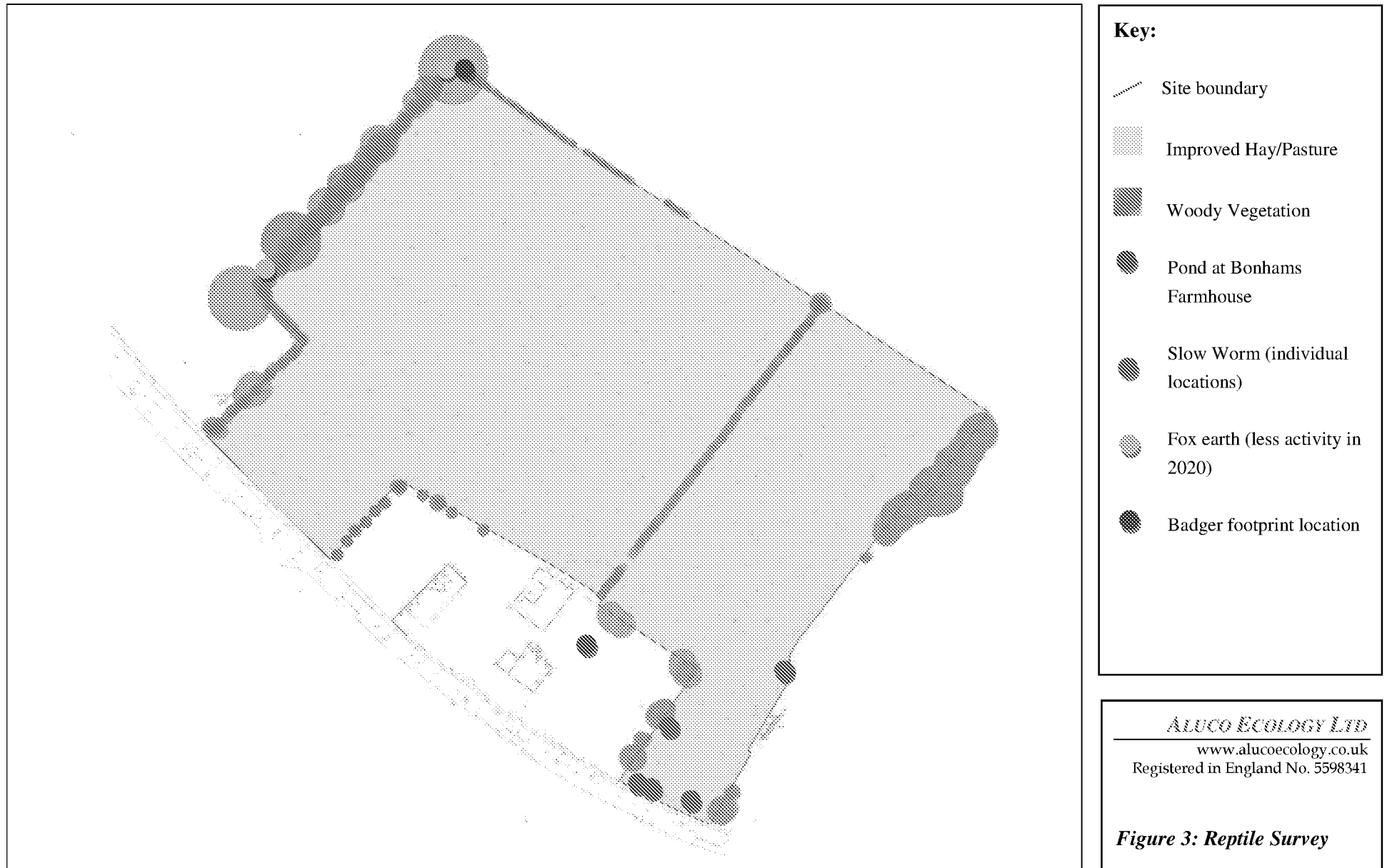
Table 2: Reptile Survey 2020

Date	Time	results
29/07/2020	am	Reptile Set Up
13/08/2020	am	1F
20/08/2020	am	1F
01/09/2020	am	2F, 1M
02/09/2020	pm	2F
04/09/2020	am	1M, 2F, 1sub
07/09/2020	pm	2F
09/09/2020	am	1M, 2F

Survey conditions were timed to be undertaken in suitable weather (with temperature suitable for reptiles using refugia)

Key: AF = Slow Worm, sub = sub adult, F = Female, M = Male





4.0 MITIGATION METHOD STATEMENT FOR HABITATS AND VEGETATION

4.1 Introduction

- 4.1.1 The following principals are set out below to ensure that these retained habitats are protected during construction. There is also a summary of the ecology features that have been built into new public open space habitats that are set out in detail in the landscape plans (see ACD, 2021).

4.2 Potential Risks

- 4.2.1 The construction has the potential to provide the following risks to vegetation and habitats:

- Direct damage to any retained habitats, woody vegetation and hedgerows, through construction activities such as tracking of machines and damage to habitat;
- Direct damage to habitats associated with retained hedges and trees, including rough grassland edges and ditches within hedgerows through construction activities such as tracking of machines and damage to habitat;
- Indirect pollution events on retained habitats through surface water run off pollution, siltation, dust and airborne pollution and littering.

- 4.2.2 The following sections below provide detailed mitigation for ensuring that the vegetation and habitats on site are protected during the construction phase and that risks outlined above are addressed through the process to provide suitable avoidance, reduction and offsetting measures and safe biodiversity protection zones.

4.3 Retained Vegetation – Protection Areas

Hedgerow & Associated Boundary Features

- 4.3.1 The boundary hedgerows and additional grassland edge vegetation are to be retained as part of the scheme. These boundaries will be marked to the edge of the works area and protective fencing to relevant building standards will be erected at the edge of the works/retained habitat areas to ensure that habitats are retained in situ during construction. The grassland edge habitat at the base of these habitats is important to reptiles and will be retained in situ as part of the reptile mitigations strategy, and protected by the site fencing.
- 4.3.2 There should be no storage of materials, or equipment, or use of the retained hedge/boundary on the site by any construction activities.

Indirect Pollution Potential

- 4.3.3 Potential for indirect impacts to retained habitats and adjacent habitats should be avoided through best practice pollution prevention measures in construction. Best practice pollution prevention guidelines to be followed during the construction phase are set out in Government guidelines for best practice (see [Gov.UK](https://www.gov.uk)).

4.4 Construction Area

- 4.4.1 The habitats over the construction area are to be removed according to protected species mitigation statements below. This includes:
- All woody vegetation within the construction zone,
 - Grassland areas within the construction zone;

4.5 Habitat Enhancement and Creation

- 4.5.1 **Figure 1** shows the development masterplan, and detailed landscaping plans for the public open space are reproduced at **Figure 4**.
- 4.5.2 Recommendations are provided to enhance these features for wildlife and are built into the longer term management of the areas following construction. They include:
- Existing boundary hedgerow/tree line habitats are to be retained, with the exception of a widening of the access between the two fields. Where these features are present along the edges of public open space (the south eastern edge of the central hedgerow), and where a management strip is provided at the back of gardens, the management of these habitats in the longer term will allow for a reduced cutting to provide a thick hedgerow resource of value to wildlife, with fruiting allowed during the winter period and late winter rotational management. This will be a reduced cycle of only 50% per year in the late winter;
 - New tree and shrub planting is proposed within the open space areas to provide new habitats. These will comprise a number of native species shrubs and trees (see Landscape plans for details produced by ACD). The management of these will be to allow for maturing then low intensity/sensitive cutting to allow fruiting and habitat to develop for wildlife, in a regime similar to the retained hedges above. Grassland edge habitat around shrubs will be allowed to develop;
 - Tall uncut grassland habitats are proposed as edge habitat to woody/hedgerow creation. This habitat will be allowed to develop from existing edge grassland in retained open space areas, or created from wildflower grassland in open space areas within the construction zone. This will comprise tussocky grassland edges that can be allowed to develop with some limited woody infiltration from

suckering woody species and bramble, to create a grassland edge habitat to the hedges and native species woody areas of scrub/woodland. This will be managed in the longer term through ensuring that tall grassland habitat is retained in extent through cutting of the woody encroachment;

- Semi-natural wildflower grassland is to be seeded in parts of the open space. This should be undertaken in either autumn or spring and a very hard cut with scarification of existing grassland to create bare ground areas to allow seeds to colonise. Adding Yellow Rattle *Rhinanthus minor* into the seed mix will reduce grass vigour. Yellow Rattle must be seeded in the autumn for germination. Management in the longer term will be of a hay cut (1-3 times a year depending upon growth rates – late summer, late autumn and if considered necessary, early spring) with cuttings removed. To keep a neat look at the edge of the development a 1m edge can be regularly mown along outer boundaries (eg road edges);

4.5.3 The detailed management and maintenance schedule will be set out in a Management and Maintenance Plan/Schedule. This will need to have regard to the following recommendations for ecology prescriptions (habitats are shown on **Figure 4**):

(1) Tall (uncut) Grassland Edge Habitat. Management will include annual or every second year cutting of encroaching woody vegetation (eg Bramble) to maintain an area of grasslands that are left uncut to form tussocky grassland edges. This will allow existing rough grassland habitats to develop into more complete habitats around the edges of the site, particularly the scrub habitats proposed.

Target = To retain and enhance tall grassland edge habitat to woody and other features, to provide important suitable habitats for birds, small mammals, foraging bats, reptiles, amphibians and invertebrates.

