

ECOLOGICAL ASSESSMENT

LAND EAST OF TYE LANE, WALBERTON

JUNE 2017

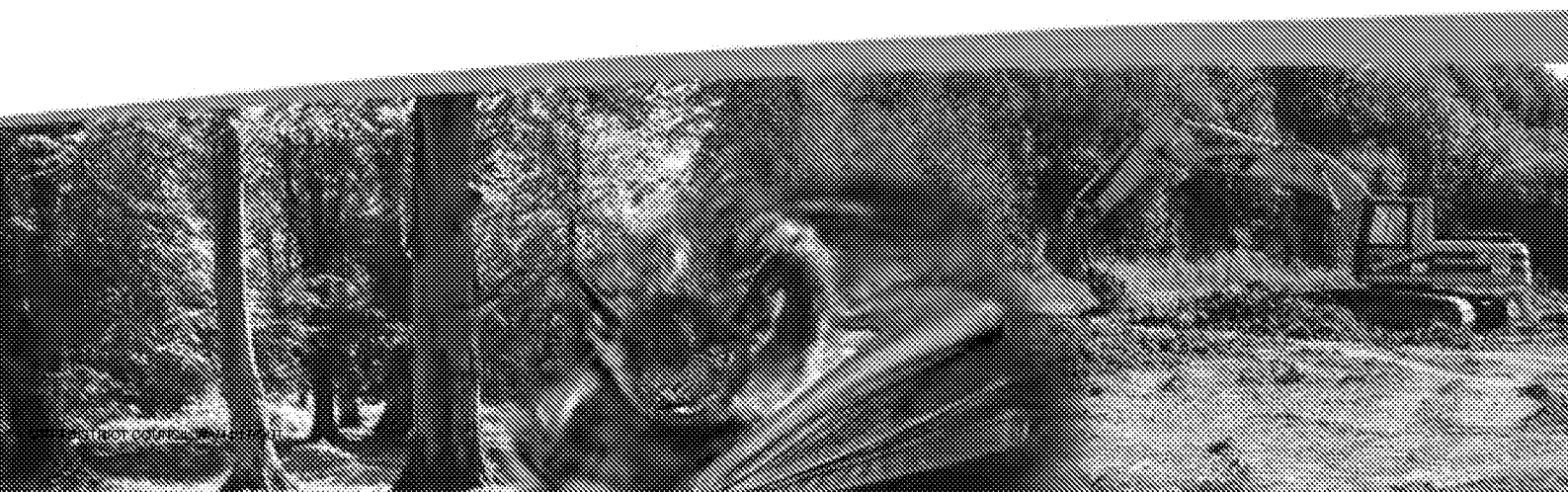


Land East of Tye Lane, Walberton, West Sussex

Ecological Assessment

Final Report
June 2017

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Client:	Wates Developments Wates House Station Approach Leatherhead Surrey KT22 7SW
Main Author(s):	Karen Colebourn BSc (Hons) CBiol FCIEEM
Contributors/Surveyors:	Daniel O'Sullivan BSc (Hons) MRes MCIEEM 
Report Prepared for Issue by:	 Karen Colebourn BSc (Hons) CBiol FCIEEM 
Report Approved for Issue by:	 Phil Colebourn MA MSc MCIEEM MRTPI

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Ecological Planning & Research Ltd

The Barn, Micheldever Station, Winchester, Hampshire SO21 3AR

Land East of Tye Lane, Walberton, West Sussex

Ecological Assessment

Executive Summary

EPR was commissioned by Wates Developments to undertake an Ecological Assessment of proposals for residential development at Land East of Tye Lane, Walberton (SU 97328 06230). The draft proposals are illustrated in **Appendix 1**.

The proposed development is likely to trigger the following biophysical changes: vegetation clearance, lighting, increased recreational demand, increased predation/disturbance and landscape planting.

The potential for these changes to affect important ecological features has been investigated through review of local biological records, biodiversity policy and strategy and site survey.

The Site is situated to the north of Walberton village in West Sussex, on relatively flat land at the base of a hill that rises to the north-east. Most of the Site is an arable field, with little marginal habitat but a small number of scattered mature trees. There is a mown species-poor grassland field to the north-east and a small area of non-native broad-leaved woodland on part of the western boundary. The other boundaries are marked by scattered scrub and trees and hedgerows in various states of management, although most of these trees are outside the site boundary.

The important ecological features considered in detail are: woodland, hedgerows, tree-lines and individual trees; the assemblage of birds; bats; reptiles; and the local population of Hedgehogs.

Apart from the arable land and species-poor grassland, most of the other habitats will be largely retained, with very small losses to the woodland and hedgerows for the installation of footpaths and an access road.

The proposed development includes extensive green infrastructure which will extend and improve the retained features. The scheme therefore has the potential to deliver biodiversity gain.

Further actions are identified, including the production of a Landscape and Ecological Management Plan, which will include methods to protect features during site preparation and construction and a long-term management plans for the green infrastructure.

The proposed development is unlikely to cause a significant negative effect on the conservation status of any European Protected Species. It is considered that habitat creation within the proposed open space areas and subsequent management of existing and newly created habitats in the Site will have a positive effect on wildlife including bats and birds within the Zone of Influence.

Land East of Tye Lane, Walberton, West Sussex

Ecological Assessment

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Land East of Tye Lane, Walberton, West Sussex

Ecological Assessment

1 INTRODUCTION

Commissioning

- 1.1 Ecological Planning & Research Limited (EPR) was commissioned by Wates Developments to carry out an Ecological Assessment (EA) of proposals for residential development at Land East of Tye Lane, Walberton, West Sussex (SU 97328 06230), hereafter referred to as 'the Site'.

Background

- 1.2 Proposals are for a residential development of up to 175 dwellings, new vehicular access, together with associated car parking, landscaping and community facilities to include allotments, play space and community orchard, as illustrated in **Appendix 1**.

Study Area

- 1.3 The Site is located to the north of Walberton village in West Sussex, below the foothills of the South Downs. Most of the Site is an arable field with a small scatter of mature trees. There is a small mown grass field to the north-east and a narrow woodland along part of the western boundary. The other boundaries comprise tree-lines, hedgerows and fencing. There is a golf course to the north, housing to the east, south-east and south-west, the village school, community centre and playing field to the south and Tye Lane to the west, with agricultural land beyond.

Scope

- 1.4 EPR's approach takes account of the Chartered Institute of Ecology and Environmental Management's (CIEEM) advice in Guidelines for Ecological Impact Assessment in the UK and Ireland (January 2016).
- 1.5 As summarised on the Biodiversity Checklist included at **Appendix 2**, this EA provides the ecological information that the Local Planning Authority (LPA) requires to:
- Determine whether the proposals accord with national and local planning policies; and
 - Allow it to discharge its Biodiversity Duties under the NERC Act 2006 and the Conservation of Habitats and Species Regulations 2010 (as amended).

Planning Context

- 1.6 Arun District Council sets out its environmental policies in Chapter 17 of the emerging Local Plan for 2011 – 2031, which was published in October 2014. This Local Plan is yet to be adopted but is still considered as part of this assessment. The most relevant policy is:

Policy ENV DM5: Development and Biodiversity

Development 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.

- 1.7 There are no proposals for the modification of this policy. The saved policy from the 2003 Adopted Local Plan is:

Policy GEN29: Nature Conservation Across the District

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

- 1.8 The emerging policy is substantially more ambitious than the saved one, but is in keeping with national Government's advice in the NPPF.
- 1.9 The Walberton Neighbourhood Development Plan (2015) also sets out relevant policies:

Policy VE 3: Protection of Trees and Hedgerows

Development that damages or results in the loss of ancient trees/trees of arboricultural and amenity value or loss of hedgerows or significant ground cover and habitat will be resisted. Development proposals must be designed to retain wherever possible ancient trees, trees of good arboricultural and amenity value and hedgerows. Proposals should be accompanied by a survey that establishes the health and longevity of any affected

trees or hedgerows and a management plan to demonstrate how they will be so maintained.

Policy VE 10: Biodiversity & Archaeology

Proposals that have a positive impact on heritage and ecology will be encouraged, subject to other policy constraints. Conversely, proposals with a negative impact on the Parish's heritage and ecology will not be supported, unless sufficient mitigation measures are proposed.

- *Proposals will be required to be accompanied by an appraisal from a respected independent body*
- *Protected species and habitats will receive unfettered support, and those of lesser but still relevant classifications will be acknowledged by the appropriate degree of support recommended by statutory consultees and other bodies*

1.10 The EA comprises the following main elements:

- Review of the ecological policy context;
- Assessment of the changes which are likely to affect biodiversity; and
- Survey of the development site and, where possible, any other areas likely to be affected.

1.11 As advised in paragraph 118 of the National Planning Policy Framework, the resulting information is used to:

- Characterise potentially significant effects (including cumulative effects);
- Avoid or minimise those effects through scheme design;
- Design appropriate compensation for residual effects, if necessary; and
- Incorporate biodiversity gains (where possible).

1.12 Where relevant, legislative and policy considerations are highlighted, including:

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

1.13 This includes advice on further work to provide the information that:

- Natural England may require to determine an application for a European Protected Species Licence;
- The applicant needs to conform with other biodiversity legislation.

Pre-Application Consultation

- 1.14 Pre-application advice was sought by Wates Developments from Arun District Council with a response provided on 27 March 2017. The following response related to biodiversity was provided by the Greenspace Officer:

A habitat survey would need to be commissioned and any recommendations of the report included within the conditions of any planning approval. Clearing of any vegetation must not be carried out during the bird nesting season. A reptile survey would need to be carried out prior to works commencing on site. Vegetation to the boundaries to be retained. Bat and bird boxes to be provided to enhance the ecological potential of the site and mitigate for the loss of any mature vegetation.

- 1.15 Wates Developments held a public consultation event on 8 May 2017. Few ecological issues were raised, but the presence of Hedgehogs in the locality was mentioned.

Methods and Constraints

- 1.16 Information on the ecological context was gathered from Sussex Biodiversity Records Centre (SxBRC) and relevant biodiversity policies and strategies. These are mentioned where relevant within this report.
- 1.17 The Site was surveyed as set out in **Table 1.1**, using good practice survey methods as set out in **Appendix 3**. All surveys were conducted within the appropriate season.

Table 1.1: Ecological surveys within the Site

Survey	Date of Survey	Methodology
Habitat appraisal	6 March 2017	Phase 1 survey – survey methodology adapted from the Handbook of Phase 1 Habitat Survey, JNCC 2010
Botanical grassland survey	5 April 2017	Walkover quadrat survey
Ground level bat tree inspection survey	12 April 2017	Habitat appraisal including tree inspections – survey methodology is consistent with the Bat Conservation Trust Good Practice Guidelines 2016
Breeding bird survey	13 April, 27 April, 8 May and 15 May 2017	Breeding bird survey – survey methodology adapted from Gilbert et al. 1998
Great Crested Newt survey	13 April 2017	Pond assessment – survey methodology followed Habitat Suitability Index (Oldham et al. 2001)
	26/27 April, 2/3 May, 9/10 May and 18/19 May 2017	Pond survey – survey methodology followed Great Crested Newt Mitigation Guidelines (English Nature, 2001)

2 NATURE AND EXTENT OF PREDICTED BIOPHYSICAL CHANGES

- 2.1 Certain activities associated with the preparation, construction and occupation/operation of the proposal are likely to generate biophysical changes. These changes, and the Zone of Influence over which they are likely to occur, are summarised in **Table 2.1 and 2.2** below.

