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Ecology Mitigation and Enhancement Statement

Rev 04

Land West of Tye Lane, Walberton, West Sussex

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Report Summary

- 1. The Ecology Co-op was commissioned by David Wilson Homes to detail necessary mitigation for land proposed for development at Land West of Tye Lane, Walberton in relation to a planning application for a residential development comprising up to 155 new dwellings.**
- 2. This document sets out the measures proposed to protect and enhance existing biodiversity at the site during the life of the project. It is based on survey information reported in the Phase 1 Habitat Survey Report and the Phase 2 Ecology Survey Holding Document produced by The Ecology Co-op in 2018.**
- 3. The layout of the scheme has been designed to minimise the loss of important existing habitats and avoid significant impacts on protected species. Most of the existing hedgerows and trees have been retained, together with a large area of land along the southern boundary of the site which will be enhanced.**
- 4. Enhancement measures are proposed to encourage biodiversity at the development site, including the creation of new species-rich native hedgerows, SuDS pond and swale creation and wildflower meadow habitat that will be beneficial for a variety of invertebrates and in turn provide value for foraging birds and bats. Roosting features for bats have been incorporated into the scheme along with bird boxes for nesting birds.**
- 5. Specific mitigation measures are proposed to ensure that existing protected species including reptiles, bats and nesting birds are safeguarded during the construction phase including securing an EPS licence for dormouse mitigation.**
- 6. Site staff must be briefed prior to the commencement of construction on the importance of protecting the reptile fencing and contacting an ecologist in the event that any reptiles or other wildlife are identified within the construction zone. Post construction management is detailed in Section 4 for all habitats and features, both retained and newly created.**
- 7. A Biodiversity Impact Calculation (using the DEFRA Metric) will be required to demonstrate net gain in biodiversity and demonstrate compliance with the NPPF. With the retention of habitats and the creation of new habitats within the site, it is considered that a residential development within the site could potentially result in a net gain in biodiversity.**

This report has been prepared by The Ecology Co-operation Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client. This report only becomes the property of the client once payment for it has been received in full.

We disclaim responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.



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1 INTRODUCTION

1.1 Purpose of the Report

This document has been produced to demonstrate how a residential development involving construction of up to 155 residential dwellings at Land West of Tye Lane, Walberton, West Sussex, will minimise its impact upon protected species, wider biodiversity and provide targeted enhancement measures for nesting birds and bats. It outlines all mitigation and compensation measures that are designed to ensure that valuable habitats are either protected, replaced or enhanced, together with the measures put in place to prevent harm to legally protected species and comply with wildlife legislation.

All of the prescribed mitigation measures described within this document will be issued to relevant works contractors to ensure that they are carried out in full. Implementation of this will be overseen by a suitable ecological consultancy, and the works contractor will be given contact details for an ecologist so that any issues can be resolved promptly.

This document sets out the measures proposed to protect and enhance the wildlife value at the site through the life of the development project. This includes measures put in place during the design of the scheme to retain and protect existing habitats of high value, prescribe mitigation measures to prevent impacts to protected or notable species and to create and appropriately manage new high-value habitats for the benefit of targeted wildlife and wider biodiversity.

This report was commissioned and produced at the request of Barratt Homes.

1.2 Background

In February 2018, The Ecology Co-op undertook a Preliminary Ecological Appraisal and Phase 1 Habitat Survey¹ of the site and this was followed by Phase 2 protected species surveys undertaken by The Ecology Co-op throughout 2018². The results of these surveys are presented in a separate report submitted as part of the planning application². The surveys confirmed the presence of common dormouse *Muscardinus avellanarius* in the boundary hedgerows, foraging and commuting bats across the site including the rare barbastelle *Barbastella barbastellus* and a low population of slow worms *Anguis fragilis* and grass snake *Natrix helvetica*.

The site comprises a single large arable field and four pastoral fields which are heavily grazed by horses, along with a residential garden and some ditches running throughout the land. There are a number of residential properties to the west, south and east with arable fields, the A27 and Ancient woodland to the north of the site (Figure 1).

The proposed development includes the construction of up to 155 new residential dwellings, along with associated garden space and landscaping. There is a large area of land that will remain undeveloped

¹ The Ecology Co-op (2018/2020) Phase 1 Habitat Survey and Preliminary Ecological Appraisal, Land West of Tye Lane, Walberton, West Sussex 27th August 2020.

² Burkitt, J. (2018/2020) Phase 2 Ecology Surveys, Land West of Tye Lane, Walberton, West Sussex - The Ecology Co-op Ltd. 27th August 2020. Doc Ref P2637.



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along the southern boundary of the site which will include Sustainable Drainage Systems (SuDS), Local Area for Play (LAP) and Local Equipped Area for Play (LEAP). Figure 2 shows the proposed layout produced by Barratt Homes.