Upper Limit = Cutting of encroaching scrub either annually or every second year, to ensure a rough grassland edge is retained at the edges of the boundaries/woody habitat. Scrub encroachment (eg Brambles) can feature in this habitat type, but should not be more than 30% of area.

Lower Limit = No cutting of grasslands within designated rough grassland areas.

(2) Hay Meadow Grassland. Once established, hay meadow should be managed through cutting in the late summer/early autumn annually. Cuttings to lay on ground for 1-2 days and then collected. This should be undertaken during dry periods. A second cut can be undertaken in late autumn (Oct). Where grass growth is vigorous a further early spring cut can be taken.

Target = To manage wild flower meadows to allow flowering of herbaceous and grass species, followed by traditional hay cut maintenance to allow seeds to drop and maintain meadow habitat.

Upper Limit = Cutting up to three times annually late summer, late autumn and early spring. Cuttings should lay on ground and then be removed 1-2 days later. Compost can take place on site in compost pile, if suitable discrete location can be located. Scrub

encroachment (eg Brambles) and uncut tall grassland can feature in this habitat type, but should not be more than 10% of area.

Lower Limit = Cutting of grassland once per year in late summer, cuttings to be removed as above.

(3) Woody Vegetation. Retained hedgerow and woody vegetation should be managed to allow flowering and fruiting of shrubs/trees through lower intensity cutting. For new native species planting in open space the establishment of new woody planting should ideally allow for grasses to develop at the base of the planting rather than spraying to create a natural woody habitat with associated grassland edge rather than over managed bare base. Where possible, once established, guards should be removed for natural growth.

Target = To manage all woody habitat on site (retained hedgerows/boundary vegetation, and new native planted) to flower/fruit with cutting to take place outside the bird nesting season and in late winter, with limits of cutting below taken into account..

Upper Limit = Cutting up to 50% of the resource late winter (Jan-Feb) on rotation, so that only half the resource is cut annually. Regard can be had to encroachment into formal areas to ensure that sightlines of roads is taken into account and that hedges do not encroach into private gardens.

Lower Limit = Cut every second late winter (Jan-Feb)

5.0 MITIGATION METHOD STATEMENT FOR NESTING BIRDS

5.1 Introduction

- 5.1.1 All birds and their nests are protected from harm under Section 1 of the Wildlife and Countryside Act 1981 (as amended) (see **Technical Appendix 1**). A strategy is provided below to ensure that the construction of the proposed development does not affect any nesting birds.

5.2 Potential Risks

- 5.2.1 The construction of this phase of the development has the potential to provide the following risks to birds:

- Direct damage to retained trees and hedgerows that may be used as nesting bird habitat through construction activities such as tracking of machines and damage to habitat;
- Damage to habitats associated with retained hedges and trees, including rough grassland edges and ditches within hedgerows through construction activities such as tracking of machines and damage to habitat.

- 5.2.2 The following sections below provide detailed mitigation for ensuring that the nesting birds and habitats on site are protected during the construction phase and that risks outlined above are addressed through the process to provide suitable avoidance, reduction and offsetting measures.

5.3 Mitigation for Nesting Birds

Timing & Vegetation Works

- 5.3.1 All woody habitat not to be retained on site will be removed outside the nesting bird season where possible (which is considered to be early March-August). Vegetation clearance will be undertaken in the following way:

- In areas where reptiles may be present all vegetation will be cleared to just above ground level (c10-15cm) to remove nesting bird habitat but not disturb the ground;
- There is only low potential for ground nesting birds in the grasslands on site, and none have been recorded during survey work. However measures should be undertaken to ensure that vegetation within the works area is not allowed to develop into suitable ground nesting bird habitat in the spring/summer. These should include regular cutting to ground level through this period, or tilling of the ground to ensure it remains bare during the construction process. Pre-construction survey effort of any new works area may be required during the

nesting bird season to check there are no ground nesting birds that may be impacted. Where ground nesting birds are present, a suitable buffer zone will be instated with no access to construction until nesting has been completed by the birds in question;

- Vegetation clearance will be undertaken with supervision from an ecologist if considered necessary or via an agreed method statement;
- It may be possible to sensitively undertake small amounts of vegetation works during the nesting bird season where such vegetation is able to be checked by a suitably qualified ecologist to determine no nesting birds are impacted.

Protection of Retained Habitats & Habitat Creation

5.3.2 Measures outlined Section 4 in relation to retained habitats should ensure that the habitats outside the works area is protected via fencing to ensure that construction activities do not impact on the features.

5.3.3 New habitats (see **Figure 4**) will provide opportunities for bird species in the longer term, with new woody vegetation planting, grassland to be provided in public open space.

Bird Nest Boxes

5.3.4 A total of 8 bird nest boxes and 6 specific swift nesting opportunities will be provided within the scheme and locations are shown at the **Figure 4**. The exact locations to be agreed with the ecologist during construction. The boxes to include a mixture of types and some examples are provided in **Technical Appendix 7**:

- Woodcrete type Blue/Great Tit box
- Swift box or brick;
- Woodcrete type House Martin
- Woodcrete type House Sparrow

6.0 MITIGATION METHOD STATEMENT FOR BATS

6.1 Introduction

- 6.1.1 A number of bat species have been recorded foraging and commuting on site (see Aluco Ecology, 2016). No evidence of roosting bats was noted following detailed survey effort. A re-assessment of potential for roosting bats was undertaken in August 2020. A Pine on the northern boundary has potential bat roost features (see photo in **Technical Appendix 2**). All trees are to be retained and are set away from buildings.

6.2 Potential Risks

- 6.2.1 The construction of this phase of the development has the potential to provide the following risks to bats:

- Potential for indirect impacts on retained habitat used by foraging and commuting bats;
- Potential impacts from lighting on retained trees or off-site buildings with potential roost features, and foraging/commuting routes.

- 6.2.2 The following sections below provide detailed mitigation for ensuring that the bat populations and habitats on site are protected during the construction phase and that risks outlined above are addressed through the process to provide suitable avoidance, reduction and offsetting measures and safe biodiversity protection zones.

6.3 Foraging and Commuting

- 6.3.1 The design of the development allows for retained boundary hedges, garden habitats and open space habitats to develop to provide links through the site.
- 6.3.2 The provision of new woody planting and less intensive maintenance of parts of the open space grasslands will provide additional semi-natural habitats for commuting and foraging in the local area.

6.4 Provision of Bat Boxes

- 6.4.1 A total of 8 bat roosting structures will be erected on site (see **Figure 4**), using Schwegler or inbuilt designs (examples frequently used are provided in **Technical Appendix 7**). Boxes/tiles and bricks should be located on site by an experienced ecologist to ensure that they are placed in suitable locations.

6.5 Lighting

6.5.1 Street lighting has the potential to impact on bat foraging and mitigation guidelines have been developed (see BCT 2018). Design and location of lighting within the new scheme will consider the following:

- Identify key points in the landscape where artificial light at night disrupts spatial connectivity of dark areas, and reduce or remove lighting in these areas if possible. On the site this would include boundaries, particularly the north western boundary Hazel hedge that will need to be retained as a dark corridor. Location of bat boxes/roost features will also need to be in a dark zone;
- Maintain and create unlit ‘dark corridors’ between habitat patches where possible.
- Avoid use of, and remove where possible, lamps that waste light by emitting vertically or horizontally – ensure that lighting is designed with minimum spill and is downward facing and directional and that retained hedges and trees are not lit.
- Reduce as much as possible the intensities of light emitted from lamps
- Avoid use of white and blue light wherever possible. The broader the spectrum of light that a lamp produces, the wider the range of organisms it is likely to affect.
- Avoid use of lamps that emit in the ultraviolet (UV) range. UV light is not seen by humans but many animals see UV and it may disrupt their natural behaviour.

6.5.2 A detailed lighting strategy is to be prepared. This will consider the location of main bat commuting and foraging habitat around the scheme, i.e. principally around the woody boundaries of the site. The aim has been to reduce and preventing light spill into these habitats. Regard will also be had to the location of Bat box mitigation and lighting.

7.0 MITIGATION METHOD STATEMENTS FOR OTHER MAMMALS

7.1 Introduction

- 7.1.1 Survey work in 2020 has recorded likely occasional use of the site by Badger, with a single footprint noted on a mammal track on the boundary of the site. No active Badger Setts have been recorded, and an update walkover survey was undertaken in June 2021. Other mammals including Fox and Hedgehog are present in the zone of influence.

7.2 Potential Risks

- 7.2.1 The construction of this phase of the development has the potential to provide the following risks to terrestrial mammals:

- Direct damage to retained habitats that may be used by mammals;
- Damage to habitats associated with retained woody vegetation, including rough grassland edges and ditches within hedgerows through construction activities such as tracking of machines and damage to habitat;
- Potential Indirect Impacts through disturbance, and pollution events.

- 7.2.2 The following sections below provide mitigation for ensuring that the habitats of protected mammal species on site are protected during the construction phase and that risks outlined above are addressed through the process to provide suitable avoidance, reduction and offsetting measures and safe biodiversity protection zones.

7.3 Badgers

Ongoing Site Monitoring

- 7.3.1 Monitoring of all habitats on site will continue during pre-construction ecology site work. Ongoing monitoring during the pre-construction and construction period will ensure that any changes in the activities of Badgers on site are taken into account during construction, and the mitigation strategy for the site updated as necessary.