Table 2.1: Activities that can generate biophysical changes

Preparation/construction phase
• access and travel on/off-site, including temporary access routes for construction vehicles and vessels; • areas for plant maintenance and for storage of oils, fuels, and chemicals; • acoustic disturbance and vibration from construction activities; • dust generation; • soil stripping; • environmental incidents and accidents e.g. spillages, noise, and emissions; • lighting; • storage areas for construction/excavated materials; and • vegetation/habitat clearance including tree felling.
Occupation/operational phase
• access to site; • drainage; • implementation of landscape design and habitat management; • presence of people, vehicles and their activities e.g. increased public access and recreational pressure; • lighting; • presence of pets; and • site operation and management e.g. maintenance operations, lighting, noise, use of a road by traffic.

- 2.2 **Table 2.2** details those biophysical changes predicted to be caused by the activities listed above and the Zone of Influence over which the changes are likely to occur. These are mostly confined to the Site and its immediate surrounding area, except for the risks of increased recreational demand and increased pet predation/disturbance. The Zone of Influence specific to important ecological features identified further within this assessment is described in more detail in the relevant appendices that support this assessment.

Table 2.2: Summary of predicted changes likely to cause biophysical changes

Predicted Biophysical Change	Zone of Influence
Vegetation clearance	Within the site and immediate surrounds only
Lighting (during construction and operation)	Within the site and immediate surrounds only
Increased effects arising from recreational pressure	Considered up to 5km
Increased predation/disturbance from pets	Within 400m
Landscape planting	Within the site only

3 IDENTIFICATION AND CHARACTERISATION OF IMPORTANT ECOLOGICAL FEATURES VULNERABLE TO DEVELOPMENT

Geographic and Historic Context

- 3.1 The proposal is for land on the northern edge of the village of Walberton which lies below the South Downs. The Site is on relatively flat land at the base of a hill that rises to the north-east. The Site is surrounded by a school and houses to the south and east, a golf course to the north and a mixture of arable and pasture to the west.
- 3.2 The South Coast Plain and Hampshire Lowlands Natural Area Profile (Cox 1997) notes that there is a long history of agricultural production in this area. The area also contains Ancient Woodlands that are largely confined to the foot of the South Downs, as clearly illustrated on **Map 1**. The Natural Area Profile also notes that the long history of arable farming in this area, between Chichester and Brighton, has left little space for wildlife habitats. In this area, hedges are in a poor state of repair or have been removed and other wildlife habitats such as farm ponds, patches of rough grassland and scrub are now rare.
- 3.3 From the old land utilisation maps (Land Utilisation Survey of Britain 1936), it appears that the Site was formerly meadow and permanent grassland that formed part of a larger estate.

Geology and Soils

- 3.4 The soils belong to the Soilscape 6: freely draining slightly acid loamy soils (Cranfield University). This soil typically supports neutral and acid pastures and deciduous woodlands. The underlying bedrock geology is London Clay Formation; clay, silt and sand.

Important Ecological Features

Arable Land

- 3.5 As shown on **Map 3**, most of the Site is arable land, with narrow margins. The arable land is intensively farmed with limited value for wildlife. The loss of this habitat will therefore not cause a significant ecological effect and this feature is not considered further in this assessment.

Grassland

- 3.6 The Natural Area Profile identifies Neutral Grassland as one of the Key Wildlife Features of the area. The grass field within the north-east of the Site was therefore surveyed, but was found to support a species-poor vegetation community, which does not qualify as a Priority Habitat (see **Appendix 4** for results of the survey). The loss of this vegetation will therefore not cause a significant ecological effect and this feature is not considered further in this assessment.

Woodland, Hedgerows, Tree-lines and Individual Trees

- 3.7 The Site's boundary features generally comprise relatively recently planted tree-lines and garden hedges, although the hedge along Tye Lane is older. This hedge is associated with a dry ditch, which also runs through a small strip of planted non-native woodland along the western boundary.
- 3.8 None of these features are species-rich or managed to promote biodiversity. Species present include Poplar, Sycamore, Beech, Field Maple, Blackthorn, Elm (young only) and Hawthorn. There is also Holly in the woodland strip. The hedges and tree-lines are fragmentary, and do not form good corridors, or link to a wider network, being species-poor, narrow and isolated by roads, urban development and the intensively managed golf course.
- 3.9 Mature trees, including Pedunculate Oak are scattered along the boundaries, and in the south-eastern part of the arable field. Their potential for bats has been assessed below. They are isolated from each other and other vegetation by ploughed land.
- 3.10 These features currently contribute little to biodiversity beyond the Site, but have the potential to form a framework for the establishment of larger, more diverse and better connected vegetation corridors, which would deliver wider biodiversity gains. This would be in accordance with the Walberton Neighbourhood Development Plan (2015), which has identified the need to restore and improve hedgerows in the parish. This is discussed further in the following sections.

Birds

Desktop Study

- 3.11 The farmland habitat within the Site can support farmland species including a characteristic assemblage of birds. **Map 2** shows that many farmland birds have been recorded within 2km of the Site.

Breeding Bird Survey

- 3.12 A series of breeding bird surveys were conducted on the Site during Spring 2017, the results of which are set out in **Appendix 5** and shown in **Map 4**. The only truly farmland bird recorded was Linnet (Red-listed Birds of Conservation Concern (BoCC)), which was seen on the adjoining golf course. This species feeds almost entirely on seeds and therefore requires areas of grassy and scrubby vegetation where the plants are allowed to seed.
- 3.13 The other species of conservation concern recorded during the surveys were Starling (Red-listed BoCC), House Sparrow (Red-listed BoCC), Dunnock (Amber-listed BoCC), Kestrel (Amber-listed BoCC) and Mallard (Amber-listed BoCC). These are urban and sub-urban species, not necessarily connected with farmland. Starling, House Sparrow, Dunnock and Linnet are Priority Species. No birds listed under Schedule 1 of the Wildlife and Countryside Act 1981 or Annex 1 of the EU Birds Directive were recorded.
- 3.14 A total of 27 bird species were recorded from within the Zone of Influence (taken to be the Site and immediate surrounds) during the breeding bird surveys in 2017. In line with the

precautionary principle, species recorded as breeding 'confirmed', 'probable' or 'possible' are considered as 'breeding species' within this report, a total of 18 species.

- 3.15 Starling and House Sparrow were recorded using the Site in relatively low numbers to feed but are likely to be nesting in buildings offsite. Kestrel and Mallard were observed on a single occasion flying over the Site.
- 3.16 Bird territories were concentrated around boundary tree-lines, hedgerows and woodland. The boundary habitats in general contained a range of common species including Dunnock, Green Woodpecker, Blackbird, Wren and Chiffchaff.

Evaluation

- 3.17 The breeding bird assemblage within the Zone of Influence is made up of largely common and widespread species, with species of heightened conservation importance present in low numbers. Nesting birds are confined to the boundary habitats (tree-lines, hedgerows and woodland) with no evidence of ground-nesting birds seen in the fields, although these were used for foraging by some species in low numbers.
- 3.18 The overall assemblage of birds recorded within the Zone of Influence is valued at **Local** importance.

Bats

Desktop Study

- 3.19 There are records of eleven species of bat within 2km of the Site between 1999 and 2015 (see **Map 2**). The nearest record is an unspecified Brown Long-eared roost approximately 10m to the south of the Site boundary in 2012.
- 3.20 The Walberton Neighbourhood Development Plan mentions a Pipistrelle maternity roost in St Mary's Church and two Barbastelle colonies on the Fontwell Estate, to the west.

Ground Level Tree Survey

Thirteen trees were considered to have low potential to support bats (see **Map 5** for tree locations and **Appendix 6** for more detailed results). With relation to the masterplan, one tree with low potential (Tree 1) may potentially require removal as part of the proposed scheme. The remaining trees within the Site identified as having potential to support roosting bats are to be retained.

Evaluation

- 3.21 The boundary habitats are considered to have low potential to act as an important commuting and foraging feature for bats because they are fragmented and do not form an optimal connective corridor.
- 3.22 Most of the Site comprises intensively farmed arable land, likely sprayed with pesticides, which is of relatively little value as a foraging resource for bats.

- 3.23 Most of the features of potential value to bats, i.e. the south-western woodland, will be retained along with the majority of the boundary habitats. However, some minor loss of trees and boundary vegetation is necessary for the installation of infrastructure and access points.
- 3.24 The Site is within the core sustenance zone of the Brown Long-eared bat roost and possibly the other roosts. However, currently there are no features on the Site in optimal condition for these bats, as they ideally require continuous flight lines to complex habitats which provide their invertebrate prey.
- 3.25 Overall, the local assemblage of bats is likely to be of **Local-District** importance.

Amphibians

Desktop Study

- 3.26 The Natural Area Profile mentions that Great Crested Newts are a key wildlife feature and are present in many ponds in the South Coast Plain and Hampshire Lowlands area. However, the local Biodiversity Action Plan states that populations within the Coastal Plain west of Worthing (including Walberton) and the whole of Chichester District appear to be scarce, although viable populations do still exist. The intensive agricultural landscape of the Coastal Plain and the lack of large numbers of suitable ponds are thought to be the main reasons for this.
- 3.27 The nearest record of Great Crested Newt returned by the local biodiversity records centre was 515m south of the Site in 2005 (see **Map 2**). There is a network of minor roads and the residential dwellings of Walberton village separating the location of this record from the Site. However, there are a series of five ponds in the golf course to the north that were identified within the Zone of Influence (taken to be up to 250m from the Site).

Field Survey

- 3.28 The five ponds within the Zone of Influence were assessed through a Habitat Suitability Index survey as having potential to support Great Crested Newt (see **Map 6**) and therefore were subject to further presence/likely absence surveys, with the results set out in **Appendix 7**. No Great Crested Newt were found, but Smooth Newt, Palmate Newt and Common Frog are present within the ponds surveyed. The low value boundary features and arable field do not provide amphibians with good opportunities for foraging, shelter or movement during their terrestrial phase.

Evaluation

- 3.29 It is considered reasonable that Great Crested Newt are absent from within the Zone of Influence, and therefore the proposal is unlikely to result in any significant effects on Great Crested Newt populations. Great Crested Newt will therefore not be considered further within this assessment.
- 3.30 Smooth Newt, Palmate Newt and Common Frog are not of sufficient conservation status to be considered explicitly in the remainder of this assessment, but they do have some local value. The proposals for biodiversity gain set out in the following sections will benefit these amphibians.

Reptiles

Desktop Study

- 3.31 Records of Adder and Grass Snake within approximately 600m of the Site were returned from SxBRC, with a record of Adder being the closest record at approximately 200m to the south of the Site from 2002 (see **Map 2**).

Site Survey

- 3.32 The woodland, scattered scrub and western and north-eastern hedgerow within the Site may provide refuge and hibernating habitat for common reptiles such as Slow Worm, Grass Snake and Common Lizard, albeit to a limited extent. The majority of these habitats within the Site will be retained as part of the proposal. However, a very small section of the woodland and western and north-eastern hedgerow will be cleared for installation of pathways and an access road.

Evaluation

- 3.33 As the area of habitat to be lost will be minimal it is considered that clearance works would have limited impact on the conservation status of any local reptile populations should they be present. Given the limited extent of suitable habitat within the Site, it is very unlikely that the assemblage of reptiles could be sufficiently important to trigger a significant ecological effect.

Hazel Dormice

Desktop Study

- 3.34 Hazel Dormice have been recorded in Potwell Copse, approximately 500m to the west in 2011. Whilst there are no records, it is possible that this species may also occur in woodland nearer the Site given the connectivity to habitats known to support this species.

Site Survey

- 3.35 The absence of continuity in the boundary vegetation around the Site with areas of woodland likely to support Hazel Dormice suggests that Hazel Dormice are not likely to be present on Site.