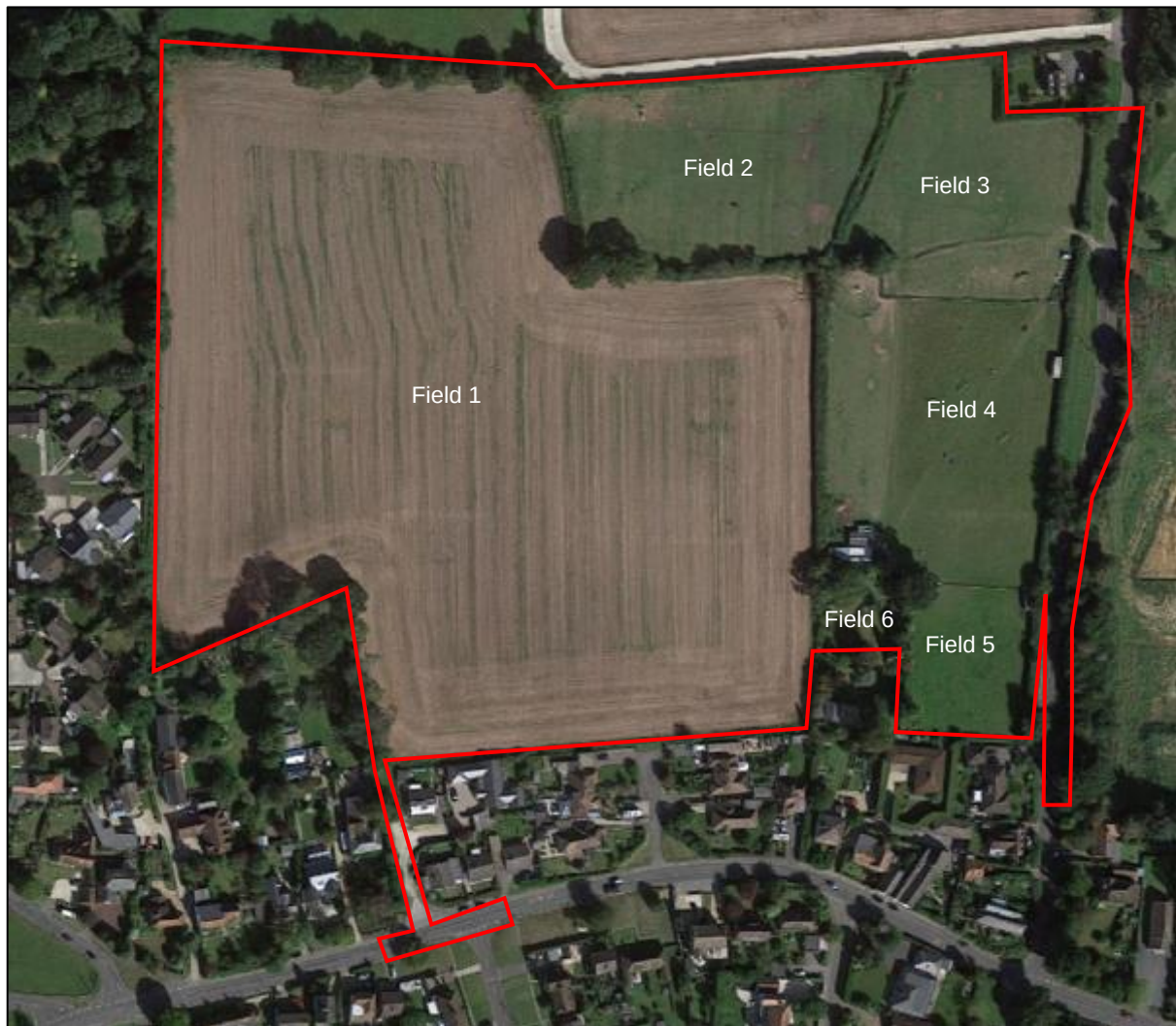


Figure 1. An aerial image showing the location of the development site with the site boundary outlined in red. Images produced courtesy of Google maps (Map data ©2020 Google).



Figure 2. The proposed layout of the development within the Land West of Tye Lane, Walberton. Plans produced by Barratt Homes, Drawing No.CMP-01, Rev P3, 10/08/20.

1.3 Legislation and Policy

Legal protection applying to relevant bird, mammal and herpetofauna species is detailed in Appendix 1 of this report. This includes both national and European legislation that protects badgers, bats, dormice, reptiles, and breeding birds.

2 DESIGN STAGE IMPACT AVOIDANCE MEASURES

The layout of the proposed scheme has been designed to minimise adverse impacts and effects on the most ecologically valuable habitats at the site including those important for protected species. The boundary hedgerows and trees, and ditches have been retained as part of the design, although there will be some hedgerow habitat loss within the site due to the need to provide new access between field parcels.

The soft landscaping for the proposed development will be designed with nature conservation and enhancement as a guiding principle and will be set out on detailed plans submitted with a full planning application. This should include the planting of native trees and hedgerows, and creation of wildflower meadows along with swales, two Sustainable Drainage Systems (SuDS) ponds, as well as LEAP and LAP areas within the site. Figure 2 shows the proposed layout and retained habitats within the site.

The combined impact avoidance and habitat enhancement measures proposed, ensure that direct impacts on protected species are not significant. With the field boundaries and ditches largely retained,



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foraging and commuting habitat for bats has been conserved, together with areas of improved grassland along the southern, eastern and western boundaries which will be used as the on-site receptor area for reptiles and open green space.

Potential disturbance impacts caused by artificial lighting on nocturnal species such as bats, dormice, hedgehogs and invertebrates will be minimised by adherence to the guiding principle set out by the Bat Conservation Trust³. The detailed design for the proposed scheme will incorporate a 'sensitive lighting plan' developed as part of the detailed design, in accordance with these guidelines. This will include measures to create 'dark corridors' throughout the development site, and measures to minimise light spill onto all retained semi-natural habitat particularly along the retained hedgerows and tree lines, reptile receptor area and ditches. All street lighting will be directed downwards and emit warm-light spectrums that are not attractive to insects.

3 CONSTRUCTION PHASE MITIGATION MEASURES

3.1 Retained Habitat Protection

All hedgerows and trees will be protected during the construction phase by the establishment of root protection zones in accordance with British Standard 5837, and buffer zones are per the design layout. All semi-natural habitat to be retained will be protected from construction activity (e.g. excavation work, vehicle movements, pedestrian traffic) by exclusion zones demarcated by temporary barrier fencing and signage. Construction staff shall be briefed on respecting these exclusion zones and the importance of protecting the boundary trees and hedgerows.

The root protection zones, buffer strips and exclusion zones around trees and hedgerows will be set out on detailed plans submitted with a full planning application.

3.2 Protected Species

3.2.1 Bats

The existing stable buildings contained within the site offer negligible potential to support bats and the trees assessed within the site did not have suitable features to support roosting bats.

Potential impacts of artificial lighting have been dealt with at the design stage through an 'ecologically sensitive lighting scheme'. During the construction phase, any temporary lighting will also be kept to a minimum, directed away from retained semi-natural habitats where bats may be foraging or commuting, and controlled by motion sensors or timers to ensure they are only switched on when needed. 'Dark Zones' will be implemented along the boundaries of the site and around semi-natural habitats to ensure artificial lighting does not affect these retained features and the species using them.

3.2.2 Common Dormouse

Upon receipt of full planning approval for the project, an EPS licence application will be submitted to Natural England, together with a detailed method statement on mitigation measures to prevent harm to

³ Collins, J. (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). The Bat Conservation Trust, London.



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individual dormice when clearing the small sections of hedgerow to make way for the construction of the access road leading in from Tye Lane along the eastern boundary.

The mitigation steps likely to be required are outlined below:

1. All vegetation marked for removal will first be hand-searched by a suitably qualified ecologist before removal and all vegetation clearance will be overseen by an ecologist.
2. All the above-ground vegetation will first be coppiced to approximately 200mm above ground, using handheld power tools (i.e. chainsaw) in late autumn (October-November). The works will be undertaken with care to avoid compaction of the ground. This timing avoids the breeding season for dormice and the bird nesting season, but dormice may be active on warm days, giving them the opportunity to move into adjacent retained habitat.
3. The excavation of the stumps and root balls will be undertaken in the spring the following year. This ensures that any remaining hibernating dormice have become active and moved into adjacent retained habitat.