Minimising secondary impacts to Badgers

- 7.3.2 It is expected that Badgers may travel through the site during construction and therefore the following measures should be implemented to reduce the risk of secondary impacts to badgers:
- trenches in excess of one metre in depth should be covered or secured and a means of escape provided for any animal that does fall in (a suitable escape can be provided by wooden planks placed at a 45 degree angle);
 - any temporarily exposed open pipe system should be capped in such a way as to prevent Badgers gaining access;

- chemicals and fuels should be stored carefully and as far away from setts and badger paths as possible, and in accordance with the Code of Construction Practice; and
- any security lighting (if required) should be directed away from any sett protection zones.

7.3.3 To facilitate these measures, contractors and subcontractors should be made aware of the location of any setts and protection zones as part of environmental site induction courses. They should also be informed of the protection afforded to badgers under the Protection of Badgers Act 1992 and the need for confidentiality of the sett locations.

7.4 Foxes

7.4.1 Foxes are present in the local area. Where active Fox Earths are located within the construction zone or within 20m of it then the following guidelines will apply:

- Potential Fox Earths will be checked regularly for signs of use;
- Holes will be part, then fully soft blocked and monitored for a period of up to two weeks;
- Where monitoring and discouragement of use is applied successfully and no evidence of further use is made, the holes will be destructively searched;
- Where there is continued use of holes, the installation of one way gates will be necessary with a further period of monitoring;
- Exclusion of Foxes from holes will only take place outside the breeding period (ie closure can occur during June – Jan depending upon local circumstances).

7.5 Hedgehog

7.5.1 Hedgehog *Erinaceus europaeus* are recorded in the wider local area and may use the site. Any pre-construction vegetation clearance where Hedgehogs may be present should have regard to their potential presence and be carried out sensitively. This can be combined with reptile mitigation work set out in Section 8 below.

7.5.2 During site construction all fences to new gardens should allow gaps or provide ‘hedgehog highways’ to allow continued access through the site. The gap in the fencing should be as a minimum 13cm x 13cm. Some suppliers already provide fencing with ‘hedgehog highway’ gaps pre-built in.

8.0 MITIGATION METHOD STATEMENT: REPTILES & AMPHIBIANS

8.1 Introduction

8.1.1 All reptiles are protected under the Wildlife & Countryside Act 1981 (as amended) (see **Technical Appendix 1**). The following strategy has been devised in order to follow best practice guidance (HGBI, 1998, Froglife, 1999).

8.1.2 Survey work has recorded a relatively low population of Slow Worm on site, primarily around the southern boundary of the two fields, but with field boundaries containing small amounts of suitable edge habitat for reptiles. The 2020 update survey recorded Slow Worms in the southern end of the eastern field. No amphibians were recorded on the survey, and old records of Great Crested Newt in the wider local area could not be re-found during survey effort (eg see Aluco Ecology, 2016). A single formal ornamental Carp pond is present off site to the south that is considered unsuitable for breeding Great Crested Newt. This feature was still present and used to the same purpose during 2020 survey work.

8.2 Potential Risks

8.2.1 The construction of this phase of the development has the potential to provide the following risks to reptiles & amphibians:

- Direct damage to reptiles through construction activities such as tracking of machines and damage to habitat;
- Damage to habitats associated with retained hedges and trees, including rough grassland edges and ditches within hedgerows through construction activities such as tracking of machines and damage to habitat;
- Potential Indirect Impacts on retained habitats.

8.2.2 The following sections below provide detailed mitigation for ensuring that reptiles & amphibians on site are protected during the construction phase and that risks outlined above are addressed through the process to provide suitable avoidance, reduction and offsetting measures and safe biodiversity protection zones.

8.3 Mitigation Strategy

8.3.1 A local translocation strategy is required to ensure that the development does not harm reptiles/amphibians. The following strategy was set out as part of the Outline Planning Permission, and is developed in detail here to ensure that reptiles are protected in the long term.

- The main aim is to retain reptile populations within the local area, and within retained habitat on the site, including public open space area;
- In the short term this will require a local translocation of reptiles from the construction area to retained areas;
- Retained areas will be enhanced through provision of new reptile habitat in long term management of open space habitats;
- The public open space is show on landscape plans, reproduced as **Figure 4**;
- Prior to construction commencing, phases of the construction zone will be subject to translocation and a destructive search to the methods set out below and in **Technical Appendix 8**, to ensure that reptiles are not harmed;
- In undertaking this, amphibians present within the works area will also be encountered and translocated in a similar manor.

8.4 Translocation Methodology

8.4.1 The construction zone is highlighted in **Figure 5** below. The translocation will be undertaken according to the following strategy:

- The existing hay meadow area should be cut short regularly to ensure that the construction zone is retained as short grassland;
- The areas of edge habitat within the construction zone of the site will be sensitively strimmed to c10cm using hand tools, careful not to harm reptiles potentially present; Where trees and bushes are also to be removed, due regard will be given to the mitigation strategy for nesting birds and other mammals;
- At present it is assumed that with appropriate timing and management of construction zones to ensure reptile habitats are removed and do not re-develop, reptile protective fencing is not considered to be effective/needed along retained boundary areas. This can however be reviewed during construction;
- Refugia will be placed along the construction works area and a translocation will be made based on the methodology outlined in **Technical Appendix 8**;
- Reptiles and any amphibians will be translocated to the retained habitat in public open space away from the construction zone (see **Figure 5**);
- Following 3-5 negative visits in suitable conditions a destructive search will be undertaken of the works area by a suitably qualified ecologist;
- Where necessary site Heras/reptile fencing will continue to provide protection of the retained habitat around the edge of the development area, from construction intrusion;
- Long term management proposals of all retained habitat are provided in a management plan (ACD, 2020);
- The reptile strategy will be undertaken outside of the hibernation period and during late March/April-October, depending upon weather conditions and other factors. Where potential reptile habitat is contained within the works area

outside this period, no construction works will be undertaken in this habitat during this period.

- The reptile strategy will be detailed to conform to any mitigation requirements for other protected species.

8.4.2 In the unlikely event Great Crested Newt are recorded during mitigation work on site, the site ecologist will need to consult with Natural England, and construction work will only be allowed to (re)commence when an agreed updated strategy (and potential for European Protected Species Licence) is put in place.

8.5 Retained & Created Habitats – Public Open Space

8.5.1 New habitats comprising extended areas of tall uncut grassland edge will be allowed to develop from existing grasslands in the public open space part of the site, which is where the existing population of Slow Worm were recorded. The habitats to be created and managed within the public open space will be subject to a management & maintenance plan and detailed landscape planting plans (with ecology management recommendations set out in Section 4 above). These are set out in conjunction with the Landscape Plans (ACD, 2021). A summary of the landscape plan is provided at **Figure 4**.

8.5.2 Ecological mitigation has been built into the landscaping, in order to provide native retained hedgerows and boundaries, new native species woody planting, and a series of grasslands from tall grassland edge habitat that will be of suitability to reptiles and amphibians, and hay meadows sown with wildflower mixes to provide another habitat type.

8.5.3 Management prescriptions for reptile edge tall grassland and other habitats is designed to ensure that ongoing management of public open space has regard to reptiles present within the site.

9.0 INVERTEBRATE MITIGATION

9.1 Introduction

9.1.1 No legally protected invertebrates have been recorded during the survey work for the scheme. Opportunities exist to create new habitats in public open space for invertebrates and habitat creation and management measures for the open space include prescriptions that will provide habitats for invertebrate populations to develop and colonise on site.

9.2 Habitat Creation

- 9.2.1 Features to be built into the new habitats to be created on site include the provision of new grassland, woody/shrub edge habitat in public open space will allow micro habitats to develop that will be of value to invertebrates, and provide nectar sources from wild flower grasslands. There should be reduced use of herbicides and pesticides in semi-natural open space habitats will allow further colonisation.

10.0 SUMMARY

- 10.1 Update survey work, evaluation and assessment in 2020 & 2021 has been undertaken to accompany an updated site Application for an increase in units from 56 to 63. The assessment has shown broadly similar ecological features and impacts as previous survey work, with no significant changes to the ecological baseline. Therefore, a detailed ecology mitigation strategy has been devised and amended where necessary to ensure that biodiversity features are protected during construction of the approved scheme and that there are long term measures to maintain and enhance biodiversity in a built scheme and during operation. A timetable of works is provided at **Table 1** below.





SUMMARY TIMETABLE

A timetable showing main construction mitigation work periods for ecology during a year is provided below at **Table 3** (but see method statements for detail).

Table 3: Summary of Anticipated Protected Species Mitigation Timescales During Construction

2021 =	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
Vegetation																					
Protect retained vegetation with fencing																					
Planting of new habitats in POS																					
Nesting Birds																					
Principal Cutting of woody vegetation period																					
Vegetation manipulation of potential ground nesting bird habitat																					
Erect Bird Boxes – when relevant property is built																					
Bat Mitigation																					
Erect Bat Boxes – when relevant property is built																					
Badgers & Foxes																					
Ongoing site monitoring for Badger Fox																					
Fox earth exclusion measures																					
Reptiles																					
Grass cutting/manipulation																					
Monitor reptiles																					
Translocation																					
Destructive Search																					

10.0 REFERENCES

ACD (2021) Landscape Plan SEA20727 09C

Aluco Ecology (2016) Land at Bonhams, Yapton, Ecological Assessment

Aluco Ecology (2019) Land at Bonhams, Yapton, Ecology Mitigation Strategy

BCT (2016) Bat Survey Guidelines 3rd Edition

BCT & ILP (2018) Guidance Note 08/18 Bats and Artificial Lighting in the UK, Bats and the Built Environment Series

Edgar, P., Foster, J. and Baker, J. (2010) Reptile Habitat Management Handbook. Amphibian and Reptile Conservation, Bournemouth

Froglife, 1999. Froglife Advice Sheet 10. Reptile Survey. An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife, Halesworth, Suffolk.