Evaluation

- 3.36 This species is susceptible to predation and may occur within the 400m Zone of Influence within which cats introduced by new residents are likely to roam from the Site. Although the more suitable habitat is located at the further reaches of the perceived cats' range, reducing the likelihood of predation. However, it is considered that pet cats rarely predate on Hazel Dormice and are not a significant threat to local populations, as the cats are usually hunting at ground level whilst the Hazel Dormice are inhabiting the canopy/shrub layer (Bright and Morris 1993, Bright et al 2006, Morris 2004, Woods *et al* 2003). Therefore, a significant negative impact is unlikely and this species will not be considered further within this assessment.

Water Voles

Desktop Study

- 3.37 There are records of Water Voles along Binsted Brook, 200m to the north-east and also to the south of the Site in 2015. Water Voles have declined throughout the UK in recent decades. However, this is due to the introduction of the American Mink and degradation of their habitat, neither of which effects will be triggered by this proposal.

Site Survey

- 3.38 There is currently no habitat on the Site which could be used by this species.

Evaluation

- 3.39 As there is no suitable habitat on the Site, this species will not be considered further within this assessment.
- 3.40 However, the proposals to create water features within a green infrastructure network will increase the potential for this species. Therefore, whilst not considered further in this assessment, they could benefit from the proposed biodiversity gain.

Badgers

Desktop Study

- 3.41 The data request from the Badger Trust West Sussex did not return any records of Badger from within the Site boundary. The closest record of Badger is approximately 500m to the south of the Site.

Field Survey

- 3.42 There is a single active mammal burrow with fresh spoil outside the entrance that is located next to the mature Pedunculate Oak within the south of the Site (TN1 on **Map 3**). This tree is noted to be retained. From inspection, the mammal burrow appears to be currently used by Fox (through presence of a Fox hair and paw print). No other signs or evidence of Badger was found within and immediately surrounding the Site.

Evaluation

- 3.43 It is considered reasonable that Badger are absent from within the Zone of Influence, and therefore the proposal is unlikely to result in any significant effects on Badger populations. Badgers will therefore not be considered further within this assessment.
- 3.44 However, in view of the likely timescales for the development, which could allow Badger to occupy this burrow or form new excavations within the Site, it is recommended that an update survey including a 2-week monitoring period of the identified burrow using remote cameras is undertaken at least 3 to 6 months prior to the start of construction works. This leaves sufficient time to close any Badger setts in current use that might be confirmed and could be negatively affected by the proposal.

Brown Hare

Desktop Study

- 3.45 The arable habitat within the Site can support Brown Hare. **Map 2** shows that Brown Hare, a Priority Species, has been recorded within 2km of the Site in 2000.

Site Survey

- 3.46 Brown Hare was not recorded during any of the surveys, many of which were early and late in the day, when Hares are most often seen.

Evaluation

- 3.47 No significant effects on this species are anticipated and it is not considered further in this assessment.

Hedgehog

Desktop Study

- 3.48 Hedgehogs, a Priority Species, have been recorded locally (see **Map 2**). This species is declining rapidly nationally. It is habituated to humans.

Site Survey

- 3.49 Currently the features on Site are in sub-optimal condition to support this species, which requires connected hedges or similar and diverse foraging opportunities.

Evaluation

- 3.50 While the features on Site are in sub-optimal condition, the loss of habitat as part of the proposals has the potential to fragment habitats used by this species.

Statutory Nature Conservation Sites

- 3.51 There are two nationally designated sites within 5km of the Site (see **Map 1**). Fairmile Bottom Site of Special Scientific Interest (SSSI) lies approximately 2.4km to the north-east and is designated for its Yew Taxus woodland and unimproved chalk grassland as well as the Silver-washed Fritillary butterfly.
- 3.52 Arundel Park SSSI lies approximately 3.9km to the east of the site. Arundel Park SSSI one of the most important sites in the country for invertebrates including a number of rare and notable species. The area has a particularly diverse breeding bird community and is important for overwintering species. The site also includes examples of species-rich chalk grassland containing several plants uncommon in Sussex.
- 3.53 There is also a locally designated site within 5km of the Site. Fairmile Bottom Local Nature Reserve (LNR) is part of the same area of land designated as a SSSI and lies approximately 2.4km to the north-east of the Site (see **Map 1**).

- 3.54 Having reviewed the citations and Condition Assessments for the designated SSSIs and LNR within 5km of the Site boundary, no particular vulnerability to public access and recreation is identified. As there are no other predicted biophysical changes which could affect these features, they are not considered further in this assessment.

Non-Statutory Local Wildlife Sites and Ancient Woodland

- 3.55 There are a number of non-statutory wildlife sites within 2km, most of which are protected because they support Ancient Woodland (see **Map 1**). The nearest is Rewell Wood Complex Local Wildlife Site (LWS) which lies approximately 300m to the north-east. This LWS is designated for its Ancient Semi-Natural Woodland.
- 3.56 The woodland is privately owned, but can be accessed by a Public Right of Way which passes through it. However, Ancient Woodland is not identified in local planning policy or strategy as being particularly vulnerable to increased recreational demand within the local area. No significant effects are therefore predicted and these features are not considered further in this assessment.

4 IDENTIFICATION OF POTENTIALLY SIGNIFICANT EFFECTS

- 4.1 During site preparation and construction, the birds, bats, reptiles and Hedgehogs which may use the Site are vulnerable to disturbance and harm.
- 4.2 In the longer term, the following features may be significantly affected (positively or negatively) by the proposal. Other effects that may trigger legislation are covered in **Section 7**.

Construction Phase

Woodland, Hedgerows, Tree-lines and Individual Trees

Habitat Loss

- 4.3 The proposed new access road and footpaths to Tye Lane and Yapton Lane will cause the loss of a limited number of trees, hedge and scrub and fragmentation of linear features. However, most of these features will be retained within substantial areas of green infrastructure which are larger, more diverse, more continuous and better managed than the current features. As habitat loss will be minimal and given the extensive habitat creation proposed which will more than compensate for habitat loss, this is considered to not cause a significant effect.

Birds

Habitat Loss

- 4.4 The vast majority of bird nesting habitat will be retained as part of the Site. Losses will be limited to a small number of trees and sections of hedgerow and woodland to be breached to create access roads and pathways. No birds of conservation concern were recorded as holding territory here and these breaches are not considered to be significant in terms of their potential to affect the conservation status of the breeding bird assemblage.
- 4.5 Some foraging habitat in the north-eastern grassland field will be lost to development, although this will be minimal and unlikely to have a significant effect upon the conservation status of the breeding bird assemblage as a whole.
- 4.6 The retention of most of the boundary habitats and creation of new habitat within the open space areas throughout the Site will provide additional foraging and nesting resources that will enhance the Site for the local bird assemblage and compensate for the loss of suitable habitat as part of the scheme.

Harm or Death to Individuals

- 4.7 The clearance of trees and vegetation has the potential to kill and injure nesting birds and destroy nests, eggs and dependent young. Given the small areas to be cleared, any losses of individual birds and/or nests would be minimal and unlikely to affect the conservation status of the overall breeding bird assemblage to the degree that the effect would be significant. However, this would constitute a legal offence under the provisions of the Wildlife and Countryside Act 1981 (as amended) and will therefore need to be avoided and mitigated.

Disturbance

- 4.8 Site clearance and construction activities may cause disturbance to key breeding bird species including Dunnock that occupy habitats on the boundaries of the Site through increased noise (heavy plant, generators etc.), activity (movement of vehicles and people) and through increased lighting (tower lights).
- 4.9 However, the disturbance effect would be short-term and reversible and the magnitude of the effect will vary, depending on the number and type of construction operations being undertaken at once, and their proximity to adjacent habitats. The extent of the disturbance effect, despite being widespread across the Site, is only likely to be at a level that would affect breeding birds at the very edge of these areas next to the construction boundary.
- 4.10 It is possible that disturbance will cause some stress to breeding birds and may result in the abandonment of breeding territories and nesting sites in localised areas. A short-term negative effect is therefore likely, but is unlikely to affect the conservation status of the breeding bird assemblage overall and is therefore considered to be not significant.

Bats

Harm or Death to Individuals

- 4.11 No tree's that are potentially required for removal were found to have more than low potential to support bat roosts. Unmitigated, there is the potential for harm or death to individual bats during the felling of Tree 1 assessed as having low potential to support bats. This would constitute an offence under the provisions of the Wildlife and Countryside Act 1981 (as amended) and Habitats Regulations 2010 (as amended). In the absence of mitigation, a significant negative effect of death and/or injury to bats is likely within the Zone of Influence level.

Loss and Fragmentation to Habitat

- 4.12 The majority of suitable and key habitat for bats within the Site will be retained. To facilitate the creation of road and pathway access points, small areas of woodland and hedgerow habitat will be removed. As the amount of vegetation to be removed will be minimal, that the existing high tree canopy will be maintained and that any street lighting to be installed as part of access creation will be minimised and designed to limit lighting effects, it is considered that there will be an insignificant effect on bats with relation to habitat loss and fragmentation as existing features available to foraging and commuting bats will be maintained.

Disturbance

- 4.13 Construction activity, noise and lighting would have the potential to disturb roosting, commuting and foraging bats and may result in abandonment of roosts or core foraging areas. In the absence of mitigation this could negatively affect the conservation status of bat populations and would be a significant negative effect within the Zone of Influence level. Under the provisions of the Wildlife and Countryside Act 1981 (as amended) and Conservation of Habitats and Species Regulations 2010 (as amended) this could constitute an offence and will need to be mitigated.

Reptiles

Harm or Death to Individuals

- 4.14 The clearance of small sections of the woodland and western and north-eastern hedgerow has the potential to kill and injure reptiles. Given the small areas to be cleared, any losses of individual reptiles would be minimal and unlikely to affect the conservation status of the overall local reptile assemblage to the degree that the effect would be significant. However, this would constitute a legal offence under the provisions of the Wildlife and Countryside Act 1981 (as amended) and will therefore need to be avoided and mitigated.

Operational Phase

Birds

Disturbance and Predation

- 4.15 Breeding birds are likely to be subject to increased levels of disturbance from human activity, traffic movements and resultant noise, due to the proximity of housing to habitats used by birds for nesting and foraging. The number of domestic pets is likely to increase with a resultant increase in disturbance from dogs and predation by cats. The disturbance effect will be permanent and irreversible, with a variable frequency and magnitude. The Site is predicted to see an increase in cat predation as a result of the residential areas created, while the areas of public open space proposed for the Site is likely to attract increased numbers of dog walkers and associated disturbance effects.
- 4.16 Although it is likely that disturbance and predation will have negative effects, this is considered unlikely to affect the overall conservation status of the breeding bird assemblage within the Zone of Influence. This is particularly the case when taken in the context of habitat creation and enhancement measures described above that will benefit birds by providing additional nesting and foraging resources to boost populations. This effect is therefore considered to be not significant.

Habitat Creation, Management and Enhancement

- 4.17 The Site includes the creation of areas of public open space, including tree and hedgerow planting and creation of SuDS. A range of bird boxes to benefit different species will be erected on suitable trees around the Site.
- 4.18 These habitat creation and enhancement measures are likely to benefit the breeding bird assemblage by providing increased habitat for nesting, foraging and shelter. The wildlife-friendly management measures are also likely to boost the invertebrate population within the Zone of Influence, that will benefit breeding birds which feed, or feed their young, on invertebrates. However, it is not possible to say with certainty whether this will significantly change the conservation status of the breeding bird assemblage within the Zone of Influence, particularly when coupled with operational-phase effects such as cat predation, described below.