As for bats and badgers, the ecologically sensitive lighting scheme will ensure that hedgerow and woodland habitat will not be illuminated in any way by artificial lighting from the development both during construction and post construction.

3.2.3 Reptiles

The proposed development layout will inevitably result in the loss of improved grassland as well as some hedgerow and scrub habitat. However, there are areas along the southern, western and eastern boundaries which are to be retained and enhanced for reptiles (Figure 2). The whole of the proposed construction zone including the working footprint of the site, additional landscaping areas, any material storage and areas to be tracked over by machines will need to be fenced with semi-permanent reptile fencing.

It is proposed that a reptile translocation is undertaken, and an 'on-site' receptor area is used (see Figure 3) thus allowing the reptile population to remain on site and utilise the surrounding landscape as well as the green areas within the new development. The present low suitability of the pasture at the site (which is heavily grazed by horses), means that the low population of slow worms and grass snakes can be accommodated on a smaller area of habitat that is significantly enhanced to support foraging, breeding and hibernating reptiles.

On-site Reptile Receptor Area

An on-site reptile receptor site has been located to the south, west and east of the proposed development site (Figure 3). At present, this land comprises heavily grazed improved grassland and arable field with semi-improved grassland and scrub buffer strips (see Figure 5 and 6). The on-site receptor area will be enhanced for the benefit of reptiles and secured in perpetuity. Reducing the mowing and grazing of the proposed open green space area will allow rough, tussocky grassland to establish which is suitable habitat for reptiles. Aftercare of the receptor site including maintenance is set out in Section 4.

To ensure that enhancements for breeding and hibernating reptiles are made, it will be important for at



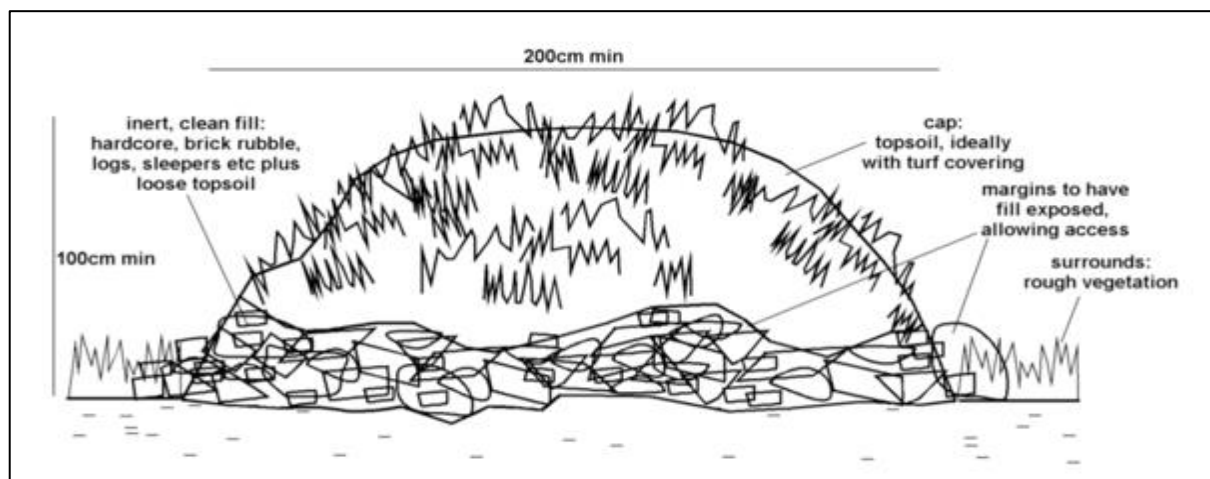
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least seven new reptile hibernacula to be created throughout the reptile receptor area to increase the carrying capacity for reptiles. The hibernacula will be constructed using logs and branches, piled on top of each other, with grass cuttings, earth and turf laid over the top to provide insulation (see Figure 4). These hibernacula will also provide benefits for a variety of species including solitary bees, wasps and other insects.

To ensure that suitable habitat has established prior to the commencement of the reptile translocation, these receptor areas must be excluded from cutting or grazing to ensure the sward height is at least 20cm in height and all proposed hibernacula have been constructed prior to the commencement of the translocation.



Figure 3. The location of the on-site receptor site outlined by the black dotted line. The reptile receptor area currently comprises arable field, heavily grazed improved grassland and some scrub. The red triangles indicate possible locations for reptile hibernacula within the receptor area.





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Figure 4. An example of a suitable design for an artificial hibernaculum⁴.

Photographs of Receptor Site



Figure 5. The heavily grazed improved grassland within Field 5 (photo taken in August 2020).

⁴ English Nature (2001) Great Crested Newt Guidelines. English Nature, Peterborough.



Figure 6. The arable land (Field 1) where part will be retained as open green space and an on-site reptile receptor.

Reptile Translocation Strategy

The proposed construction zone, to include the working footprint of the site, additional landscaping areas, any material storage areas and areas to be tracked over by machines, will be fenced with semi-permanent amphibian and reptile proof fencing.

A semi-permanent polypropylene material that is tough and stabilised against ultraviolet light should be installed to a depth of not less than 20cm below ground and supported by stakes every 2 metres fixed with clout nails and washers (See Figure 7). The fencing should be backfilled with earth and tightly compacted to make sure that it acts as an impassable barrier. The advantage of the semi-permanent fence is that it is less susceptible to damage by dogs, deer, foxes and other animals as well as any accidental damage by construction staff and is suitable for developments where fencing may need to remain in-situ over a long period of time.

The fencing will comprise a continuous line to separate the construction site from all adjacent green habitats, from which reptiles and amphibians might otherwise migrate onto the construction zone (Figure 8). The fencing remains in-situ until all construction work deemed a risk to reptiles and amphibians has been completed. To minimise the risk of killing or injury during installation, the fence should be installed outside of the newt and reptile hibernation period (generally October to late February dependent of weather conditions) and the vegetation along the fencing alignment and all access routes first cut to a height of 15cm prior to use of vehicles or machines across reptile habitat.



Figure 7. An example of the semi-permanent fencing material that will be used.

The fencing will comprise a continuous line to separate the construction site from all adjacent green habitats, from which reptiles and amphibians might otherwise migrate onto the construction zone. The fencing remains in-situ until all construction work deemed a risk to reptiles and amphibians has been completed i.e. earthworks and associated landscaping. This will prevent any animals from the surrounding areas migrating onto the site during the construction phase.