Gov.UK (2019) Standing Advice for Protected Species and Habitats

Herpetofauna Groups of the British Isles (HGBI) Guidelines (1998) “Evaluating Local Mitigation/Translocation Programmes: Maintaining Best Practice and Lawful Standards.” HGBI Advisory notes for Amphibian and Reptile Groups (ARGs). HGBI, c/o Froglife, Halesworth, personal collection.

Technical Appendix 1
Wildlife & Countryside Act
Habitats Regulations and Schedule 2 Species
Natural Environment & Rural Communities Act 2006

WILDLIFE & COUNTRYSIDE ACT 1981 (AS AMENDED)

The Wildlife and Countryside Act 1981 (as amended) (WCA) is the principle legislation in Britain for the protection and conservation of our wildlife and its habitats of national importance. The legislation adopts a habitat and species based approach to nature conservation. Habitats and some species are protected in designated Sites of Special Scientific Interest (SSSI). Other species are afforded some protection from harm or disturbance by way of inclusion in either Section 1 (birds), Schedule 1 (specially protected birds), Schedule 5 (specially protected animals) or Schedule 8 (specially protected plants).

Protection Afforded to SSSIs

The presence of an SSSI on or near to a development is a material consideration, and this is discussed further in planning policy (see National Planning Policy Framework)

Law Relating to Protected Species

The WCA provides protection to such species in Part 1 of the Act. These sections provide protection from intentionally:

- killing, injuring or taking any wild bird or taking, damaging or destroying the nest or eggs of a wild bird
- disturbing any wild bird in Schedule 1 whilst building, on or near a nest, or disturbing dependant young of such birds
- damaging, destroying or obstructing access to any structure or place of shelter or protection of a schedule 5 animal, or disturbs any such animal whilst it is occupying a structure or place it uses for that purpose
- killing, injuring or taking any animal listed in Schedule 5
- Having in procession or control any live or dead wild bird or egg, or any wild animal in Schedule 5, or trading in any animal under Schedule 5.
- Damage to plants listed in Schedule 8 or uprooting of wild plants unless an authorised person.

Exemption and licences for development can be obtained in certain circumstances. Protected species are also a material consideration in planning applications.

Disturbance & Recklessness

The Countryside and Rights of Way Act 2000 (CRoW Act 2000) adds to protected species legislation in the WCA. The lesser test of ‘Recklessness’ is added to the protection from disturbance in three circumstances. These are:

- disturbance to Schedule 1 birds and their nests, eggs and dependant young,
- disturbance to Schedule 5 animals in their place of shelter/protection, and
- disturbance to the places of shelter/protection of Schedule 5 animals.

This addition means that any person who deliberately takes an unacceptable risk or fails to notice an obvious risk is falls under the Section irrespective of intention. The CRoW Act also provides greater protection to SSSIs from operations (and non operations) of owners, occupiers and third party users of the SSSI.

For further information see: <https://www.legislation.gov.uk/ukpga/1981/69>

HABITAT REGULATIONS 2017***General***

The Conservation of Habitats and Species Regulations 2017 (‘The Habitat Regulations’) consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive), into national law. They also transpose elements of the EU Wild Birds Directive in England and Wales. The Regulations provide for the designation and protection of ‘European sites’, the protection of ‘European protected species’, and the adaptation of planning and other controls for the protection of European Sites.

European Protected Species

Species listed under Annex II of the Habitats Directive were formally afforded protection by the Habitat Regulations. European protected species include the great crested newt, dormice and all species of bats. The provision relating to wild animal offences is reproduced below:

Protection of certain wild animals: offences

43.—(1) A person who—

- (a) deliberately captures, injures or kills any wild animal of a European protected species,
 - (b) deliberately disturbs wild animals of any such species,
 - (c) deliberately takes or destroys the eggs of such an animal, or
 - (d) damages or destroys a breeding site or resting place of such an animal,
- is guilty of an offence.

(2) For the purposes of paragraph (1)(b), disturbance of animals includes in particular any disturbance which is likely—

- (a) to impair their ability—

- (i) to survive, to breed or reproduce, or to rear or nurture their young; or
- (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate;
- or
- (b) to affect significantly the local distribution or abundance of the species to which they belong.
- (3) It is an offence for any person—
 - (a) to be in possession of, or to control,
 - (b) to transport,
 - (c) to sell or exchange, or
 - (d) to offer for sale or exchange,anything to which this paragraph applies.
- (4) Paragraph (3) applies to—
 - (a) any live or dead animal or part of an animal—
 - (i) which has been taken from the wild, and
 - (ii) which is of a species or subspecies listed in Annex IV(a) to the Habitats Directive;
 - and
 - (b) anything derived from such an animal or any part of such an animal.
- (5) Paragraphs (1) and (3) apply regardless of the stage of the life of the animal in question.
- (6) Unless the contrary is shown, in any proceedings for an offence under paragraph (1) the animal in question is presumed to have been a wild animal.
- (7) In any proceedings for an offence under paragraph (3), where it is alleged that an animal or a part of an animal was taken from the wild, it is presumed, unless the contrary is shown, that that animal or part of an animal was taken from the wild.
- (8) A person guilty of an offence under this regulation is liable on summary conviction to imprisonment for a term not exceeding six months or to a fine, or to both.
- (9) Guidance as to the application of the offences in paragraph (1)(b) or (d) in relation to particular species of animals or particular activities may be published by—
 - (a) the appropriate authority; or
 - (b) the appropriate nature conservation body, with the approval of the appropriate authority.
- (10) In proceedings for an offence under paragraph (1)(b) or (d), a court must take into account any relevant guidance published under paragraph (9).
- (11) In deciding upon the sentence for a person convicted of an offence under paragraph (1)(d), the court must in particular have regard to whether that person could reasonably have avoided the damage to or destruction of the breeding site or resting place concerned.

Section 44 provides certain defences to the above.

The granting of a licence under Part 5 Section 55 of the Habitat Regulations

In order to carry out a lawful operation (e.g. development work which has full planning permission) that may result in any of the offences above, it is necessary to obtain a licence from Natural England to allow the operation to proceed.

However, in accordance with the requirements of the Habitats Regulations, a licence can only be issued after the following conditions have been satisfied:

- *that there is no satisfactory alternative, and*

- *that the action authorized will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.*
- *that the action is required in preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment;*

Full planning permission is required to apply for a Natural England licence (where such a consent is necessary for the work to be carried out). In addition, a method statement which details the survey results, methodology of work to be undertaken, mitigation and compensation measures, must be submitted to Natural England with the licence application.

Plans and Projects & Designated Sites

The Regulations provide procedure whereby designated SAC or SPA and other European Protected Sites are afforded protection from plans and projects that may be likely to have a significant effect on the Features for which these sites are designated. Where a significant effect is considered likely in combination with other projects an appropriate assessment is required to be undertaken. Details of this procedure can be found at Part 6 of the Act onwards, see link below.

For Full details of the 2017 Habitat Regulations see:

http://www.legislation.gov.uk/ukxi/2017/1012/pdfs/ukxi_20171012_en.pdf

NATURAL ENVIRONMENT AND RURAL COMMUNITIES ACT 2006

This Act places a specific duty to conserve biodiversity on all public bodies, including Local Planning Authorities. In order to aid with this process Section 41 of the Act requires the Secretary of State to publish lists of living organisms and habitats which are of principal importance for the purpose of conserving biodiversity. These are the national Biodiversity Action Plan (BAP) lists, and BAP projects are also undertaken at a County, Borough or District level.

For further information see: <https://www.legislation.gov.uk/ukpga/2006/16/part/3>

Arun District Council Biodiversity Planning Policies: Local Plan 2018**Policy ENV SP1****Natural Environment**

Arun District Council will encourage and promote the preservation, restoration and enhancement of biodiversity and the natural environment through the development process and particularly through policies for the protection of both designated and non-designated sites. Where possible it shall also promote the creation of new areas for habitats and species. In relation to designated sites, development will be permitted where it protects sites listed in Tables 17.1-17.7 that are recognised for the species and habitats contained within them.

Policy ENV DM1**Designated Sites of biodiversity or geological importance**

- a. Proposed development likely to have an adverse effect on land with the designated features of any Site of Biodiversity or Geological Importance as listed in Tables 17.1 - 17.7 or any subsequently designated sites (either individually or in combination with other developments), will not normally be permitted. Consideration will be given to the exact designated features present on the site, their scarcity/rarity and recognition of the protection offered by their existing status. Development on wildlife sites with the highest value will only be permitted exceptionally where the following can be demonstrated:
 - i. There is no alternative solution (which shall be adequately demonstrated by the developer).
 - ii. There are reasons of public health or public safety or

- iii. There are benefits of primary importance to the environment or
- iv. There are imperative reasons of overriding public interest.

Notwithstanding the above however, 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.