Bats

Disturbance

- 4.19 Lighting has been shown to be highly disturbing to bats and can have an effect on bat activity and use of a site (Stone, 2013; BCT, 2009). Direct lighting can cause abandonment of roosts, change feeding habits and interrupt commuting routes, or result in artificial roosts installed within mitigation schemes not becoming colonised. Increased lighting of stationary objects has been shown to significantly increase bat collisions through the effects of glare on their sensitive eyesight and increased ambient lighting results in avoidance of established commuting routes and foraging zones due to an increase in perceived predation risk.
- 4.20 An increase in uncontrolled lighting could result in the loss and fragmentation of foraging areas, roosting sites and commuting routes. Therefore, in the absence of control measures, artificial lighting in the Site is likely to adversely affect the conservation status of the bat populations and result in a significant negative effect within the Zone of Influence level.

Habitat Creation, Management and Enhancement

- 4.21 The proposed green infrastructure provides an opportunity to deliver biodiversity gains for bats by increasing the extent, diversity and connectivity of their habitats. A range of bat boxes to benefit different species will be erected on suitable mature trees around the Site. However, it is not possible to say with certainty whether this will significantly change the conservation status of the bat assemblage within the Zone of Influence.

Hedgehogs

Habitat Fragmentation

- 4.22 This species is vulnerable to fragmentation of its habitat by the introduction of impermeable barriers such as fences which are cemented directly into the ground. However, permeability through the Site will be maintained through areas of open space to be created. Therefore, it is considered that there will be an insignificant effect on Hedgerows with relation to habitat fragmentation.

5 MEASURES TO AVOID OR REDUCE IMPACTS AND DELIVER BIODIVERSITY GAIN

- 5.1 All mitigation and biodiversity gain measures will be combined into a Landscape and Ecological Management Plan (LEMP) which will be submitted to Arun District Council for approval prior to the start of works on the Site. This Plan will be implemented by the appointed Management Company with funding agreed as part of a Section 106 Agreement. This will ensure that the potential gains identified in the previous section are delivered.
- 5.2 The following measures below will avoid, reduce or compensate for the significant effects set out in **Section 4**. The measures will be detailed in the LEMP.

Construction Phase

Birds

Harm or Death to Individuals

- 5.3 Harm or death to nesting birds and their nests, eggs and dependent young will be avoided by timing clearance of potential breeding habitat outside of the breeding season, which is from March to September inclusive.
- 5.4 Where vegetation clearance work during this period is required, this will need to be immediately preceded by a check for evidence of nesting birds by a suitably experienced ecologist. Should an active nest be found, work in the vicinity of the nest will stop and the nest protected in situ until any dependent young have fledged the nest.
- 5.5 This will avoid the risk of contravention of the requirements of the Wildlife & Countryside Act 1981 (as amended) in respect of its provisions regarding the protection of nesting birds, their nests, eggs and young. It is therefore considered that following the application of these mitigation measures, a legal offence will be avoided.

Bats

Harm or Death to Individuals

- 5.6 As many bat species that use trees for roosts are known to exhibit roost switching behaviour and that there is potential for tree roost features to develop further over time, Tree 1 that is required for removal and has been identified as having low potential to support roosting bats will be felled under a safe working Method Statement as recommended within the Bat Conservation Trust Good Practice Guidelines (Bat Conservation Trust, 2016), details for which are outlined below.

Timing

- 5.7 The removal of Tree 1 that has low potential to support bat roosts will be undertaken where possible outside of the main active period for bats (May to September inclusive). This should also ensure that the main breeding bird season is avoided (March to August inclusive). The length of this period will be dictated by seasonal weather conditions. Felling/removal during

these periods should only take place where an inspection survey has confirmed that a roost is not present.

Method for Tree Works

- 5.8 Tree 1 that was assessed as having low bat roost potential will be inspected prior to felling works by a suitably qualified and licensed bat ecologist, using climbing equipment, torches and an endoscope where necessary. If bats are found during the tree inspection survey or during felling works then works will not start or cease immediately and Natural England will be contacted for further advice, as further survey work and a European Protected Species Licence (EPSL) may be necessary to enable works to take place lawfully.
- 5.9 Where removal is necessary, any tree that is found to support a bat roost will be felled under an EPSL granted by Natural England. Tree specific mitigation and compensation will be clarified prior to obtaining an EPSL. Delivery of the mitigation strategy would become a condition of an EPSL, with the associated Method Statement that would be agreed with Natural England incorporated in the LEMP.
- 5.10 Inspection of roost features will be undertaken as described above immediately prior to felling. This inspection will aid the identification of parts of the tree where bats may be present, and allow particular care to be taken when working in these areas. The felling of a tree with bat roost potential will be undertaken under methodology suitable for the specific tree and will broadly follow the soft felling techniques as described below:
- Cross-cutting will be avoided in proximity to cavities or hollows;
 - Limbs with internal fissures will be pruned carefully to maintain integrity of features as potential roost sites;
 - Any sections felled which contain cavities should be lowered carefully and left on the ground for 24 hours with the openings clear, allowing any bats inside an opportunity to escape;
 - Split limbs under tension will be wedged open to prevent their closure when pressure is released, potentially trapping bats;
 - Loose bark will be removed carefully before each section is felled, to avoid trapping bats when the limb falls;
 - Depending on its thickness, any Ivy growth will either be pruned/sectioned or, if sufficiently thick to protect potential bats roosting behind, will be left intact and the tree section felled, inspected on the ground and then left for 24 hours before section cutting; and
 - The tree will also undergo a detailed search on the ground once it has been felled.
- 5.11 Implementation of the above precautionary measures immediately prior to, and during, felling will avoid the potential for accidental harm or death to bats which may be roosting within Tree 1 at the time of felling. Potentially significant effects and associated legal consequences will therefore be avoided.

Disturbance

- 5.12 It will be necessary to develop a series of measures to ensure that activities associated with site clearance and construction (construction lighting, noise) do not result in significant disturbance to the likely bat population in and adjacent to the Site. Construction work will be restricted to daylight hours. Any construction site lighting will be subject to approval from the consultant ecologist, to ensure that disturbance to bats and other nocturnal wildlife is minimised. It is therefore considered that following the application of these mitigation measures, potentially significant effects and associated legal consequences will therefore be avoided.

Reptiles

Harm or Death to Individuals

- 5.13 As the area of suitable reptile habitat to be lost is minimal it is felt that clearance works would have limited impact on local reptile populations should they be present. However, to minimise the risk of harm to any potential resident reptiles at the Site, retained boundary vegetation with suitability to support reptile species will be protected from disturbance during construction through use of heras-type fencing.
- 5.14 As a precautionary measure, vegetation removal works of suitable reptile habitat shall be carried out in a sensitive manner via a destructive search during the active reptile season from March to October inclusive. This will involve an ecologist supervising the manipulation and removal of habitat in a phased manner, to persuade any reptiles present to move into the boundary features that are to be retained and protected. This is anticipated to avoid the risk of contravention of the requirements of the Wildlife and Countryside Act 1981 (as amended) in respect of its provisions regarding the protection of reptiles. It is therefore considered that following the application of these mitigation measures, a legal offence will be avoided.

Operational Phase

Bats

Disturbance

- 5.15 A lighting strategy for the Site will be designed in order to ensure that the surrounding habitat suitable for bats such as the woodland area, hedgerows and trees are not subject to illumination. Particular attention should be paid to any lighting associated with the boundary vegetation of the Site. Any new light fixtures will be angled downwards to minimise light spill. It is therefore considered that following the application of these mitigation measures, potentially significant effects and associated legal consequences will therefore be avoided.

Delivery of Biodiversity Gain and Protection of Retained Features

- 5.16 The following measures will deliver biodiversity gain and protect retained features. The measures will be detailed in the LEMP.

- To minimise the removal of woodland and hedgerow for the road access and the footpath to Tye Lane, then to manage the retained woodland, hedges, tree-lines and trees to promote biodiversity;
- Protect features to be retained during construction through incorporation of suitable buffer zones with the aid of heras-type fencing i.e. retained woodland, trees and hedges;
- The open space areas to be created as part of the green infrastructure of the Site will be designed to maximise the potential for biodiversity gain. The retained features will be extended and diversified by planting locally native trees and shrubs which provide food and shelter for birds and bats. The expanded wooded features will be managed to maximise their production of food and continuous cover;
- Newly created grassland in the open space areas will be sown with a locally appropriate wildflower mix and manage it to produce areas of short and long grass;
- The margins between the hedges and wooded features and the grassland will be managed to create graduated edges, with maximum flowers and fruit to support birds and invertebrates;
- There will be a selection of walking routes created within the open space areas which will absorb some of the existing and increased demand for informal recreation.
- The surface water drainage features will be designed to maximise their potential for amphibians and Water Voles; and
- Garden fences will be designed to allow access for Hedgehogs, increasing the permeability of the Site for this species.

6 ECOLOGICAL ASSESSMENT

- 6.1 Taking account of the mitigation set out in the previous section, the residual impacts are discussed below and summarised in **Table 6.1**.

Woodland, Hedgerows, Tree-lines and Individual Trees

- 6.2 The new planting and management proposed will enable these features to become more extensive, more diverse, part of a more connected ecological network and better managed. This will enhance the condition of these features and the conservation status of the species which rely on them.

Birds

- 6.3 Given the predicted increase in nesting habitat and food sources and the level of human habituation of most of the species recorded, the conservation status of the assemblage of birds is not likely to be significantly negatively affected by increased predation and disturbance. Implementation of a safe method of works, as detailed within the LEMP, will ensure harm or death to individuals is avoided.

Bats

- 6.4 Providing an appropriate lighting strategy is implemented, the expanded and improved green infrastructure is likely to improve the conservation status of the assemblage of bats in the area. Implementation of a safe method of works, as detailed within the LEMP, will ensure harm or death to individuals is avoided.

Reptiles

- 6.5 Implementation of a safe method of works, as detailed within the LEMP, will ensure harm or death to individuals is avoided.

Hedgehogs

- 6.6 Providing the green infrastructure and garden fences are designed to allow permeability through the Site for this species, the conservation status of the local population is likely to improve due to access to improved habitat.

Table 6.1: Summary: Assessment of Residual Ecological Impacts and Opportunities for Biodiversity Gain

Important Ecological Feature	Estimated Importance/ Condition/ Trend	Potential Impacts in the Absence of Mitigation (Alone/In-combination)	Impact Avoidance, Mitigation, Compensation and Ecological Restoration	Predicted Residual Impacts/Biodiversity Gain	Assessment of Likely Significant Effect with Mitigation
Woodland, hedgerows, tree-lines and individual trees	Site Unfavourable Stable	Increased extent, diversity, management and connectivity.	Retain and enhance most features. Minimise unavoidable losses for access road and footpath to Tye Lane. Plant locally appropriate trees and shrubs to expand, diversify and link existing features. Manage retained and new features to maximise biodiversity.	Increased size, improved condition and better connected habitats.	Significant positive and long-term effects likely.
Birds	Local Local trend not known, but some species declining nationally	Harm or death to individuals. Loss of nesting and foraging habitat. Increased predation and disturbance.	Retain and enhance most features with potential for nesting birds. Unavoidable removal of potential nesting features to be conducted in accordance with agreed Method Statement (as detailed within a LEMP).	Increased and improved habitat will provide opportunities to minimise disturbance and predation.	No significant negative effects. Significant positive and long-term effects likely.
Bats	Local-District Local trend not known, but some species at risk nationally	Harm or death to individuals. Loss of bat roosts. Lighting and fragmentation of flight lines.	Retain most roost features within improved ecological network. Design lighting to avoid roosts, foraging areas and flight lines where possible. Increase potential habitat. Any unavoidable removal of potential roost features to be conducted in accordance with an agreed Method Statement (as detailed with a LEMP) and, if necessary, EPSL.	Increased and improved habitat will more than compensate for losses.	No significant negative effects. Significant positive and long-term effects likely.
Reptiles	Site Local status and trend not known.	Harm or death to individuals.	Unavoidable removal of potential suitable habitat, while minimal, to be conducted in accordance with agreed Method Statement (as detailed within a LEMP).	Increased and improved habitats.	No significant negative effects. Significant positive and long-term effects likely.
Hedgehog	Site Local status not known.	None predicted	Design green infrastructure and garden fences to enable access by Hedgehogs.	Increased and improved habitats.	Significant positive and long-term effects likely.