Figure 8. The indicative fencing route at Land West of Tye Lane, Walberton, to enclose the entire construction and landscaping zone of the site is shown in blue. The actual fencing alignment may differ from that shown in this figure



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as terrain and root protection zones will be taken into consideration. Images produced courtesy of Barratt Homes Ltd (2020).



Figure 9. 'Cut-backs' used to guide animals away from the site entrance.

The installation of the fencing will be overseen by a suitably qualified ecologist, with a hand search conducted of the fence line ahead of the trencher or small excavator digging the trench, for the installation of the semi-permanent fence.

Reptile Translocation Process

The reptile trapping methodology proposed is based on currently accepted best practice guidelines outlined by the Amphibian and Reptile Group UK (ARGUK). A minimum total of 60 trapping visits will be made between mid-March and October, using 'reptile mats' (bitumen roofing felt 1m x 0.5m sections) and 'reptile tins' (corrugated metal sheets) placed at a density of not less than 100 per hectare across all suitable reptile habitat on the development site and enclosed within reptile proof fencing.

Trapping and translocation visits will be undertaken every working day where possible as long as the air temperature is between 9 degrees and 18 degrees Celsius in the morning or mid-afternoon in the absence of wet or very windy weather. All captured reptiles will be placed into a large smooth-sided bucket with some green hay at the bottom and transported immediately to the proposed receptor site. All capture details would be recorded for submission to the LPA if requested, as evidence of the work undertaken.

Trapping and translocation should continue beyond 60 visits if reptiles continue to be caught or observed. The construction zone will be declared free of reptiles once 60 trapping visits have been completed and following 5 days with no capture or observation of reptiles in the construction zone. In exceptional circumstances, reptile trapping may be curtailed by weather conditions or no captures before 60 trapping visits have been completed. In these circumstances, the alternative approaches put in place to prevent harm to reptiles will first be agreed with all relevant stakeholders.

'Habitat manipulation' will be used in conjunction with trapping to help focus efforts following the first 20 trapping visits. This involves carefully cutting back vegetation in selected areas to concentrate remaining reptiles into progressively smaller areas of habitat. The vegetation is cut using a hand-held strimmer, on a day when the temperature is above 10°C and reptiles are active, in two passes. The first pass will be to a height of approximately 10-15cm, which removes the bulk of material without any risk of harm to reptiles and encourages them to move out of the area. The second pass is then made later



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the same day to take the grass height down to below 5cm to discourage reptiles from returning.

Destructive Search of Reptile Refugia and Topsoil Strip

Once the proposed site is deemed to be 'clear' of reptiles, a destructive search will be undertaken within the site. This will involve the dismantling of any potential reptile refugia such as log piles, compost heaps, and piles of brash and grass cuttings and this will be overseen by a suitable qualified ecologist. In addition, an ecologist will supervise a topsoil strip of the proposed construction zone. This will involve a digger gently removing the topsoil and an ecologist carrying out a watching brief to ensure any reptiles are not harmed during the works. Any reptiles or other animals identified during the watching brief will be placed inside a high sided bucket and removed from the construction zone to the receptor site.

3.2.4 Nesting Birds

Any scrub, trees or hedgerows within the construction zone must be removed outside of the nesting bird season (1st March to 31st August inclusive). Where this is not possible, small areas of scrub or individual trees may be removed if preceded by a 'nesting bird check' by a suitably qualified ecologist and no evidence of nests or breeding bird activity found. If an active nest is discovered, a 20m exclusion zone should be established around the site and works postponed until the chicks have fledged.

4 BIODIVERSITY ENHANCEMENT MEASURES

4.1 Wildflower Meadow Creation

A wildflower meadow will be established in the retained areas along the western, southern and eastern boundaries of the proposed development site (Figure 2) and in some of the open green space areas throughout the development.

To establish these areas a process of light rotavating and seeding will be employed with good ground preparation essential to the success of the wildflower meadow. The sowing process is best undertaken between late August and the end of September during mild and wet weather best suited to seedling establishment or during mid-March to mid-May when the ground has sufficient moisture and there is very little risk of frosts. The rotavating process is designed to create an area of largely bare ground to allow the wildflower seed mix to establish. Immediately following rotavating, a suitable seed mixture containing not less than 20 wildflower and grass species would be sown across the ground at a density of four grams per square metre. The species mix included must all be of native British origin. A recommended seed mixture is EM5 – Meadow mixture for loamy soils, which is available from Emorsgate seeds (www.wildseed.co.uk). Table 1 details the composition of this mixture.

As part of on-going management, the sward should be cut and gathered to a height of approximately 5cm at least three times in its first year of establishment to control the flush of annual weeds which will grow during the first growing season. Thereafter the sward should be cut (with all cuttings removed and composted) between mid-August and late September every year. Cutting in the spring (March/April) should be included if the sward grows too vigorously.

To ensure that reptiles are not harmed during the ground preparation for the wildflower creation, the process of precautionary habitat manipulation must be carried out prior to any rotavating. This will



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involve the cutting of vegetation to a height of 200mm using handheld trimmers on a day where the ambient temperature is above 9 degrees Celsius. This will remove a significant proportion of cover for reptiles while minimising harm to them. A second cut will be made, to a height of 50mm, to remove the remaining vegetation from site and encourage reptiles to move into areas of suitable habitat to the north. This process must be undertaken during the active season for reptiles (April to September).

Table 1. Composition of EM5 – Meadow mixture for loamy soils to be sown within the retained green space.

%	Wildflowers- Latin name	Common name
0.5	<i>Achillea millefolium</i>	Yarrow
3	<i>Centaurea nigra</i>	Common Knapweed
1	<i>Daucus carota</i>	Wild Carrot
2.5	<i>Galium verum</i>	Lady's Bedstraw
0.3	<i>Geranium pratense</i>	Meadow Cranesbill
1.2	<i>Knautia arvensis</i>	Field Scabious
0.5	<i>Lathyrus pratensis</i>	Meadow Vetchling
0.4	<i>Leontodon hispidus</i>	Rough Hawkbit
0.5	<i>Leucanthemum vulgare</i>	Oxeye Daisy
0.5	<i>Lotus corniculatus</i>	Birdsfoot Trefoil
1	<i>Malva moschata</i>	Musk Mallow
0.5	<i>Plantago lanceolata</i>	Ribwort Plantain
0.5	<i>Plantago media</i>	Hoary Plantain
1	<i>Primula veris</i>	Cowslip
1	<i>Prunella vulgaris</i>	Selfheal
2	<i>Ranunculus acris</i>	Meadow Buttercup
1	<i>Ranunculus bulbosus</i>	Bulbous Buttercup
1.5	<i>Rhinanthus minor</i>	Yellow Rattle
1	<i>Rumex acetosa</i>	Common Sorrel
0.1	<i>Trifolium pratense</i>	Wild Red Clover
20		

%	Grasses- Latin name	Common name
8	<i>Agrostis capillaris</i>	Common Bent
3	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass (w)
3	<i>Briza media</i>	Quaking Grass (w)
32	<i>Cynosurus cristatus</i>	Crested Dogstail
10	<i>Festuca ovina</i>	Sheep's Fescue
20	<i>Festuca rubra</i>	Slender-creeping Red-fescue
3	<i>Phleum bertolonii</i>	Smaller Cat's-tail
1	<i>Trisetum flavescens</i>	Yellow Oat-grass (w)
80		

4.2 Tree and Hedgerow Planting

New species-rich native hedgerows and trees are to be planted along all boundaries of the site and throughout the proposed new development. The existing hedgerows will be retained and strengthened to provide increased foraging and commuting habitat for bats as well as nesting areas for birds.