- b. In determining any planning application affecting Sites of Biodiversity or Geological Importance the Council will ensure that the intrinsic natural features of particular interest are safeguarded or enhanced having regard to;
 - i. The European, National or Local status and designation of the site;
 - ii. The nature and quality of the site's features, including its rarity value;
 - iii. The extent of any adverse impacts on the notified features of interest;
 - iv. The need for compensatory measures in order to re-create remaining features of habitats on or off the site.
- c. Where appropriate the Council will ensure the effective management of designated sites through the imposition of planning conditions or Section 106 agreements as appropriate.

Policy ENV DM2

Pagham Harbour

- a. Within Zone A (0-400m from the boundary) as identified on the Policies Maps, development will only be permitted in exceptional circumstances where the developer is able to demonstrate there will be no detrimental effects on Pagham Harbour, including non-native species and the water environment. Regard shall also be had to tests 1-4 as set out in Policy DM1 (Designated Sites of Biodiversity or Geological Importance).
- b. Within Zone B (0-5km) for all new residential development and development which is likely to have an impact on Pagham Harbour will be required to:
 - i. Make developer contributions towards the agreed strategic approach to access management at Pagham Harbour.
 - ii. create easily accessible new green spaces for recreation within or adjacent to the development site: These shall be capable of accommodating the predicted increases in demand for local walking, including dog walking. Good pedestrian links shall be provided between housing areas and new and existing green space in order to discourage car use.
- c. Major developments (as defined in the GDPO 1995 as amended⁽⁶¹⁾) taking place outside Zone B and close to its boundary will be considered on a case by case basis to determine any potential effects on Pagham Harbour, and the need for any avoidance or mitigation measures.

Policy ENV DM3**Biodiversity Opportunity Areas**

Development shall:

- a. Retain and sympathetically incorporate locally valued and important habitats, including wildlife corridors and stepping stones
- b. Be designed in order to minimise disturbance to habitats

Development proposals that do not reasonably address opportunities for enhancing these through their design, layout and landscaping or access/management shall not be permitted. Where a development scheme would result in a habitat loss, mitigation measures will be proposed as part of the proposed scheme and such measures agreed with the Local Planning Authority prior to the determination of any planning application. Within Biodiversity Opportunity Areas (BOAs) identified on the Policies Maps or where likely to have an impact on species or habitats within the BOAs, any application for planning permission shall include a properly conducted survey of the presence of that species and habitat and impact(s) that development may have on the BOA.

Policy ENV DM4**Protection of trees**

Development will be permitted where it can be demonstrated that trees protected by a Tree Preservation Order(s), (TPO) identified as Ancient Woodland, in a Conservation Area or contributing to local amenity, will not be damaged or destroyed now and as they reach maturity, unless development:

- a. Would result in the removal of one or more trees in the interests of good arboricultural practice. This shall be demonstrated by the developer following the advice of a suitably qualified person which shall be guided by BS 5837 (2012). Details of any advice received having regard to BS 5837 (2012) shall be submitted, in writing, as part of a planning application; or
- b. Would enhance the survival and growth prospects of other protected trees;
- c. The benefits of the proposed development in a particular location outweigh the loss of trees or woodland, especially ancient woodland.

Where planning permission is granted in any of the above instances, conditions shall be used to ensure that, for any trees which are removed as part of a development, at least an equivalent number of a similar species and age (where practical) are planted on the proposed development site. Sufficient space for replacement trees to mature without causing future nuisance or damage shall be provided. The planting of new trees shall form an integral part of the design of any development scheme.

Proper provision must be made for the protection and management of trees or areas of woodland on-site when undertaking development. A management plan shall be provided as part of a planning application in accordance with BS 5837 (2012) in order to ensure that trees are adequately protected during development and appropriately maintained in the future. Conditions for the continued protection of trees on sites shall be included in any planning permission given.

Where there are existing trees on or adjacent to a development site, developers shall be required to provide:

- d. Land and tree surveys
- e. A tree constraints plan
- f. An arboricultural impact assessment to include a tree protection plan and arboricultural method statement

These will ensure that development is planned to take a comprehensive view of tree issues at an early stage in the design process and that development works do not have a negative impact on existing trees.

Policy ENV DM5

Development and biodiversity

Development schemes shall, in the first instance, seek to achieve a net gain in biodiversity and protect existing habitats on site. They shall also however incorporate elements of biodiversity including green walls, roofs, bat and bird boxes as well as landscape features minimising adverse impacts on existing habitats (whether designated or not). Development schemes shall also be appropriately designed to facilitate the emergence of new habitats through the creation of links between habitat areas and open spaces. Together, these provide a network of green spaces which serve to reconnect isolated sites and facilitate species movement.

Where there is evidence of a protected species on a proposed development site, planning applications shall include a detailed survey of the subject species, with details of measures to be incorporated into the development scheme to avoid loss of the species. This involves consideration of any impacts that will affect the species directly or indirectly, whether within the application site or in an area outside of the site, which may be indirectly affected by the proposals. All surveys shall be carried out at an appropriate time of year and shall be undertaken by a qualified and, where appropriate, suitably licensed person.

All developments shall have regard to Natural England's standing advice for protected species.

Technical Appendix 2

Update Survey Photos 2020

The annotated photos below are based on an update site visits in August – September 2020 and June 2021.



South western boundary with road and grassland habitats as per previous survey (August 2020)



Frontage of Site following Reptile construction mitigation works (September 2020) and new access construction (photo, June 2021)



Main extent of grassland on site (NW field) (August 2020)



Main extent of grassland on site (NW field) prior to usual hay cut in July, sheep grazing by tenant farmer has taken in this field in 2021 (June 2021)



North east boundary hedgerow – species poor thorn hedge regularly maintained (August 2020)



North west boundary hedgerow – showing buffer with protective fencing (June 2021)



Central Hedgerow –species poor thorn hedge, regularly maintained (August 2020)



South east boundary with dwellings (August 2020)



South west boundary adjacent to walled property (small amount of reptile habitat against wall) (Aug 2020)



Protective Fencing set back to retain edge habitat (June 2021)



Off site Pine Tree in Northern corner of site (this is on site boundary to be retained and contains potential bat roost features but no evidence of bat roosts from emergence work to date)



Tree protective fencing (June 2021)

Technical Appendix 3

Ecological Appraisal Method

Introduction

The methodology for this appraisal is based on the Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom published by the Chartered Institute of Ecology and Environmental Management (IEEM June 2006, CIEEM 2016). Regardless of whether a statutory Environmental Impact Assessment is required, these guidelines provide a robust framework for ecological assessment at any scale.

Desk Study

The first stage of the appraisal is a desk study of the proposed development site and associated Zone of Influence. This provides background information on the site and local environment so as to more effectively target field survey and further desk research.

The Multi Agency Geographical Information for the Countryside (MAGIC) database is searched for information regarding nationally or internationally designated sites within proximity of the development site.

The National Biodiversity Network (NBN) data base is searched to provide background information on local protected species records. The NBN provides access to a substantial volume of biodiversity data for the UK. Although rarely site specific, it does provide valuable background information on the local occurrence of protected species.

Where appropriate, the local environmental/biological records centre is consulted to provide information regarding locally identified sites and records of protected and/or notable species within the zone of influence of the proposed development.

Site Survey Methodology

The aims of the survey are to record land-use and broad vegetation types present on the site and in the surrounding areas, and to evaluate the habitats and vegetation communities ecological value along with the potential to support protected species, species of principal importance, and any other notable species.

Where relevant, habitat immediately adjacent to the site is also assessed as this can have a bearing on the possible presence of protected species on the site and the ecology of adjacent areas can be affected by development nearby.

Habitats and Vegetation

Habitats and vegetation communities are recorded on a broad scale by visually noting contrasting land uses, vegetation zones and landscape features, such as hedgerows and trees. Dominant plant species are recorded in each of the areas identified, as are any notable plant species, such as protected species and habitats or notifiable weeds.

Protected Species

Many plant and animal species are legally protected in the UK. Some, such as bats, badger, water vole and great crested-newt are commonly encountered on development sites.

Case law has established (Regina vs. The Cornwall County Council ex parte Hardy 2001) that “It is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted.

For the most regularly encountered protected species, a brief summary of methods follows:

Bats

Bats use buildings and trees for roosting and breeding, and so the potential for any of these features on site to support bats was considered, as was the sites potential for providing bat foraging habitat. An Appraisal survey will consider potential features that could support a Bat roost, and this may include external inspections of the trees and buildings on site. The Appraisal survey will also consider bat habitats in relation to foraging and commuting potential, with semi-natural vegetation features considered and evaluated.

Where an inspection is undertaken this will look for the presence of bats as well as signs of their presence such as Bat droppings, e.g. within cavities and buildings; Staining at potential roost access points; Lack of bat evidence cannot be taken to mean the lack of use by bats because of a number of potential limitations:

- Signs of bats can be easily washed off by wind or rain;
- Droppings are hard to see where rubble and other floor debris may obscure them;
- Low numbers of droppings can easily be missed especially where they may become damp and deteriorate;
- Evidence of bats may not be apparent where bats roost out of view, such as in tree cavities etc.

Badgers

An initial inspection is undertaken during the Appraisal survey for evidence of the presence of Badgers *Meles meles*, in particular Badger setts, on or near to the site. The Appraisal will search for presence of Badger foraging activity and territorial behaviour. Such signs include foraging trails, foraging scrapes in short grass, which are commonly known as 'snuffle holes' (shallow scrapes in soft ground or even turf rolling created by foraging for ground-dwelling invertebrates such as worms and grubs), footprints, hairs caught under fences, sett entrances, and latrine sites.