	Declining nationally				
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7 LEGAL CONSIDERATIONS

7.1 Should planning permission be granted for the proposals, the following legal considerations will apply, in accordance with the following items of legislation:

- The Conservation of Habitats and Species Regulations 2010 (as amended); and
- The Wildlife and Countryside Act 1981 (as amended).

Birds

7.2 The LEMP will include a Method Statement designed to avoid disturbing or harming breeding birds during the construction phase.

Bats

7.3 The proposal is not likely to cause a significant negative effect on the conservation status of any bats. There is ample opportunity for mitigation, compensation and biodiversity gain. Arun District Council can therefore be confident that it is not unlikely that any required European Protected Species Licence would be granted.

7.4 Prior to the start of work on site, the features with potential for bat roosts should be surveyed in accordance with appropriate guidance as detailed in **Section 5**. Depending on the results, it may then be necessary to apply for a EPSL. The EPSL application must be supported by sufficient survey data and a Method Statement, which would also be incorporated in the LEMP, to enable Natural England to assess the likely effects and effectiveness of the proposed mitigation and compensation.

Reptiles

7.5 The LEMP will include a Method Statement designed to avoid harming reptiles during the construction phase.

8 FURTHER ACTIONS

- 8.1 **Table 8.1** sets out the actions proposed to be undertaken to detail the biodiversity measures and meet legal requirements and inform project timings, should planning permission be granted.

Table 8.1
Further actions required to meet legal requirements and inform project timings

Action	Timing
Draft and agree LEMP	Prior to the start of work on site
Draft and agree lighting strategy	Prior to the start of work on site
Bat inspection of affected tree with low bat potential prior to felling	October to February
Update Badger survey	3 to 6 months prior to the start of works on site
Supervision by a suitably experienced ecologist of any necessary removal of nesting bird habitat during the breeding bird season	March to September
Supervision by a suitably experienced ecologist of any necessary removal of suitable reptile habitat	March to October
If necessary, apply for EPSL	Prior to removal of important features supporting European protected species. Incorporate Method Statement into LEMP

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Maps

- Map 1** Protected Sites within the Zone of Influence
- Map 2** Records of Relevant Species within the Zone of Influence
- Map 3** Habitats and Features on Site
- Map 4** Breeding Bird Survey Results
- Map 5** Ground Level Tree Bat Inspection Results
- Map 6** Habitat Suitability Index Survey Results



MAP 1 Protected Sites within the Zone of Influence

KEY

- Site boundary
- 2km linear distance from site boundary
- 5km linear distance from site boundary
- Local Nature Reserve (LNR)
- Site of Special Scientific Interest (SSSI)
- Local Wildlife Site (LWS)
- Ancient Woodland

SCALE: 1:40,000 at A3

0 500 1,000 1,500 2,000 Metres



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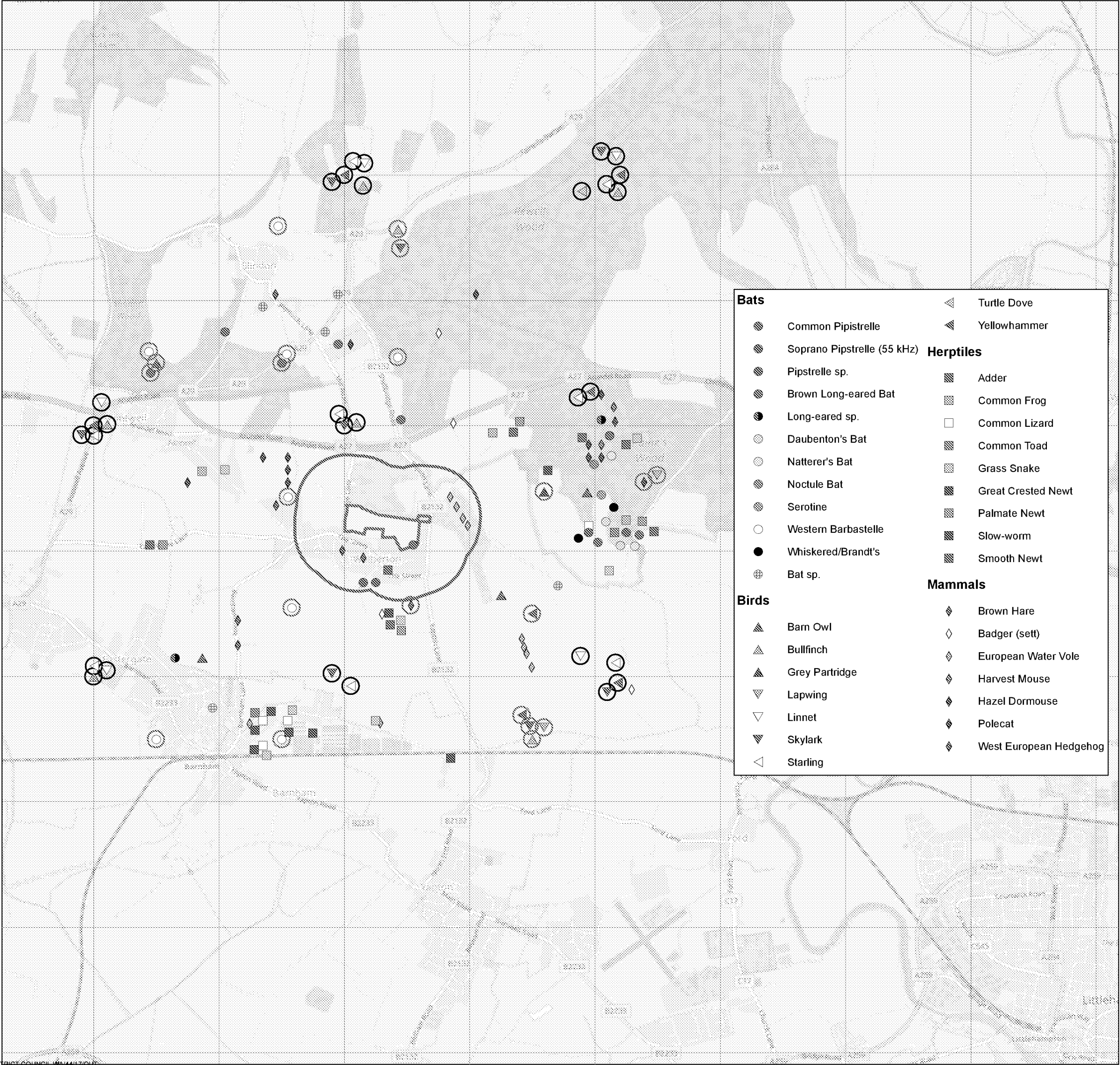
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PROJECT: Walberton

DATE: June 2017

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MAP 2 Records of Relevant Species within the Zone of Influence

KEY

- Site boundary
- 400m linear distance from site boundary
- Record accurate to 1km
- Record accurate to 2km

Bats		Herptiles	
Common Pipistrelle		Adder	
Soprano Pipistrelle (55 kHz)		Common Frog	
Pipistrelle sp.		Common Lizard	
Brown Long-eared Bat		Common Toad	
Long-eared sp.		Grass Snake	
Daubenton's Bat		Great Crested Newt	
Natterer's Bat		Palmate Newt	
Noctule Bat		Slow-worm	
Serotine		Smooth Newt	
Western Barbastelle			
Whiskered/Brandt's			
Bat sp.			
Birds		Mammals	
Barn Owl		Brown Hare	
Bullfinch		Badger (sett)	
Grey Partridge		European Water Vole	
Lapwing		Harvest Mouse	
Linnet		Hazel Dormouse	
Skylark		Polecat	
Starling		West European Hedgehog	
		Turtle Dove	
		Yellowhammer	

SCALE: 1:30,000 at A3

0 500 1,000 1,500 2,000 Metres



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MAP 3 Habitats and Features on Site

KEY

-  Site boundary
-  Arable
-  Semi-improved grassland
-  Broadleaved woodland
-  Scattered scrub
-  Bare ground
-  Species-poor hedge
-  Tree
-  Target note (with ID)
-  Hedgerow trees

SCALE: 1:2,500 at A3

0 25 50 75 100 Metres



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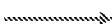
P17/01

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



MAP 4 Breeding Bird Survey Results

KEY

-  Site boundary
-  Red Listed Species: approximate centre of territory
-  Red Listed Species: seen/heard
-  Amber Listed Species: approximate centre of territory
-  Amber Listed Species: seen/heard
-  Bird in flight

SG - Starling
D - Dunnock
HS - House Sparrow
LI - Linnet
K - Kestrel
MA - Mallard

SCALE: 1:2,500 at A3

0 25 50 75 100 Metres



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P17/01

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



MAP 5 Ground Level Tree Bat Inspection Results

KEY

- Site boundary
- Low potential tree
- Negligible potential tree

SCALE: 1:2,500 at A3

0 25 50 75 100 Metres



Ecological Planning & Research

CLIENT: Wates Development

PROJECT: Walberton

DATE: June 2017

MAP 6 Habitat Suitability Index Survey Results

KEY



SCALE: 1:2,500 at A3

0 25 50 75 100 Metres



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PROJECT: Walberton

DATE: June 2017

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Appendix 1

Illustrative Masterplan

Appendix 2

Biodiversity Checklist

BIODIVERSITY CHECKLIST

Please complete this form having regard to the Biodiversity Checklist Notes, which can be found at:
<http://www.arun.gov.uk/biodiversity-checklist>

If you tick Yes, you must provide supporting information/statement with the application. If you do not the application will be held as invalid until you do so.

Site Address/Application Reference Number:

LAND EAST OF THE LANE, WALBERTON,
WEST SUSSEX

Bats

YES

NO

Has the site been surveyed for bats?

☐
☒

Are there any structures on site which have the potential to support roosting bats?

☒
☐

Structures with high potential include all agricultural buildings, buildings with weather boarding, tunnels, mines, ice houses, bridges, cliff faces with crevices and woodland. Further guidance can be found in 'Bat Surveys: Good Practice Guidelines' available from www.bats.org.uk and the Bat Mitigation Guidelines available from:

<http://www.naturalengland.org.uk/ourwork/regulation/wildlife/species/bats.aspx>

Are there any trees on the site which have the potential to support roosting bats?*

☒
☐

Trees with high potential to support roosting bats include old and veteran trees and any tree with cracks or crevices. Where appropriate, foraging and commuting routes should be incorporated into the design of the scheme. Further guidance can be found in 'Bat Surveys: Good Practice Guidelines'

Barn Owls

YES

NO

Has the site been surveyed for barn owls?*

☐
☒

Is there any evidence of barn owls nesting on or near the site or are there suitable nesting areas on the development site?*

☐
☒

Barn owls often nest in farm buildings, dovecotes, bale stacks, hollow trees and a wide variety of derelict buildings. Barn owls require habitat which supports high number of small mammals including pasture, hedgerows and woodland. Further information can be found at <https://www.gov.uk/guidance/construction-near-protected-areas-and-wildlife>

Breeding birds

YES

NO

Has the site been surveyed for breeding birds?*

☒
☐

Will areas of hedgerow/scrub/woodland/trees or other features likely to be used by nesting birds be affected by the proposal?*

☒
☐

If 'Yes' then mitigation measures to ensure occupied nests are protected should be included with the application.