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These new species-rich hedgerows must use only native species from UK stock and include at least 50% hawthorn *Crataegus monogyna*. The remaining 50% should be made up of five of the following species: Blackthorn *Prunus spinosa*, spindle *Euonymus europaeus*, dogwood *Cornus sanguinea*, Wayfaring-tree *Viburnum lantana*, field or dog rose *Rosa arvensis/ Rosa canina*, guelder rose *Viburnum opulus*, elder *Sambucus nigra*, field maple *Acer campestre*, holly *Ilex aquifolium*, wild privet *Ligustrum vulgare*, beech *Fagus sylvatica* and hazel *Corylus avellana*. It is also recommended that native honeysuckle *Lonicera periclymenum* is introduced along these lengths as they are a favoured nesting material for common dormice.

The landscaping plan will incorporate a variety of trees with only native trees sourced from UK stock to be used in all of the wider landscaping around the site boundaries (non-native trees and shrubs may still be used for landscaping the residential plots). This will provide an increase in suitable habitat for a variety of birds and invertebrates. Given the arrival of ash dieback, it is not recommended that any ash saplings are planted anywhere on the site.

4.3 Water Bodies

4.3.1 Sustainable Drainage Systems (SuDS)

Two SuDS ponds will be created along the southern boundary of the site and the sloping banks of the pond will be sown with a pond edge seed mixture to increase the ecological value of the area. A recommended seed mixture of native British origin is EP1 – Pond Edge Mixture, which is available from Emorsgate Seeds (www.wildseed.co.uk). Table 2 details the composition of this mixture.

A small area in the centre of the pond should be designed to retain water throughout the year, ideally not less than 15cm of water. This can be achieved through incorporating Bentonite clay into the pond bed or meeting the natural groundwater level by excavating to the right depth. This will allow the planting of native species and an increase in wildlife value.

Table 2. Composition of EP1 – Pond Edge Mixture to be sown on the banks of the two new SuDS ponds.

Wildflowers		
%	Latin name	Common name
1	<u><i>Achillea ptarmica</i></u>	<u>Sneezewort</u>
2.3	<u><i>Angelica sylvestris</i></u>	<u>Wild Angelica</u>
0.1	<u><i>Caltha palustris</i></u>	<u>Marsh Marigold</u>
0.6	<u><i>Eupatorium cannabinum</i></u>	<u>Hemp Agrimony</u>
3	<u><i>Filipendula ulmaria</i></u>	<u>Meadowsweet</u>
1	<u><i>Geum rivale</i></u>	<u>Water Avens</u>
0.4	<u><i>Hypericum tetrapterum</i></u>	<u>Square-stalked St John's Wort</u>
4	<u><i>Iris pseudacorus</i></u>	<u>Yellow Iris</u>
1	<u><i>Lotus pedunculatus</i></u>	<u>Greater Birdsfoot Trefoil</u>
0.8	<u><i>Lycopus europaeus</i></u>	<u>Gypsywort</u>
0.6	<u><i>Lythrum salicaria</i></u>	<u>Purple Loosestrife</u>
0.1	<u><i>Mentha aquatica</i></u>	<u>Water Mint</u>
0.1	<u><i>Pulicaria dysenterica</i></u>	<u>Common Fleabane</u>
2.5	<u><i>Ranunculus acris</i></u>	<u>Meadow Buttercup</u>



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0.1	<u>Scrophularia auriculata</u>	<u>Water Figwort</u>
1	<u>Silene flos-cuculi - (Lychnis flos-cuculi)</u>	<u>Ragged Robin</u>
1	<u>Succisa pratensis</u>	<u>Devil's-bit Scabious</u>
0.4	<u>Vicia cracca</u>	<u>Tufted Vetch</u>
Grasses		
10	<u>Agrostis capillaris</u>	<u>Common Bent</u>
2	<u>Alopecurus pratensis</u>	<u>Meadow Foxtail (w)</u>
2	<u>Anthoxanthum odoratum</u>	<u>Sweet Vernal-grass (w)</u>
2	<u>Briza media</u>	<u>Quaking Grass (w)</u>
32	<u>Cynosurus cristatus</u>	<u>Crested Dogstail</u>
1	<u>Deschampsia cespitosa</u>	<u>Tufted Hair-grass (w)</u>
24	<u>Festuca rubra</u>	<u>Slender-creeping Red-fescue</u>
1	<u>Hordeum secalinum</u>	<u>Meadow Barley (w)</u>
6	<u>Schedonorus pratensis - (Festuca pratensis)</u>	<u>Meadow Fescue (w)</u>

4.4 Enhancements for Bats

4.4.1 Bat Roosts in Trees

The tree climbing assessment revealed a lack of roosting opportunities for bats and therefore to encourage tree-roosting bats, it is proposed that bat boxes will be placed in suitable trees along the boundaries of the proposed development site.

Two 2F Schwegler bat boxes, two Large Multi Chamber Woodstone bat boxes and two Improved Crevice bat boxes should be hung on suitable semi-mature or mature trees upon the northern, eastern and southern site boundaries (Figure 10). The boxes would be hung by a suitably qualified ecologist to ensure that this positioning is most suitable, but generally locations above 3.5 metres in the most south-easterly facing aspect of a tree is best. This assortment of boxes will be suitable for pipistrelle *Pipistrellus sp.* bats, common noctule *Nyctalus noctula*, barbastelle, brown long-eared *Plecotus auritus*, and *Myotis* species. Figure 11 outlines indicative locations for each of the proposed bat boxes.



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Figure 10. The 2F Schwegler Bat Box, Large Multi Chamber Woodstone Bat Box, and the Improved Crevice Bat Box.