Dormice

The Appraisal survey will consider the potential for presence of Dormouse on or near the site, principally through habitat suitability, combined with data on occurrence within the area from the data search. Where suitable habitat occurs, further survey for feeding signs on hazel nuts where Hazel occurs, and searches for arboreal nests. If a site is considered suitable, further Phase 2 survey work may be required.

Other Mammals

Consideration is also given in an Appraisal survey to the potential for habitats to support other legally protected mammals, and those of nature conservation significance. Where waterbodies and watercourses occur on or near to the site, the potential presence of species including Water Vole *Arvicola amphibious* and Otter *Lutra lutra* are considered. Depending upon the geographic location consideration is also given to species such as Red Squirrel.

Breeding Birds

Any notable bird species seen during the Appraisal survey are recorded. The type and quality of breeding, foraging and roosting habitats available for birds is also considered and interpreted with particular reference to protected or notable bird species, and birds of conservation concern.

Consideration is given to any features which could support nesting birds, including buildings and other structures, and areas of vegetation that may be affected by a development.

Reptiles

Any areas of habitat considered suitable for supporting reptiles are noted (for example, areas of rough grassland and scrub, banks, burrows, and rubble piles, compost heaps). If a site is considered suitable, further Phase 2 survey is usually required if an impact from the development or project is considered likely.

Great Crested Newt

An Appraisal Survey considers habitat suitability, through the occurrence of suitable ponds and/or terrestrial habitat, and this will be combined with knowledge on their distribution from biological records for the area. If a site is considered suitable, further Phase 2 survey is usually required if an impact from the development or project is considered likely.

Invertebrates

A very small proportion of invertebrates are afforded legal protection under the Wildlife and Countryside Act 1981 (as amended), although a relatively high number of invertebrates are included within the UK and local BAPs, and many more species are identified as being Nationally Scarce. Most invertebrates require specialist knowledge in order to identify them, although some groups, including butterflies and dragonflies, can be readily identified by generalists. Therefore, apart from recording any species of these readily identifiable groups, an Appraisal Survey concentrates on recording the presence of any key habitats of nature conservation importance considered suitable for supporting more scarce and restricted invertebrates, for example bare ground, dead wood and botanically rich habitats.

Survey Constraints and Limitations

An Appraisal survey is carried out during a brief window of time. Therefore the survey can only provide a snapshot of the range of plants and animals that might be present. However, professional judgement is used to interpret the habitat features recorded, and their likely value for supporting protected and notable species, including species of principal importance. Survey was restricted through land access as it is unusual to have a landowner owning land surrounding that which is being surveyed.

Assessment Guidelines

Introduction

The IEEM guidelines (2006) and updated in 2016 (CIEEM, 2016) provide three principal reasons for an ecological feature being valued and therefore included: biodiversity value, social/community value, and economic value.

The evaluation and assessment undertaken assigns one of a number of value labels based on a geographic scale as follows:

- International
- National
- Regional
- County
- District
- Local (Parish)
- Within the zone of influence

Value is determined with reference to the following factors:

- level of designation (sites) or biodiversity-based protection (legal and policy);
- biodiversity value (e.g. inclusion in Biodiversity Action Plans, rarity, position in ecosystem, assemblages and communities, size and diversity);
- social and economic value;
- legal issues (eg protected sites).

All impacts of the scheme on features of local importance or greater are assessed in the impact assessment stage

Assessment of Likely Impacts

The ecological impact assessment methodology used is based on the following considerations.

Characterisation of Likely Impacts

The potential impacts identified as a result of the proposals are characterised according to the following parameters:

- Positive or negative
- Magnitude (and extent if not synonymous)
- Duration
- Reversibility
- Timing and frequency

Significance of Impact

A significant impact on a valued ecological feature (whether negative or positive) is defined in CIEEM's guidelines as an impact on the integrity of a defined site or ecosystem, and/or the

conservation status of habitats or species within a given geographical area. These terms are defined below.

Integrity

Integrity is defined as follows. ‘*The integrity of a site is the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.*’ A site or ecosystem that achieves this is considered to be at favourable conservation status.

Conservation Status

For habitats, conservation status is determined by the sum of the influences acting on the habitat and its typical species, which may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area.

For species, conservation status is determined by the sum of the influences acting on the species, which may affect the long-term distribution and abundance of its populations within a given geographical area.

Impact Prediction

For guidance as to whether an impact is likely to result in an adverse effect on the integrity or conservation status of a feature, reference has been made to the conservation objectives for that feature where they are available, for example in habitat and species action plans. Otherwise professional judgement has been made based on available information.

The confidence in the prediction that an activity will give rise to a significant adverse impact on a valued ecological feature is given based on a four point scale:

- Certain (or near-certain);
- Probable;
- Unlikely; and
- Extremely unlikely

Drawing Assessment Together

The above factors – value, integrity and conservations status of the feature, prediction and characterisation of the impact and overall significance of the impact is brought together in the final assessment. This is done without additional mitigation measures that may be proposed. An impact is then summarised as significant or not.

Mitigation, Compensation and Enhancement

Where impacts are characterised as significant mitigation or compensation may be offered to prevent, reduce or offset such impacts. In addition enhancement measures may be built into a scheme to ensure that the scheme is compliant with the proactive measures outlined in the latest Government policy on nature conservation (National Planning Policy Framework).

Technical Appendix 4

Badger Survey Methodology

Survey Methods

Survey work involves systematically searching for the presence of Badgers *Meles meles*, in particular badger setts, on or near (30-40m) of the site where access could be obtained. A site is also assessed for the presence of badger foraging activity and territorial behaviour. Such signs include foraging trails, foraging scrapes in short grass, which are commonly known as 'snuffle holes' (shallow scrapes in soft ground or even turf rolling created by foraging for ground-dwelling invertebrates such as worms and grubs), footprints, hairs caught under fences, sett entrances, and latrine sites.

A thorough check of all fencing on site is also undertaken, looking for any potential access points. This can be located by looking for pushed up fencing. These access points can be created by any large mammals included dogs, cats, foxes as well as badgers. The area around a potential access point is methodically searched for mammal hairs as these are usually found underneath any regularly used access point. Any hairs found can be used to identify the species. In addition the vegetation around the entrance gives an indication of frequency of use.

Where substantial vegetation, such as large Bramble domes and scrub precludes extensive searching, signs of entry into the scrub is searched for, although the potential for an unrecorded Sett under such vegetation is always a possibility.

References

Kruuk, H., Parish, T., Brown, C.A.J. & Carrera, J. (1979). The use of pasture by the European badger (*Meles meles*). *Journal of Applied Ecology*, 16, 453-459.

Cresswell, W.J. & Harris, S. (1988) Foraging behaviour and home-range utilisation in a suburban badger (*Meles meles*) population. *Mammal Review*, 18, 37 – 49.

Natural England 2007 Badgers & Development, A Guide to Best Practice and Licensing Interim Guidance. Natural England, Sheffield.

Technical Appendix 5

Bat Survey Methodology

Bat Tree Survey, Emergence and Activity Monitoring

Trees Survey Method

Introduction

All bat species and their roosts are fully protected in Britain under the Wildlife and Countryside Act 1981(as amended) and the Conservation (Natural Habitats &c.) Regulations 1994 (as amended).

Initial Survey

Tree survey methodology involves looking for any suitable holes, cracks, niches or crevices which could be used by bats for roosting. In addition, large or apparently unhealthy trees which have a dense covering of Ivy possibly covering holes or crevices also have some potential to support bats. These are all termed potential roost features.

A survey for signs of residence by bat species consists of a slow methodical search of all aspect of the tree for actual roosting bats and their signs. Droppings around holes, on the tree trunk or on the ground beneath can be used to identify species. Scratch marks and staining at roost entry and exit holes. The presence of spider webs at a potential roost can often indicate their absence at that time although does not mean that the hole is not used at all. Careful attention is given to any sounds indicating the presence of a breeding bat roost (i.e. audible social calls). The survey is completed using binoculars from ground level and high powered torch and endoscope to inspect cavities with ladder where safe access permits.

Detailed Tree survey

Where the value of an individual tree or woodland area is found to be high during a preliminary survey, a more comprehensive survey in order to fully assess the likely value of the potential bat feature is undertaken. The scope of additional work will vary depending on a range of environmental factors.

Survey techniques are likely to include:

- Emergence survey during early evening (i.e. prior to emergence and at emergence), with the aid of a bat detector for ultrasonic calls.
- Climb-and-inspect assessment of selected trees to check for cavities and inspection with an endoscope or mirrors if appropriate.

- Foraging and transect walks through habitat surrounding potential tree roosts to understand local bat use of the site.

Survey work is tailored to each individual case, and the degree of evening emergence and foraging work undertaken is based on the following factors:

- size of the site;
- number of trees to be affected;
- habitats on site (eg water features/woodland);
- habitats and protected sites in the wider countryside;
- knowledge of bat use in local area;
- geographical range of rare species;
- proximity to known or suspected roosts.

Limitations of Tree Survey

Bats may move regularly between different tree roosts, and if used infrequently, signs to indicate the use of such trees by bats are unlikely to be evident. In addition, any signs which are left on trees by bats as a result of their use of a roost site (e.g. droppings below a roost exit) may be washed off as a result of wind and rain. Consequently, it is often difficult to confirm the presence of a bat tree roost. Surveys are best described as a sampling tool to assess presence of different bat species using the site at that time and place and general use of the area by bats.