Badgers

YES

NO

Has the site been surveyed for badgers?*

☒
☐

Is there any evidence of badgers on or near the application site?*

☐
☒

Are badgers commuting through the site to foraging areas?*

☐
☒

Badgers use a wide variety of habitats and setts can be found in hedgerows, woodlands, scrub and field margins. Where appropriate, safe routes to foraging areas should be incorporated into the development proposals. Further information can be found in 'Badgers and Development' available at:

<http://www.naturalengland.org.uk/ourwork/regulation/wildlife/species/badgers.aspx>

Updated 11/05/16

	YES	NO
Dormice		
Has the site been surveyed for dormice?*	☐	☒
Is there suitable habitat for dormice on, or close to the application site?*	☒	☐

Dormice are found in a variety of habitats including ancient semi-natural woodland, scrub, young plantations (both broadleaved and coniferous) and hedgerows. Occasionally they are recorded in gorse scrub, heathland and alder trees in reedbeds.

<https://www.gov.uk/guidance/hazel-dormice-protection-surveys-and-licences>

	YES	NO
Great crested newts		
Has the site been surveyed for great crested newts?*	☒	☐
Is there suitable habitat for great crested newts on, or close to the application site?*	☒	☐

Great crested newts are often recorded in ponds, reedbeds, ditches and mineral workings. Terrestrial habitat used by newts is varied and includes semi-natural grassland, woodland, hedgerows and pasture and are often found in urban sites including gardens. Further guidance on great crested newts can be found in the Great Crested Newt Mitigation Guidelines from:

<https://www.gov.uk/guidance/great-crested-newts-protection-surveys-and-licences>

	YES	NO
Reptiles		
Has the site been surveyed for reptiles?*	☐	☒
Is there suitable habitat on the site for reptiles?*	☒	☐

Reptiles use a variety of habitats including rough grassland, heathland, allotments, scrub, brownfield sites, field margins and abandoned gardens. Further information can be found at:

<https://www.gov.uk/guidance/reptiles-protection-surveys-and-licences>

Appendix 3

Methodology

EVALUATION METHODOLOGY

The Ecological Assessment has been completed following guidance in the Chartered Institute of Ecology and Environmental Management (CIEEM) *Guidelines for the Ecological Impact Assessment in the United Kingdom* (2016).

Using the above guidance and professional judgement, the important ecological features assessed in this report are valued according to the EclA guidelines (CIEEM, 2016) on a geographical frame of reference, at either within the Zone of Influence, Parish/Local, District, County, Regional, National, European or International level of importance.

The study area encompassed the Zone of Influence of the proposal. The Zone of Influence is defined as *“the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities”* (CIEEM, 2016).

DESK STUDY METHODOLOGY

A desk study was carried out to gather and refer to existing biodiversity and contextual information with respect to the Zone of Influence and the wider area. This involved interrogation of internet resources, including the Multi-agency Geographic Information for the Countryside (MAGIC), aerial photos, current Ordnance Survey maps and the Old Maps online database. Reference was also made to local planning policies, strategies and initiatives relating to biodiversity.

Sussex Biodiversity Records Centre was commissioned to provide information from their database to provide existing data records with full coverage of the site. Statutory site designations for nature conservation were identified within 5km and non-statutory sites, protected species records and all other records were identified within a 2km radius from the centre of the site.

FIELDWORK METHODOLOGY

Preliminary Ecological Appraisal

The field survey was completed by Daniel O’Sullivan of EPR on 6 March 2017. The entire site and immediate surrounds (where access was permitted) was walked, recording habitats and features of potential value to wildlife and any evidence of, or potential for, protected or notable species or habitats, in accordance with the methods described below.

Land Use, Habitat Types, Vegetation Communities and Flora

Within the study area the land use, habitat types and landscape features (such as hedgerows and veteran trees) were described and mapped. For each main habitat type the dominant vegetation communities were recorded, along with any notable or indicator plant species, (including Japanese Knotweed where present). A preliminary evaluation of the structure, quality and likely management of each habitat or feature was also carried out.

The survey method used to record this information was based on Phase 1 Habitat Survey methodology (JNCC 2010).

Badgers

Consideration was given to the presence of habitat potentially suitable for supporting Badgers, including woodland and grassland. Potential evidence of the presence of Badgers was looked out for and noted, including earthworks that might be Badger setts, and signs such as dung pits, mammal pathways through ground vegetation and under fences, and hairs on fences.

Bats

Bats use buildings and trees for roosting and breeding and, where present, a preliminary assessment of the potential for these features to support bats was undertaken during the survey in accordance with categories set out within the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines (2016). A summary of the methodology used to assess bat roosting potential is given below. Potential may include gaps beneath roof or hanging tiles, in soffits, or beneath the end of ridge tiles, but also under the edge of felt on flat roofs. In trees, potential roosting features include woodpecker holes, splits in branches and peeling bark.

Preliminary evidence was obtained through noting any staining around potential roost entrances, and looking for bat droppings, for example on window sills. A preliminary evaluation was also undertaken of potential bat foraging habitat in the area, including woodland, pasture, hedges and watercourses.

Dormouse

The type and quality of habitat with the potential to be suitable for supporting Dormice, such as woodland and hedgerows, was considered during the survey. In particular, the presence of Oak, Hazel and berry-bearing shrubs was noted, and the connectivity of habitat recorded.

Water Voles

The presence and quality of any watercourses with the potential to support Water Voles was recorded during the survey. Potential evidence of Water Voles, including burrows in the tops and vertical face of riverbanks, and feeding evidence was recorded where appropriate.

Otter

Where watercourses are present, a preliminary evaluation of the quality of the riparian habitat for potentially supporting Otters was made. A preliminary search was made for signs of Otters, including spraints which are often left in prominent places on river banks, such as logs and bare patches of ground.

Birds

Any birds seen whilst carrying out the survey were recorded, and the type and quality of habitats available for birds was considered, including vegetation suitable for nesting, and habitat with the potential to support valued species, including breeding and wintering birds.

Amphibians

Consideration was given to the presence of habitat potentially suitable for supporting amphibians, including water bodies (ponds, ditches), woodland, scrub and rough grassland, and features such as log piles that might provide hibernation areas. Where appropriate, effort to gather direct evidence of amphibians was undertaken by making a preliminary search for eggs by examining vegetation within reach of the margins of water bodies, and for resting animals on land by looking under potential refuges, such as stones, wood and rubbish near to water bodies.

Reptiles

The presence and quality of habitat considered potentially suitable for supporting reptiles was recorded. This included areas providing basking and foraging areas, hibernation and breeding sites, such as rough grassland and scrub, banks, burrows, rubble piles, compost heaps, hedgebanks and water bodies.

Invertebrates

Readily identifiable invertebrates seen during the survey were recorded, and habitats and features likely to support noteworthy groups and species were noted, for example herb-rich grasslands, areas of bare ground and deadwood habitats, including woodland and veteran trees.

Phase 2 Surveys

Grassland Survey

Field Survey

The grassland field within the north-east of the Site was subjected to a more detailed botanical survey to determine whether it support a Priority Habitat. Representative areas were selected at random across the field with plants recorded in a 2x2m quadrat.

Birds

Potential Zone of Influence

Some of the biophysical changes that could potentially affect birds, such as disturbance, have effects beyond the immediate construction footprint, whilst others are likely to affect bird populations through habitat changes. With this in mind, the potential Zone of Influence that has been considered within this assessment is the Site and immediate surrounding area.

Evaluation Methodology

The method for describing the importance of areas for birds is based on that developed by Fuller, 1980 & 1982, which is the standard evaluation method that can be applied to Ecological Impact Assessment. The objective is to establish the relative importance of bird populations within a geographical context which accords with the CIEEM levels of conservation importance set out above.

The three principal attributes of bird communities that are considered are population size, diversity and rarity as outlined below, as well as the presence of any conservation priority species.

Population Size

This is evaluated by assessing the percentage of a population size unit (e.g. national, county) that occurs within the study site. The standard criterion upon which evaluation of population is based is that if 1% or more of the defined geographical unit of a species regularly uses a site, then the site is important at that geographical scale. This means, for example, that if 1% of the national population occurs, then the site is nationally important for that species. Sources of population data include Musgrove *et al.* (2013) at the UK level, and recent county bird reports.

Diversity

The number of species recorded in an area (species richness) is a simple and effective measure of diversity, which can be used in the assessment of a breeding bird assemblage. **Table 1** below shows the thresholds commonly used to measure diversity (Fuller, 1980).

Table 1: Breeding bird assessment using the number of breeding bird species

Level of Importance	Number of Breeding species	
	Fuller (1980)	Adapted criteria
Local	25-49 species	<25
District	-	25-49
County	50-69	50-60
Regional	70-84	70-84
National	85+	85+

For the purposes of this assessment, Fuller's geographical levels have been adapted, so that Fuller's 'Local' importance is assumed to correspond to 'District' importance as described in the CIEEM guidelines (CIEEM, 2016). An assemblage comprising fewer than 25 breeding species is therefore considered to be of Local importance or less.

Since the publication of the criteria in 1980, species diversity has declined significantly, and it is considered that Fuller's thresholds are too high for today's breeding bird populations. For this reason, it is therefore judged appropriate to recalibrate the categories slightly downward.

Rarity

Several measures of rarity can be used. Species with fewer than 1,000 breeding pairs in Britain are described as Nationally Rare (Fuller, 1980). A species with a County population of up to 25 pairs might therefore be treated as being rare in the County (depending on the species and its status).

Rarity can also be recorded by distribution rather than population size. The Breeding Bird Atlas (Balmer *et al.* 2013) records breeding distributions of birds in Britain and Ireland by 10x10 km grid squares. This makes it possible to describe the frequency of occurrence of individual species in terms of the proportions of squares in which they occur. A 30% level forms a useful line below which species can be described as 'Scarce', for both breeding and wintering species.

The occurrence of species which are specially protected by law or otherwise listed as threatened, although not necessarily strictly rare, can also be helpful in establishing the conservation value of sites. Species listed on Schedule 1 of the Wildlife and Countryside Act 1981 or on Annex 1 of the Birds Directive are worthy of special consideration. These lists take into account measures such as population size and distribution.

Conservation Priority Species

A number of bird species are also listed as Species of Principal Importance for Conservation under Section 41 of the NERC Act 2006 (formerly referred to as UK BAP Priority Species) or as Red/Amber-listed Birds of Conservation Concern. Although not taken into account in Fuller's criteria, these species are considered to be particularly vulnerable due to factors such as serious

population declines or reductions in their natural range, and are therefore also given special consideration when assessing the conservation value of breeding bird assemblages.

Breeding Bird Survey Methodology

Four breeding bird survey visits were undertaken within the Zone of Influence by EPR ornithologists Daniel O'Sullivan and Katie Cammack between April and May 2017. The survey was based on the Common Birds Census (CBC) methodology, which is a territory mapping technique used to survey widespread breeding birds in the UK (based on methodology by Marchant, 1983, Gilbert et al. 1998 and Bibby et al. 2000). The aim of this method is to gather sufficient information on the location and activity of birds, in order to identify the likely territories of breeding bird species within the survey area. All birds seen or heard during each visit were recorded on large-scale maps using standard codes denoting species and behaviour.

The CBC usually recommends ten visits over the breeding season, however useful results can be achieved after three or four visits. Fewer visits are justified as birds recorded during the survey period (the core bird breeding season) are those that are likely to be breeding, with different levels of evidence enabling breeding to be classed as Proven, Probable or Possible.

Surveyors walked through the Zone of Influence at a slow pace during suitable weather conditions (principally in the absence of strong wind and persistent rain), to enable all birds to be identified and located. All birds seen or heard were recorded on large-scale maps using standard codes to denote species and behaviour. Routes were varied during each survey visit so that different parts of the Zone of Influence were surveyed at different times of the day.