Figure 11. The locations of the 2F Schwegler bat box (orange), Multi Chamber bat box (dark blue) and the Improved Crevice bat box (light blue).

4.4.2 Bat Roosts in Buildings

As a measure to enhance roosting opportunities for bats throughout the development, bespoke roosting features will be incorporated into the fabric of the new residential buildings. This will include the following:



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Ten Beaumaris Woodstone bat boxes (Figure 12) will be installed in locations show in Figure 13 and will be positioned upon the southern and eastern external faces of the residential building at a height of at least 3.5 metres.

The 2FR Schwegler bat tube will be installed in ten of the new residential buildings (see Figure 13). The 2FR Schwegler bat tube is designed to be set within the fabric of an external wall, incorporated in the masonry and rendered flush with the surface so that only the entrance is visible externally. The 2FR Schwegler bat tube has transverse connecting holes which allow several tubes to be placed next to each other in order to create a larger crevice for bats to roost in. It is recommended that three 2FR bat tubes are connected together on each of the ten residential buildings. The boxes are designed to be maintenance free.



Figure 12. 2FR Schwegler Bat Tube and the Beaumaris Woodstone Bat Box.



Figure 13. Locations of the 2FR Schwegler Bat Tube (orange) and Beaumaris Woodstone Bat Box (purple).

4.5 Mitigation for Bats

Bright external lighting can have a detrimental impact upon foraging and commuting bats, but importantly can also cause bats to be fooled into thinking that the light is from the sun, causing them to remain in their roosts for longer. As a result, the site boundaries and the existing broadleaved woodland must be protected from artificial lighting with no streetlamps or outside lights to face towards these boundaries, existing woodland or new species-rich hedgerows proposed to be planted. Guidelines issued by the Bat Conservation Trust (see Appendix 2) should be incorporated into the lighting scheme and the following measures must be implemented into the site design:

1. No 'upward pointing' or bare bulb lights will be installed anywhere on the development.
2. All external lights upon lamp posts will not be more than 3.5 metres in height and will have shields installed to focus light towards footpaths and roads only (See Figure 14). No light will be allowed to emit light past horizontal (90 degrees from the ground).
3. Any pedestrian ground lighting will not exceed 3 lux.
4. No external lights will be installed on new buildings above a height of 2 metres and all external lights will have shields to prevent light splash beyond the horizontal.
5. Dark zones will be created within the site to ensure bats, badgers, dormice and other wildlife are not affected by the artificial light (see Figure 15).



Figure 14. An example of suitable downward shielded street lighting.



Figure 15. The location of 'dark zones' throughout the proposed development where no artificial light will be used or directed towards.



4.6 Enhancements for Nesting Birds

In order to enhance the site for nesting birds, some common nesting bird boxes will be put up across the site. Two 1B Schwegler nest boxes (with a 32mm entrance hole) should be installed at least 3 metres high on semi-mature or mature trees along the northern and eastern boundary. A Vivara Pro Sparrow Terrace nest box should be installed across 15 of the new residential dwellings and they should be installed on the surface of a suitable wall or incorporated into the wall at least two metres above the ground. The WoodStone Swift box will be installed at a height not less than 3m on ten of the new dwellings. All boxes will be installed towards the outside edge of the development and will not be placed in direct sunlight.

See Figure 16 for examples of artificial bird nesting features that will be incorporated into the development and Figure 17 for the proposed location of each feature.



Figure 16. Examples of artificial bird nesting features: Schwegler 1B nest box, Vivara Pro WoodStone House Sparrow Nest Box and the WoodStone Swift Nest Box.



Figure 17. The proposed locations of the Schwegler 1 B (yellow), Vivara Pro WoodStone Sparrow Terrace (red)



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and the WoodStone Swift Nest Box (blue).

4.7 Hedgehogs

Hedgehog populations have declined by over half in the countryside between 2000 and 2014. Therefore, in order to enhance the proposed development site for hedgehogs, it is proposed that at least four hedgehog boxes/homes are installed within the proposed reptile receptor area. In addition, hedgehog 'highways' or 'gateways' will be incorporated into the fence-lines of all proposed residential dwellings to ensure there are no barriers to movement for this species. Figure 18 shows an example of an Eco Hedgehog Hole Fence plate used to create an access point for commuting hedgehogs. The boundary scrub habitat and tree lines are being retained and these boundaries are well connected to the surrounding landscape. This connectivity allows hedgehogs to move freely throughout a range of habitats to forage and find areas to nest.

The HH7 Hogilo Hedgehog House (Figure 18) is made from durable FSC timber with a predator resistant entrance. The Hogilo Hedgehog House will need to be placed in a quiet corner covered with leaves and brash for extra camouflage. In order to create a hedgehog 'highway'/'gateway', a hole measuring 13cm by 13cm should be made in any fence lines throughout the proposed development and an Eco Hedgehog Hole Fence plate fixed to the fence. This will clearly highlight this access for hedgehogs and ensure the hole does not get blocked up.



Figure 18. The Eco Hedgehog Hole Fence Plate and the HH7 Hogilo Hedgehog House.



5 POST CONSTRUCTION MANAGEMENT AND MONITORING

5.1 Maintenance of Reptile Receptor Site

It is important for the receptor site to be managed for reptiles in perpetuity. This means leaving the designated areas of reptile habitat undisturbed during the active season, and safeguarding features suitable for hibernation, and crucially not disturbing them in winter. The grasslands should be allowed to grow tall and should not be frequently mown. If mowing is required, such as to prevent scrub establishment, then this should be done in late autumn and never below 10cm height. Machinery with a low ground pressure should always be used and no other vehicles should be allowed to enter suitable reptile habitat.

5.2 Enhancements for Bats, Birds and Hedgehogs

The integral bat roosting features in buildings and on trees will be largely maintenance free (apart from the annual check that they remain in position). It is recommended that prospective buyers of the properties are made aware of the legal protection afforded to bats and birds and their obligations as owners. Bird nesting boxes, particularly sparrow terraces should be emptied of nesting material in winter to prevent the build-up of parasites.

Hedgehog houses are largely maintenance free apart from an annual check that they are still in place and camouflaged appropriately.

An annual monitoring scheme, designed to check for the condition of enhancement features and occupation by target species, is recommended over ten years following completion of the development. During this time, the developer or management authority will be responsible to replace or repair any structures as required.

5.3 Wildflower and Grassland Meadow Management

The meadow should be managed carefully to maintain botanical diversity and ensure that coarse grass species do not become dominant. The grassland should be mechanically cut to a sward height of approximately 50mm annually. This should be carefully timed after all flowering species have set their seeds. This is typically late July but may vary from year to year. It is essential to maintain low soil fertility by ensuring that all cut material is removed from site, by baling up ideally after it has been left to dry for a couple of days.