Evaluation of Potential Suitability of Proposed Development Sites for bats (including Buildings & Trees)

The latest bat survey guidelines has provided guidance on assessing and evaluating development sites and features for bat roost potential:

The potential for trees to support roosting or breeding bats is evaluated under the following protocol for the visual inspection of trees:

Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	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.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions^a 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^b). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.^c	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated 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 (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions ^a and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	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.
High	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 ^a 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.

^a For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

^b Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten et al., 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.

^c This system of categorisation aligns with BS 8686:2015 Surveying for bats in trees and woodland (BSI, 2015).

Table from (BCT 2016 at p35)

Bat Activity Survey

Introduction

The value of a site to bats can arrived at using activity surveys to understand how many bats use the site, the degree of use and what species are involved.

Timing

An activity survey is undertaken in conditions when bats are likely to be active. Evening surveys commenced from sunset, often beginning with monitoring certain potential bat roost trees or woodland areas where such trees exist, for any emerging bats.

Dawn survey work may also be undertaken, usually recording activity up to two hours before, and sometimes up to an hour after sunrise.

Activity surveys are undertaken during the period when bats are not hibernating, this is usually between the end of April to October.

Methods

Line transects are carried out by a surveyor carrying a bat detector/s (example used, Bat box Duet , Petterson D240x, Anabat SD1) who walks at a constant speed along a planned route and records sound for subsequent analysis, and/or bat passes or species. The data collected can be used to provide an index of bat activity along the transect. Line transects are best suited to open habitats with linear features, such as hedgerows, field boundaries and woodland rides. Transect surveys, when repeated should be undertaken in opposite directions and, if possible, started from different points along the route. The number of transects required to cover the main habitat features depend on the size and complexity of the site. Transects should be sampled within 2-3 hours after sunset. The transect methodology should consider, for example identifying listening points where a minimum of 3 minutes recording is undertaken along the route and or combined with activity monitoring with recording equipment left for longer periods recording all bat passes. (BCT, 2012)

Since different species of bats echolocate using different frequencies, there is a risk that certain species will be missed if the bat detector is not tuned to the frequency used by that species at the time. Therefore, during the majority of the survey period, a surveyor scans through different frequency ranges to ensure as many bats were recorded as possible. The main frequency ranges used were as follows:

- 32-55khz to detect the smaller species of bats, such as Pipistrelle spp, Myotis spp, etc.
- Around 22-30 khz to detect the larger bat species, including Noctule and Serotine bats.

In addition the Anabat SD1/Songmeter SM2 Automated recorders were used to allow greater survey intensity than with manual bat detector surveys. They can allow longer periods of time coverage than could be practically and economically covered by manual survey, providing more comparable results, or be used to provide a more flexible timetable for surveying. Automated systems are triggered by sound (via a detector) and these sounds are then recorded as event / bat passes.

Assessment of Landscape for Potentially Good Bat Foraging sites or Flight Lines

The habitats across the site are surveyed and assessed on their likely use by bats for foraging and for use in commuting across the landscape. This assessment is based upon the following main factors:

- Sheltered areas where insects are likely to gather;
- Presence of rough grassland or other habitats likely to result in higher insect numbers;
- Provision of linear links across otherwise open habitat to allow bats to following features within shadows (i.e. hidden from predators), while also providing foraging potential.

Data Collected

Time, flight direction and species of bat are recorded for each bat heard or seen and these were mapped on individual site maps. Time of sunset/sunrise and weather conditions are also recorded for each survey.

The following data is gathered for bat passes recorded:

- Location of observation (data highlighted on a map);
- Whether the bat was foraging or commuting (if commuting, in which direction was it travelling and whether the bat was following any landscape features);
- Species of bat observed (where possible).

References

BCT (2016) Bat Survey Guidelines 3rd Edition

Technical Appendix 6

Reptile Survey Methodology For Common Reptile Species

Introduction

All of the common reptile species (Grass Snake, Adder, Common Lizard and Slow-worm) native to Britain are protected by the 1981 Wildlife & Countryside Act 1981 (as amended) under Sections 9(1) and 9(5). This legislation makes it illegal to intentionally kill or injure a common reptile and also, to sell, barter, exchange or transport for sale these animals or parts of them. However, their habitat is not directly protected.

Survey Methods

Survey work involves the placing of cut up roofing felt or other flat materials such as corrugated iron sheeting, wood or plastic that reptiles hide under. The reptiles use these artificial refugia as they warm faster than the surrounding environment and are attractive to shelter beneath. In order to be effective, refugia need to be placed in the most suitable habitat and in the best locations within those habitats for reptiles. Survey refugia are placed at a minimum of 10/ha.

Reptiles can be surveyed using this technique between early spring and late autumn. The times of the year that provide optimum survey are April to late June, and late August to the end of September.

Survey work is undertaken during suitable weather conditions (i.e. between 9 and 18°C with little or no wind and no rain). High temperatures in late June to late August mean that suitable weather conditions occur the morning / late afternoon, after and even during rain in warm weather, and on overcast days.

Refugia survey is always complemented by visual searching for reptiles which are not utilising refugia.

Population Size Assessment

In order to assess the importance of a population the population size needs to be assessed. This uses standard numbers from the Herpetofauna Groups of the British Isles (HGBI, 1999) advisory notes for Amphibian and Reptile Groups (ARGs) **Table T1** below.

Table T1: Assessing Reptile Populations

Species	Population size (adult density)		
	High	Medium	Low
Slow-worm	(> 100 / ha)	(> 50 / ha)	(< 50 / ha)
Common lizard	(> 80 / ha)	(> 40 / ha)	(< 20 / ha)
Adder	(> 4 / ha)	(2 - 4 / ha)	(< 2 / ha)
Grass snake	(> 4 / ha)	(2 - 4 / ha)	(< 2 / ha)

References

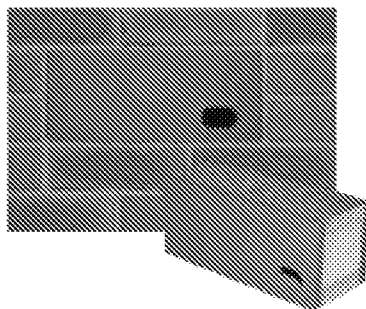
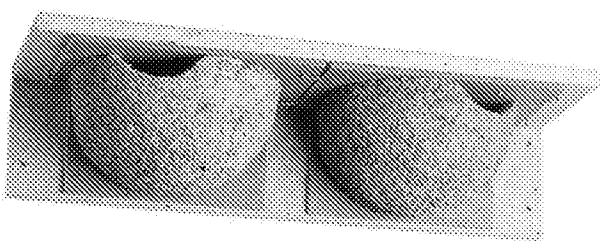
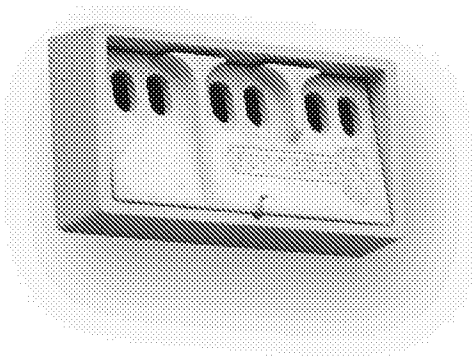
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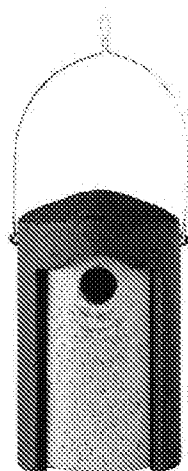
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Technical Appendix 7

Bat & Bird Box Mitigation Examples

Examples of Bird Nesting Opportunities for buildings

Swift Nesting Brick – It needs to be positioned near Apex or high up – position advised by ecologist. Design shown is from Ibstock Bricks. https://www.ibstockbrick.co.uk/kevington/eco-products/ see also: https://www.rspb.org.uk/globalassets/downloads/documents/conservation---sustainability/help-swifts/swift-bricks.pdf	
House Martin Schwegler Nest Placed under roof overhang, bargeboard – high up position advised by ecologist Design shown Schwegler from NHBS: https://www.nhbs.com/9a-schwegler-house-martin-nest	
House Sparrow Terrace Schwegler Usually placed under roof overhang, bargeboard – high up position advised by ecologist Design shown Schwegler from Wildcare: https://www.wildcare.co.uk/sparrow-terrace.html	

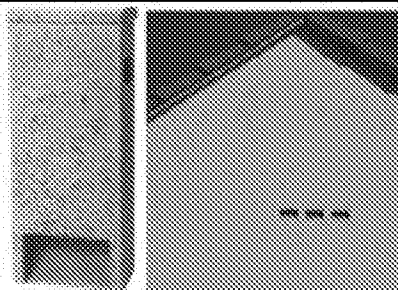
Blue/Great Tit Schwegler Nest**Design shown Schwegler from NHBS:**<https://www.nhbs.com/1b-schwegler-nest-box>**Examples of Bat Bricks/Mitigation for buildings****Schwegler Bat Roost Unit 2FR**

This Tube system meets the characteristic behavioural requirements of the types of bats that inhabit buildings. Made with Schwegler wood-concrete, the design maintains excellent climatic conditions inside the roost unit allowing the animals to either hang onto the wooden rear or onto the wood-concrete front. The box, once installed is maintenance free and self cleaning.