Analysis of Field Data

The results of the four surveys were amalgamated and analysed according to the methods detailed in Gilbert et al. (1998) to identify clusters of two or more registrations for each bird species, indicating likely territories within the Zone of Influence. Map registrations were carefully analysed to avoid misinterpretation as the presence of some species may be misleading. For example, some migrants are only likely to be passing through on passage (especially during the early season surveys), or passing over or foraging rather than nesting within the Zone of Influence (e.g. Swallow).

Bats

Potential Zone of Influence

Due to the wide-ranging nature of bats, the Zone of Influence for bats is likely to extend beyond the ownership boundary (to include the Site) and into adjacent areas to encompass any populations of bats that use affected habitats on site, although biophysical effects caused by the proposals themselves (e.g. noise, light, land clearance etc.) will be more spatially limited.

Ground Level Tree Survey

A physical survey of trees within the Site and its immediate surrounds was completed on 12 April 2017 by Daniel O'Sullivan of EPR. The survey focussed on those trees where potential for significant negative effects from the Site were identified, with a more general walkover survey conducted within the remainder of the Site to highlight any trees of particular note with relation to their potential to support bats. The surveys comprised a search from ground level, with the assistance of binoculars, for features with the potential to support bats, including woodpecker holes, loose bark, cracks and crevices, broken off limbs and dense ivy, as well as signs of bats, such as scratching and staining.

Based on the features recorded, trees were identified as having either high, medium or low value as follows:

- **Low** - limited potential/suitability for small numbers of bats - probably will not be used by bats;
- **Medium** - offering potential roosting sites for small numbers of bats - could be used but not optimum roosting sites;
- **High** - high potential offering types of roosting sites known to be used by bats and/or suitable for numbers of bats.

Amphibians

Potential Zone of Influence

From viewing maps and aerial photographs water bodies were identified to be present within 500m of the Site boundary. It is generally considered that Great Crested Newts will use terrestrial habitat within 250m and potentially up to 500m from a breeding pond (English Nature (now Natural England), 2001). Therefore, Great Crested Newts in any pond within 500m of the Site and not isolated by barriers to movement could be affected by a proposed development in the absence of mitigation. However, considering the limited area of existing suitable terrestrial habitat on site and that there is suitable terrestrial habitat present within the vicinity of those identified water bodies, only water bodies within 250m of the Site boundary that are not separated by significant barriers to dispersal require further consideration (Natural England, 2015). Surveys at a distance greater than 250m are considered to be only necessary when all of the following conditions are met (Natural England, 2015):

- Maps, aerial photos, walk over surveys or other data indicate that the pond(s) has potential to support a large GCN population;
- The footprint has particularly favourable habitat for GCN;
- The development would have a substantial negative effect on that habitat; and
- There is an absence of dispersal barriers.

A number of water bodies are located in close proximity to the Site, approximately 30m to the north within the adjacent golf course. While the Site contains mostly suboptimal habitat with limited cover there is suitable terrestrial habitat on the Site where the woodland is present that offers potential cover for dispersing and foraging Great Crested Newt. It is also possible that Great Crested Newt may cross the arable field under suitable weather conditions to reach more suitable habitat. Given the nature of the development, associated activities, the ecology and requirements of Great Crested Newt, the Zone of Influence is considered to extend outside the Site to include all suitable Great Crested Newt ponds and terrestrial habitat within 250m of the Site boundary. A total of five ponds were identified within 250m of the Site boundary in the absence of dispersal barriers with no ponds being present inside the Site boundary itself.

Habitat Suitability Index Survey

All ponds situated within the Zone of Influence and that were accessible were initially checked during a daytime visit and assessed to establish their current suitability for supporting Great Crested Newts. This was achieved by completing a Habitat Suitability Index (HSI) survey of the five ponds identified within 250m of the Site boundary (Oldham et al, 2001). The HSI is a scoring

system that produces a value against 10 suitability indices, for example 'Water Quality' and 'Pond Drying'. The total score of the 10 index values indicates whether a pond would be subjected to further presence/likely absence pond surveys. In general, waterbodies scoring an "average" HSI score or above should undergo further presence/likely absence Great Crested Newt surveys. Ponds rated as "below average" or "poor" using the HSI are considered unlikely to support Great Crested Newt (see **Table 2**). Equally, those waterbodies with poor connections to surrounding habitat and without suitable foraging habitat/shelter are unlikely to yield populations. However, this is not a definitive guide and professional opinion can override the decision.

Table 2: Categorisation of Habitat Suitability Index Scores

HSI Score	Pond Suitability
<0.5	Poor
0.5-0.59	Below average
0.6-0.69	Average
0.7-0.79	Good
>0.8	Excellent

Pond Survey (Presence/Likely Absence GCN Surveys / Population Size Class Assessment)

Great Crested Newt survey methodology followed the Great Crested Newt Mitigation Guidelines (English Nature, 2001). The Guidelines suggest a minimum of four visits is required to determine the presence or likely absence of Great Crested Newt within a water body and a minimum of six visits is required to enable an estimate of the population class size to be made. At least two of the visits should take place between mid-March and mid-May (or three visits should Great Crested Newt be recorded as present), which is the peak breeding season for Great Crested Newt.

Each pond within the Zone of Influence that required presence/likely absence surveys was visited either four or six times, depending on whether Great Crested Newt had been recorded within the four initial visits or known historically to have used the pond.

These pond surveys employed four different survey techniques, which were heavily dependent on the characteristics of each water body. The methods considered to be most appropriate for the Site were bottle-trapping, torchlight searching, netting, and egg searches. A minimum of two different survey techniques was used at each pond at each visit. A brief explanation of the methods used is given below:

- **Torchlight searching** - The water's edge of the pond was scanned at night using a powerful halogen lamp with at least 500,000 candlelight power. All water was searched systematically and repeatedly. It is possible through torching for experienced surveyors to distinguish newt species and sex from external patterning. Torch survey was only undertaken during nights with suitable weather conditions for good activity: night-time air temperature more than 5°C, with no or little rain.
- **Egg searching** - Examination of submerged vegetation for eggs was carried out where practical since this is an effective method for detecting the presence of breeding Great Crested Newt. Great Crested Newt eggs are characteristic in size and colour, laid singly and folded within pliable material such as the leaves of aquatic plants and plastic debris. This can be an effective way of establishing presence of Great Crested Newt in a pond,

even at low populations. Artificial 'egg strips' were deployed in Ponds 8, 10, 11 and 15 as the ponds were poorly vegetated. These were constructed following the Great Crested Newt Guidelines, cutting plastic bin liners cut into 1-2cm wide strips, attaching them to a wooden stake and submerging them near the pond margin. These were then checked as per the natural egg searching procedure.

- **Netting** - A long-handled dip-net was carefully used to sample heavily vegetated areas of ponds at night following torch survey. Results from netting are normally only useful for indicating presence and the technique is usually less effective than the aforementioned techniques.
- **Bottle-trapping** - Bottle-traps are made from 2 litre soft drinks bottles that have had the top cut off and inverted. The traps are then placed at an angle into the pond and held in place by means of a bamboo cane. Bottle traps were placed around the pond margin approximately one trap per two metres of shoreline or at a higher density where possible. The bottle traps are left set overnight and visited again the following morning. Surveying was only undertaken in ideal weather conditions (night-time air temperature more than 5°C), and care was taken to check the traps early prior to the temperature getting too high, this ensured that no newts were harmed during the surveys.

Population Size Class Assessment Methodology

Using maximum counts (the total of adult newts seen within all ponds within a population in a single night) any population(s) found present were assigned a size class as defined by the Great Crested Newt Mitigation Guidelines (English Nature, 2001).

Appendix 4

Grassland Survey

The botanical survey of the grassland field within the north-east of the Site was conducted by Karen Colebourn of EPR on 5 April 2017, in fine and cool weather. The results are provided in **Table 3**.

Table 3: Species List Results of the Grassland Survey

Plants Recorded from the Whole Grassland Field (SU 976 062)		
Species	English Name	Estimated abundance (Dominant; Abundant; Frequent; Occasional; Rare)
<i>Achillea millefolium</i>	Yarrow	F
<i>Bellis perennis</i>	Daisy	R (locally F)
<i>Lolium spp</i>	Ryegrass	D
<i>Plantago lanceolata</i>	Ribwort plantain	R
<i>Poa annua</i>	Annual Meadow-grass	O
<i>Ranunculus ficaria</i>	Lesser celandine	R
<i>Ranunculus repens</i>	Creeping buttercup	O
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O
<i>Taraxacum officinale</i>	Dandelion	O
<i>Trifolium spp</i>	Clover	O
<i>Veronica chamaedrys</i>	Germander speedwell	F
Plants recorded from Representative 2x2m Quadrat (SU 97633 06263)		
		Cover (Domin scale)
<i>Achillea millefolium</i>	Yarrow	4
<i>Poa annua</i>	Annual Meadow-grass	1
<i>Lolium spp</i>	Ryegrass	10
<i>Taraxacum officinale</i>	Dandelion	1
<i>Veronica chamaedrys</i>	Germander speedwell	3

Appendix 5

Bird Survey

Dates and weather conditions for each of the four breeding bird surveys conducted are given in **Table 4** below.

Table 4: Breeding Bird Survey visits

Date	Start/Finish Times	Sunrise Time	Weather Conditions
13 April 2017	07.10 – 8.50	06.10	Dry, cloud 80%, light wind, 8°C
27 April 2017	06.44 – 08.30	06.44	Dry, cloud 10%, light wind, 2-7°C
8 May 2017	06.30 – 7.40	05.25	Dry, cloud 75%, light wind, 7.5°C
15 May 2017	06.15 – 07.15	06.13	Dry with light rain towards end of survey, cloud 100%, light wind, 11-12°C

Table 5 below lists all of the bird species recorded within the Zone of Influence during the four breeding bird surveys.

Table 5: Species recorded during 2017 breeding bird surveys

Name	Scientific Name	Breeding status	Notes
Swallow	<i>Hirundo rustica</i>	N	Seen flying over the Site
Green Woodpecker	<i>Picus viridis</i>	Pr	
Great Spotted Woodpecker	<i>Dendrocopos major</i>	Po	
Pheasant	<i>Phasianus colchicus</i>	N	
Pied Wagtail	<i>Motacilla alba</i>	N	
Moorhen	<i>Gallinula chloropus</i>	N	Seen in ponds on adjacent golf course
Woodpigeon	<i>Columba palumbus</i>	Pr	
Magpie	<i>Pica pica</i>	Pr	
Jackdaw	<i>Corvus monedula</i>	Po	
Carrion Crow	<i>Corvus corone</i>	Po	
Goldcrest	<i>Regulus regulus</i>	Pr	
Blue Tit	<i>Cyanistes caeruleus</i>	B	
Great Tit	<i>Parus major</i>	Pr	
Chiffchaff	<i>Phylloscopus collybita</i>	Pr	
Blackcap	<i>Sylvia atricapilla</i>	Pr	
Wren	<i>Troglodytes troglodytes</i>	Pr	

Name	Scientific Name	Breeding status	Notes
Starling*	<i>Sturnus vulgaris</i>	N	Seen feeding in low numbers in the grassland field within the north-east of the Site, likely to be nesting in buildings offsite
Blackbird	<i>Turdus merula</i>	B	
Robin	<i>Erithacus rubecula</i>	B	
Dunnock*	<i>Prunella modularis</i>	Pr	Between 4 and 6 pairs thought to be nesting across the Site
Mallard	<i>Anas platyrhynchos</i>	N	Seen flying over the Site
Kestrel	<i>Falco tinnunculus</i>	N	Seen flying over the Site
House Sparrow*	<i>Passer domesticus</i>	N	Seen in boundary vegetation close to houses, likely to be nesting in buildings offsite
Chaffinch	<i>Fringilla coelebs</i>	Pr	
Linnet*	<i>Carduelis cannabina</i>	N	Small group of 2 or 3 individuals, including singing male seen on adjacent golf course
Goldfinch	<i>Carduelis carduelis</i>	Pr	
Long-tailed Tit	<i>Aegithalos caudatus</i>	Po	

Key

B	Breeding confirmed (nest or young seen)
Pr	Breeding probable (holding territory, e.g. singing male)
Po	Breeding possible (present during breeding season in suitable habitat)
O	Observed during breeding season, but no evidence of breeding (i.e. raptors flying over, herons with no evidence of heronry, ducks summering on an urban pond)
N	Not breeding: wintering, transients or passage
*	Listed under Section 41 of the NERC Act 2006
	Red-listed Bird of Conservation Concern
	Amber-listed Bird of Conservation Concern

Appendix 6

Bat Tree Inspection Survey

Table 6 below provides the results of the ground level bat tree inspection survey of those trees identified as having bat roosting potential.