The grassland should not be cut between April and mid-July/August to allow herbaceous species to flower and set seeds, and for the enjoyment of the residents and public. A second cut may be undertaken in the late autumn or early spring to reduce competition between the faster growing grasses and developing seedlings of herbaceous species.

5.4 SuDS Pond Management

The condition of the new SuDS ponds should be monitored closely, so that any problems can be identified and dealt with quickly. This includes:



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- dealing with any invasive non-native species that may colonise the pond before they become established
- checking the water supply is adequate
- identifying any sources of pollution or siltation problems
- ensuring fish have not been introduced into the pond.
- making sure that the native macrophyte cover of the pond does not exceed 60% by removing excess vegetation once a year in late autumn.

Allowing the pond to dry out on occasion can be beneficial by removing predatory fish and oxidising sediments. The developer or management authority will be responsible for management of the pond.

5.5 Trees and Hedgerow Management

Post-construction management should aim to preserve this existing habitat, by a policy of non-intervention where possible. Some felling of dangerous trees for health and safety reasons and/ or the control of scrub may be required over time, but where possible, the trees, shrubs and brambles should be left to grow unrestricted.

Sections of existing hedgerows, scrub and trees may require management to accommodate the development and the needs of residents (such as to allow natural light). The hedge trimming should be timed for late winter so that fruit and nut bearing trees continue to provide for birds and mammals throughout the winter. It is important that this intervention management is restricted to key locations of the development site where problems might arise, and not the site as a whole.

Should you need any further advice on the information provided above, please do not hesitate to contact The Ecology Co-op.



6 APPENDIX 1 – PLANNING POLICY AND WILDLIFE LEGISLATION

Introduction

The following text is intended for general guidance only and does not constitute comprehensive professional legal advice. It provides a summary of the current legal protection afforded to wildlife in general and certain species. It includes current national planning policy relevant to nature conservation.

The ‘Birds Directive’, ‘Habitats Directive’ and ‘Natura 2000 Sites’.

The Council Directive 79/409/EEC on the Conservation of Wild Birds (“the Birds Directive”) sets a framework for the protection of wild birds. Under the directive, a number of provisions are made including the designation and protection of ‘Special Protection Areas’ (SPAs) – areas which support important bird populations, and the legal protection of rare or vulnerable species.

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the “Habitats Directive”) directs member states of the EU to take measures to maintain favourable conservation status of important habitats and species. This requires the designation of a series of sites which contain important populations of species listed on Annex II of the directive. Together with ‘Special Areas of Conservation’ (SPAs), designated under the Birds Directive, SACs form a network across Europe of protected areas known as the ‘Natura 2000’.

Annex IV lists species in need of more strict protection, these are known as “European Protected Species (EPS)”. All bat species, common dormice *Muscardinus avellana*, otter *Lutra lutra* and great crested newts *Triturus cristatus* are examples of EPS that are regularly encountered during development projects.

The ‘Habitats Regulations’

The Conservation of Habitats and Species Regulations 2010 (the Habitats Regulations”) is the principle means of transposing the Habitats Directive and the Birds Directive, and updates the Conservation (Natural Habitats, &c.) Regulations 1994 (“the 1994 regulations”) in England and Wales.

‘Natura 2000’ sites receive the highest level of protection under this regulation which requires that any activity within the zone of influence of these sites would be subject to a Habitats Regulations Assessment (HRA) by the competent authority (e.g. planning authority), leading to an Appropriate Assessment (AA) in cases where ‘likely significant effects on the integrity of the site are identified.

For European Protected Species, Regulation 41 makes it a criminal offence to;

- Deliberately capture, injure or kill any such animal;
- Deliberately disturb wild animals of such species;
- Deliberately take or destroy their eggs (where relevant);
- Damage or destroy a *breeding or resting place* of such an animal;
- Possess, control, sell or exchange any live or dead animal or plant, of such species;
- Deliberately pick, collect, cut, uproot or destroy a wild plant of such species.

The Habitats Directive and Habitats Regulations provide for the derogation from these prohibitions for specific reasons provided certain conditions are met. An EPS licensing regime allows operations that would otherwise be unlawful acts to be carried out lawfully. Natural England is the licensing Authority and, in order to grant a license, ensures that three statutory conditions (sometimes referred to as the



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'three derogation tests') are met:

- A licence can be granted for the purposes of "preserving public health or safety or for other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment" (Regulation 53 (2) (e)).
- A licence can be granted if "there are no satisfactory alternatives" to the proposed action.
- A licence shall not be granted unless the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Wildlife and Countryside Act (1981) as amended.

This remains one of the most important pieces of wildlife legislation in the UK. There are various schedules to the Act protecting birds (Schedule 1), other animals including insects (Schedule 5), plants (Schedule 8), and control of invasive non-native species (Schedule 9).

Under the Wildlife and Countryside Act (WCA) 1981, all wild birds (with the exception of those listed on Schedule 2), their eggs and nests are protected by law and it is an offence to:

- Take, damage or destroy the nest of any wild bird while it is in use or being built.
- Take or destroy the egg of any wild bird.
- Disturb any bird listed on Schedule 1, while it is nest building, or at a nest with eggs or young, or disturb the dependant young of any such bird.

Schedule 5 lists all non-avian animals receiving protection to a varied degree. At its strongest, the Act makes it an offence to intentionally kill, injure or take any wild animal listed on Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturb animals while occupying such places. Examples of species with *full protection* include all EPS, common reptile species, water vole *Arvicola amphibius*, white-clawed crayfish *Austropotamobius pallipes* and Roman snail *Helix pomatia*. Other species are protected from sale, barter or exchange only, such as white letter hairstreak *Satyrus w-album*.

The Act makes it an offence to intentionally pick, uproot or destroy any plant or seed, and sell or possess any plant listed on Schedule 8. It is also an offence to intentionally uproot any wild plant not listed on Schedule 8 unless authorised [by the land owner]. Species on Schedules 5 and 8 are reviewed every 5 years when species can be added or removed.

Measures for the prevention of spreading non-native species which may be detrimental to native wildlife is included in the Act, which prohibits the release of animals or planting of plants into the wild of species listed on Schedule 9 (for example Japanese knotweed *Fallopia japonica*, Himalayan balsam *Impatiens glandifera*, New Zealand Pygmyweed *Crassula helmsii*).