The roost unit can be installed within any external walls (brick, block or panelling) either flush or beneath the wall surface (with suitable entrance ramp extension)

Dimensions: height 47.5 x width 20 x depth 12.5 cm, Entrance: width 15 x height 2 cm, Weight: ca. 9,8 kg

Within Brick, can also be placed within cavity with only entrance visible





Hedgehog Highways:

<https://www.hedgehogstreet.org/help-hedgehogs/link-your-garden/>

Technical Appendix 8

Reptile Translocation Methodology

Translocation of Reptiles

In summary, translocation is the movement of animals, usually deliberately, from one location to another (Gent *et al*, 1998). The receptor site is the site to which reptiles are moved, the donor site (or in this case development site/construction zone) is where they are moved from.

The aim of the mitigation strategy is to ensure that an ‘equivalent population’ is maintained to that which existed before (Gent *et al*, 1998). Reptile mitigation strategies usually involve translocations and habitat management which is implemented between end March/April and Sept/October once any reptiles on site have emerged from hibernation.

Receptor sites must be assessed prior to the translocation of any reptiles, against criteria provided as good practice guidance. This ascertains the existing population of reptiles on the receptor site and identifies any habitat management needs in order to provide the optimum habitat for translocated reptiles.

HGBI (1998) and Gent *et al* (1998) recommend that ‘reasonable effort’ should be undertaken to clear a site of reptiles prior to any works being carried out. Interpretation of what ‘reasonable effort’ translates as in minimum trapping days and capture methodologies is provided in **Table A1** below.

Monitoring is necessary in the medium and long term in order to assess the success or otherwise of the translocation programme.

Capture Areas Assessment

The areas of the site within the construction zone needs to be assessed as to potential to support reptiles and likely populations present.

Receptor Area Assessment

A receptor site for reptiles needs to meet certain criteria to ensure that the conservation status of the populations of reptiles on the capture site and any on the receptor site are maintained. In order that a receptor site is sustainable in the long term the following assessment criteria recommended by HGBI (1998) have been used to find a site:

- A receptor site should be local to the donor site, and as close as possible to it (at least within the same county or similar administrative area, with similar geology/habitat);
- Not currently supporting a viable breeding population of the species to be translocated, for known reasons, or be capable of supporting them given suitable habitat management and creation;
- Not be subject to planning or other threats in the foreseeable future;
- Subject to a written, agreed and funded pre- and post-translocation management agreement;

- Subject to a written, agreed and funded pre- and post-translocation monitoring programme.

There have been various translocation programmes which have assessed the populations and carrying capacities of a range of different reptile habitats particularly in relation to slow-worms. It is widely recognised that slow-worms can, in their ideal habitat, regularly occur at 1000+ per hectare but are usually present at lower densities. However it should always be carefully considered that few sites have large areas of continuous good slow-worm habitat capable of supporting such high populations although smaller, localised areas of a site may do so. When estimating the carrying capacity of a release site and considering the number of reptiles to be translocated, a precautionary approach will be used. The mitigation strategy will provide a larger area of suitable habitat at the receptor site than at the capture site.

Translocation Methodology

In order to fulfil a translocation of reptiles from the development site to the receptor sites, the animals must be caught, or in the case of a very low population discouraged from the areas of the site to be lost. The most effective method for capture involves the placing of cut up roofing felt or other materials such as corrugated iron sheeting, wood or plastic that snakes and lizards hide under. Refugia/Tins are best placed in locations which will be attractive to reptiles (e.g. 'sun-traps').

The most profitable time for capturing reptiles is generally between late April - June, and again between late August and late September, depending on weather conditions. The suggested number of days required to catch reptiles for a reasonable effort to remove the population is described in **Table A1** above.

Capture Site Preparation

The development site must be prepared in order to facilitate the successful removal of reptiles. Sheets of roofing felt and tin will be placed across the site to act as refugia for the reptiles. They will be placed at a high density in suitable habitat. Areas of suitable reptile habitat with a high reptile density may have a tin density of up to 5 refugia per 10m², in line with the guidance in **Table A1**. The placement of a higher number of refugia on site will increase the efficiency of capture and can reduce the number of trapping days required to clear the site of reptiles.

Capture Effort

Table A1 provides the suggested capture effort for reptile species, based on good practice guidance (HGBI, 1998). Reptile translocation can in some circumstances require at least one season (spring to autumn), and sometimes longer, to ensure that all reptiles are removed from the development site.

The purpose of this type of translocation is to make reasonable effort to remove all reptiles from a site prior to a development. Where reptile populations are low or on small sites, Natural England often provide additional guidance that reasonable effort has been made and translocation to be considered complete in any area. The capture rate needs to have declined to zero over at least three to five consecutive trapping visits in suitable weather conditions.

Table A1: Capture Effort for Common Reptiles

Species	Population size (adult density)	Tin density (tins/ha)	Trapping days in good weather
Slow-worm	High (> 100 / ha)	100	All suitable days between March & September or a full year (min. 90 suitable days)
	Medium (> 50 / ha)	100	All suitable days between March & September or a full year (min. 70 suitable days)
	Low (< 50 / ha)	50	60 suitable days
Common lizard	High (> 80 / ha)	100	All suitable days between March & September or a full year (min. 90 suitable days)
	Medium (> 40 / ha)	100	All suitable days between March & September or a full year (min. 70 suitable days)
	Low (< 20 / ha)	50	60 suitable days
Grass snake	High (> 4 / ha)	100	All suitable days between March & September or for two years (min. 90 suitable days)
	Medium (2 - 4 / ha)	100	All suitable days between March & September or two years (min. 70 suitable days)
	Low (< 2 / ha)	50	60 suitable days

The guidelines above are likely to change according to the habitats on a site and populations of reptiles, and manipulation of habitats prior to construction can reduce the number of trapping days, allowing for more efficient capture of reptiles on a translocation site.

Habitat Manipulation

The areas of habitat affected by the development will be carefully modified to reduce their suitability for reptiles where necessary. This will encourage reptile movement within the site to increase capture in key areas around refugia and may also encourage some dispersal to suitable retained habitats. The grass height will be reduced by cutting to no less than 10cm on the first cut and will be phased in bands and habitat areas across the site. The location and timing of this process will be guided by capture rates in the different areas of the site. Habitat manipulation can be used to increase catch efficiency.

Translocation programme

The translocation is inspected regularly and any reptiles are captured and moved, using the methods described above to the receptor site. For the translocation to be considered complete in any area, the capture rate needs to have declined to zero over at least three to five consecutive trapping visits in suitable weather conditions.

Close monitoring of the capture rate will allow a judgement to be made of the number of visits considered to be necessary (in relation to guidelines in **Table A1**). The site will be walked very slowly in order to search for basking reptiles and by carefully lifting each refugia, an attempt will be made to catch any reptiles basking beneath.

All reptiles will be transported to the receptor site in a secure ventilated container. At the end of each visit all reptiles caught will be released in suitable conditions at the receptor site. Details of all captures and releases will be recorded.

Exclusion Fencing

Reptile fencing will be used where required to prevent reptiles returning to cleared areas, and where populations are considered sufficient to warrant it (it is often in-effective with low populations).

Supervised site clearance

Following the completion of the translocation in any areas of the site, a supervised site clearance will be carried out. This will take place outside of the hibernation season usually between April- early October (November – February is the main hibernation period dependent on weather conditions). The technique is a last method used and requires very careful specialist supervision. Normal destructive search rates are between 0.1 and 1.0 ha per day depending on machine size and habitat type.

The search will begin by dismantling rubble piles and other debris by hand. Reptiles may be found sheltering in these structures. Following this, the vegetation will be stripped using an excavator and bucket. Firstly, the top few centimetres of the ground or first layer of rubble should be removed, to expose reptiles sheltering in crevices just below the surface. At least one experienced reptile handler should be positioned to catch any remaining reptiles as they are disturbed. Following this, larger and deeper excavations can be made, concentrating on areas which afford shelter to reptiles, such as tree stumps and buried rubble. Particular care should be taken when emptying the bucket in case any reptiles are dug up with the spoil. It is not anticipated that many reptiles (if any) are discovered as the reptile populations will have almost completely been moved by this stage.

Prior to starting works, the contractors will be alerted to the presence of protected species on the site and provided with the method statement and plans. The contractors will be shown reptiles, so that they are familiar with their identification, should they come across them during vegetation works.

Monitoring

Following completion of the work, monitoring of the reptile population at the receptor site is recommended during the following two years, in order to determine the success of the translocation project.

Natural England (English Nature, 1998) suggests the following guidance which may determine the ‘success’ of a mitigation strategy:

- Removal of a ‘reasonable proportion’ of animals from a development site or no significant impact from development where in situ conservation is involved;
- Establishment and maintenance of a range of suitable habitats: with the presence of ‘good’ features and absence of ‘negative’ features;
- Breeding and successful recruitment;
- Re-establishment of animals in a range of habitat or spread of the animals throughout a site or to adjacent sites;

- Establishment of an appropriate age structure in the population;
- Survival of a large proportion of the animals that were moved;
- Establishment of:
 - A viable population
 - An expanding population
 - An ‘equivalent’ population to that which previously occurred
 - A population that is fluctuating in size within acceptable limits;
- Persistence of individual animals over a number of years.

References

Herpetofauna Groups of the British Isles (HGBI) Guidelines (1998) “Evaluating Local Mitigation/Translocation Programmes: Maintaining Best Practice and Lawful Standards.” HGBI Advisory notes for Amphibian and Reptile Groups (ARGs). HGBI, c/o Froglife, Halesworth, personal collection.

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