Table 6: Ground Level Tree Inspection Results

New Tree ID	Species	Common Name	Approx. Height (m)	Roost Feature Description	Description	Bat Roost Potential
1	<i>Quercus robur</i>	Pedunculate Oak	5	Ivy	Dense ivy on south face of tree; south aspect	Low
2	<i>Quercus robur</i>	Pedunculate Oak	35	Flaking/lifted bark and dead wood	Flaking bark and dead wood on one limb; south aspect; 12m high	Low
3	<i>Quercus robur</i>	Pedunculate Oak	35	Flaking/lifted bark	Flaking bark on limb; south aspect; 14m high	Low
4	<i>Populus nigra</i>	Lombardy Poplar	30	Ivy	Dense Ivy covering whole tree trunk	Low
5	<i>Populus x canescens</i>	Grey Poplar	30	Ivy	Dense Ivy covering whole tree trunk	Low
6	<i>Crataegus monogyna</i>	Hawthorn	12	Ivy	Dead Ivy covering whole tree and main trunk dying	Low
7	<i>Populus nigra</i>	Lombardy Poplar	30	Ivy	Dense Ivy covering whole tree	Low
8	<i>Populus nigra</i>	Lombardy Poplar	30	Ivy	Dense Ivy covering whole tree	Low
9	<i>Populus nigra</i>	Lombardy Poplar	30	Ivy	Dense Ivy covering whole tree	Low
10	<i>Populus x canescens</i>	Grey Poplar	30	Rot hole	Rot hole from where limb has broken off (does not appear to go far); north aspect 25m high	Low
11	<i>Quercus robur</i>	Pedunculate Oak	30	Flaking/lifted bark	Lifted bark on limb; south aspect; 10m high	Low

12	<i>Prunus lusitanica</i>	Portugal Laurel	20	Rot hole and Woodpecker hole	Woodpecker hole (does not appear to go anywhere, and same for rot hole); east aspect; 8m high	Low
13	<i>Populus nigra</i>	Lombardy Poplar	30	Woodpecker hole	Woodpecker holes that are in current use by Green Woodpecker; north aspect; 25m high	Low

Appendix 7

Great Crested Newt Survey

Habitat Suitability Index Assessment

The Great Crested Newt Habitat Suitability Index (HSI) score was calculated for each pond, based on Oldham et al. (2001). The results of these calculations are summarised in **Table 7** and more detailed results are provided further below.

The results of the HSI (along with professional judgement) indicated that all five ponds should be subjected to a presence/likely absence pond survey due to their proximity to each other and that they are connected via a ditch system.

Table 7: Summary of Habitat Suitability Index Scores

Pond	HSI score	Pond suitability	Subject to further survey
1	0.39	Poor	Yes
2	0.56	Below Average	Yes
3	0.58	Below Average	Yes
4	0.59	Below Average	Yes
5	0.70	Good	Yes

Pond Survey Results (Presence/Likely Absence GCN Surveys / Population Size Class Assessment)

The results of the presence/likely absence pond surveys are summarised in **Table 8** and more detailed results are also provided further below.

Table 8: Summary of GCN Presence/Likely Absence Survey Results

Pond	No. of visits	Visit Number				Great Crested Newt eggs	Smooth Newt	Palmate Newt	Common Frog	Common toad
		Maximum Great Crest Newt Adult Count/Visit								
		1	2	3	4					
1	4	0	0	0	0	No	Yes	No	No	No
2	4	0	0	0	0	No	Yes	Yes	No	No
3	4	0	0	0	0	No	Yes	Yes	Yes	No
4	4	0	0	0	0	No	Yes	Yes	No	No
5	4	0	0	0	0	No	Yes	Yes	Yes	No

Detailed Results of the Habitat Suitability Index Survey

Suitability Indices	Pond 1	Pond 2	Pond 3	Pond 4	Pond 5
SI ₁ - Geographical Location	A - Optimal	A - Optimal	A - Optimal	A - Optimal	A - Optimal
SI Score	1	1	1	1	1
SI ₂ - Pond Area (m ²)	1180m ²	50m ²	96m ²	132m ²	180m ²
SI Score	0.92	0.10	0.19	0.26	0.36
SI ₃ - Pond Drying	Never	Rarely	Rarely	Rarely	Never
SI Score	0.90	1	1	1	0.9
SI ₄ - Water Quality	Poor	Poor	Poor	Poor	Moderate
SI Score	0.33	0.33	0.33	0.33	0.67
SI ₅ - Shade (% at perimeter)	10	20	60	70	15
SI Score	1	1	1	0.80	1
SI ₆ - Fowl	Major	Minor	Minor	Minor	Minor
SI Score	0.01	0.67	0.67	0.67	0.67
SI ₇ - Fish	Minor	Absent	Absent	Absent	Absent
SI Score	0.33	1	1	1	1
SI ₈ - Ponds (Ponds within 1km)	6	8	12	16	15
SI Score	1	1	1	1	1
SI ₉ - Terrestrial Habitat	Poor	Poor	Poor	Poor	Poor
SI Score	0.33	0.33	0.33	0.33	0.33
SI ₁₀ - Macrophytes (% Cover)	0	10	0	5	30
SI Score	0.31	0.41	0.31	0.36	0.61

Habitat Suitability Index HSI Score	0.39	0.56	0.58	0.59	0.70
Pond Suitability	Poor	Below Average	Below Average	Below Average	Good

Detailed Results of the Pond Survey Results (Presence/Likely Absence GCN Surveys / Population Size Class Assessment)

Pond 1

Date	No. of Bottle-traps	Temp. (°C)	Veg. Cover (0=none, 5=complete)	Turbidity (0=none, 5=turbid)	Torch – Number of Newts										Bottle-trap – Number of Newts										Eggs	Immature or Larvae of GCN	Rt or Bb
					GCN			Lv		Lh		Lv/Lh			GCN			Lv		Lh		Lv/Lh					
					M	F	NS	M	F	M	F	M	F	NS	M	F	NS	M	F	M	F	M	F	NS			
26/04/17	0	11.4 - 5	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No	No	0
02/05/17	19	8 - 5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No	No	0
09/05/17	15	14	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	No	No	0
18/05/17	15	12.2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No	No	0

Key: M: Male, F: Female, NS: Unsexed, GCN: Great Crested Newt, Lv: Smooth Newt, Lh: Palmate Newt, Rt: Common Frog, Bb: Common Toad

Methods used: Torching, bottle-trapping, netting, egg search

Pond 2

Date	No. of Bottle-traps	Temp. (°C)	Veg. Cover (0=none, 5=complete)	Turbidity (0=none, 5=turbid)	Torch – Number of Newts										Bottle-trap – Number of Newts										Eggs	Immature or Larvae of GCN	Rt or Bb
					GCN			Lv		Lh		Lv/Lh			GCN			Lv		Lh		Lv/Lh					
					M	F	NS	M	F	M	F	M	F	NS	M	F	NS	M	F	M	F	M	F	NS			
26/04/17	0	5	1	3	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No	No	0
02/05/17	5	11.4 - 5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	No	No	0
09/05/17	5	8 – 5	1	0	0	0	0	2	3	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	No	No	0
18/05/17	5	12.2	1	1	0	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	No	No	0

Key: M: Male, F: Female, NS: Unsexed, GCN: Great Crested Newt, Lv: Smooth Newt, Lh: Palmate Newt, Rt: Common Frog, Bb: Common Toad

Methods used: Torching, bottle-trapping, netting, egg search

Pond 3

Date	No. of Bottle-traps	Temp. (°C)	Veg. Cover (0=none, 5=complete)	Turbidity (0=none, 5=turbid)	Torch – Number of Newts										Bottle-trap – Number of Newts										Eggs	Immature or Larvae of GCN	Rt or Bb
					GCN			Lv		Lh		Lv/Lh			GCN			Lv		Lh		Lv/Lh					
					M	F	NS	M	F	M	F	M	F	NS	M	F	NS	M	F	M	F	M	F	NS			
26/04/17	0	5	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No	No	0
02/05/17	5	11.4 - 5	0	0	0	0	0	3	5	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	No	No	0
09/05/17	5	8 - 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No	No	0
18/05/17	5	12.2	0	1	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	No	No	3Rt

Key: M: Male, F: Female, NS: Unsexed, GCN: Great Crested Newt, Lv: Smooth Newt, Lh: Palmate Newt, Rt: Common Frog, Bb: Common Toad

Methods used: Torching, bottle-trapping, netting, egg search

Pond 4

Date	No. of Bottle-traps	Temp. (°C)	Veg. Cover (0=none, 5=complete)	Turbidity (0=none, 5=turbid)	Torch – Number of Newts										Bottle-trap – Number of Newts										Eggs	Immature or Larvae of GCN	Rt or Bb	
					GCN			Lv		Lh		Lv/Lh			GCN			Lv		Lh		Lv/Lh						
					M	F	NS	M	F	M	F	M	F	NS	M	F	NS	M	F	M	F	M	F	NS				
26/04/17	0	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No	No	0	
02/05/17	5	11.4 - 5	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	No	No	0
09/05/17	5	8 - 5	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	3	0	0	0	0	0	No	No	0	
18/05/17	5	12.2	0	1	0	0	0	2	0	0	0	0	5	0	0	0	0	4	6	0	0	0	0	0	No	No	0	

Key: M: Male, F: Female, NS: Unsexed, GCN: Great Crested Newt, Lv: Smooth Newt, Lh: Palmate Newt, Rt: Common Frog, Bb: Common Toad

Methods used: Torching, bottle-trapping, netting, egg search

Pond 5

Date	No. of Bottle-traps	Temp. (°C)	Veg. Cover (0=none, 5=complete)	Turbidity (0=none, 5=turbid)	Torch – Number of Newts										Bottle-trap – Number of Newts										Eggs	Immature or Larvae of GCN	Rt or Bb
					GCN			Lv		Lh		Lv/Lh			GCN			Lv		Lh		Lv/Lh					
					M	F	NS	M	F	M	F	M	F	NS	M	F	NS	M	F	M	F	M	F	NS			
26/04/17	0	5	30	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No	No	Rt tadpoles
02/05/17	15	11.4 - 5	70	0	0	0	0	3	5	0	0	0	0	0	0	0	0	7	5	0	0	0	0	0	No	No	0
09/05/17	15	8 - 5	60	0	0	0	0	10	7	0	0	0	0	0	0	0	0	5	4	0	0	0	0	0	No	No	0
18/05/17	15	12.2	60	0	0	0	0	0	0	0	0	0	6	0	0	0	0	4	4	0	0	0	0	0	No	No	0

Key: M: Male, F: Female, NS: Unsexed, GCN: Great Crested Newt, Lv: Smooth Newt, Lh: Palmate Newt, Rt: Common Frog, Bb: Common Toad

Methods used: Torching, bottle-trapping, netting, egg search