The Wildlife and Countryside Act 1981 (as amended) also prohibits certain inhumane methods of traps and devices for the capture or killing of wild animals and certain additional methods such as fixed trap, poisoning with gas or smoke, or spot-lighting with vehicles for killing species listed on Schedule 6 of the Act (this includes all bat species, badger, otter, polecat, dormice, hedgehog and red squirrel).

Natural Environment and Rural Communities (NERC) Act (2006)

The NERC Act (2006) places a statutory duty under Section 40 on all public bodies, including planning authorities, to take, or promote the taking by others, steps to further the conservation of *habitats and species of principal importance for the conservation of biodiversity* in England (commonly referred to as the 'Biodiversity Duty'). This duty extends to all public bodies the biodiversity duty of Section 74 of the



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Countryside and Rights of Way (CROW) Act 2000, which placed a duty only on Government and Ministers. Section 41 lists the habitats and species of principle importance. This includes a wide range of species from mosses, vascular plants, invertebrates through to mammals and birds. It originates from the priority species listed under the UK Biodiversity Action Plan (UK BAP) with some omissions and additions.

Protection of Badgers Act (1992)

The Badger *Meles meles* is afforded specific legal protection in Britain under the Protection of Badgers Act (1992), and Schedule 6 of the Wildlife and Countryside Act 1981 (as amended) (see above).

Under this legislation, it is a criminal offence to:

- intentionally kill, injure, take, possess, or cruelly ill-treat, a Badger, or to attempt to do so;
- interfere with a sett, by damaging or destroying it;
- to obstruct access to, or any entrance of, a Badger sett; or
- to disturb a Badger when it is occupying a sett.

A licence may be obtained from Natural England to permit certain prohibited actions for a number of defined reasons including interference of a sett for the purpose of development, provided that a certain number of conditions are met. Note that licenses are not normally granted for works affecting badgers between the end of November and the start of July.

National Planning Policy Framework

The National Planning Policy Framework (NPPF 2012) sets out the Government's view on how planners should balance nature conservation with development and helps ensure that Government meets its biodiversity commitments with regard to the operation of the planning system.

The NPPF states that the wider benefits of an ecosystem should be recognised, and the presence of a protected species is a material consideration for a development proposal (Circular 06/2005, 2005).

UK Post-2010 Biodiversity Framework

The UK Biodiversity Action Plan (UK BAP), published in 1994, was the UK's response to the commitments of the Rio Convention on Biological Diversity (1992). The UK BAP was replaced by the UK Post-2010 Biodiversity Framework. This framework covers the period 2011 to 2020 and forms the UK government's response to the new strategic plan of the United Nations Convention on Biodiversity (CBD) published in 2010. This promotes a focus on individual countries delivering target for protection for biodiversity through their own strategies.

The most recent biodiversity strategy for England, 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' was published by Defra (2011), and a progress update was provided in July 2013 (Defra 2013).

'Biodiversity 2020' builds on the Natural Environment White Paper for England – 'The Natural Choice', published on 7 June 2011, and sets out the strategic direction for biodiversity policy for the next decade.

Biodiversity 2020 deliberately avoids setting specific targets and actions for local areas because Government believes that local people and organisations are best placed to decide how to implement the strategy in the most appropriate way for their area or situation.



7 APPENDIX 2 - REDUCING IMPACTS OF ARTIFICIAL LIGHT

Bright external lighting can have a detrimental impact upon foraging and commuting bat flight paths, but more importantly can also cause bats to remain in their roosts for longer. Artificial lighting can also cause significant impacts on other nocturnal species, most notably moths and other nocturnal insects. It can also result in disruption of the circadian rhythms of birds, reducing their fitness. Guidelines issued by the Bat Conservation Trust⁵ should be considered while designing the lighting scheme. A simple process which should be followed where the impact on bats is being considered as part of a proposed lighting scheme. It contains techniques which can be used on all sites, whether a small domestic project or larger mixed-use, commercial or infrastructure development. This includes the following measures:

Avoid lighting on key habitats and features altogether

there is no legal duty requiring any place to be lit. British Standards and other policy documents allow for deviation from their own guidance where there are significant ecological/environmental reasons for doing so. It is acknowledged that in certain situations lighting is critical in maintaining safety, such as some industrial sites with 24-hour operation. However, in the public realm, while lighting can increase the perception of safety and security, measurable benefits can be subjective. Consequently, lighting design should be flexible and be able to fully consider the presence of protected species

Apply mitigation methods to reduce lighting to agreed limits in other sensitive locations – lighting design considerations

Where bat habitats and features are considered to be of lower importance or sensitivity to illumination, the need to provide lighting may outweigh the needs of bats. Consequently, a balance between a reduced lighting level appropriate to the ecological importance of each feature and species, and the lighting objectives for that area will need to be achieved. The following are techniques which have been successfully used on projects and are often used in combination for best results;

- Dark buffers, illuminance limits and zonation
- Sensitive site configuration, whereby the location, orientation and height of newly built structures and hard standing can have a considerable impact on light spill
- Consider the design of the light and fittings, whereby the spread of light is minimised ensuring that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required. Consider the height of lighting columns. It should be noted that a lower mounting height is not always better. A lower mounting height can create more light-spill or require more columns. Column height should be carefully considered to balance task and mitigation measures. Consider no lighting solutions where possible such as white lining, good signage, and LED cat's eyes. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times.
- Screening, whereby light spill can be successfully screened through soft landscaping and the installation of walls, fences and bunding
- Glazing treatments, whereby glazing should be restricted or redesigned wherever the ecologist and lighting professional determine there is a likely significant effect upon key bat habitat and features.
- Creation of alternative valuable bat habitat on site, whereby additional or alternative bat flightpaths, commuting habitat or foraging habitat could result in appropriate compensation for

⁵ Bat Conservation Trust and Institute for Lighting Professionals (2018) Guidance note 8. Bats and Artificial Lighting. <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>



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any such habitat being lost to the development.

- Dimming and part-night lighting. Depending on the pattern of bat activity across the key features identified on site it may be appropriate for an element of on-site lighting to be controlled either diurnally, seasonally or according to human activity. A control management system can be used to dim (typically to 25% or less) or turn off groups of lights when not in use.

Demonstrate compliance with illuminance limits and buffers

- *Design and pre-planning phase*; It may be necessary to demonstrate that the proposed lighting will comply with any agreed light-limitation or screening measures set as a result of your ecologist's recommendations and evaluation. This is especially likely to be requested if planning permission is required.
- *Baseline and post-completion light monitoring surveys*; baseline, pre-development lighting surveys may be useful where existing on or off-site lighting is suspected to be acting on key habitats and features and so may prevent the agreed or modelled illuminance limits being achieved.
- *Post-construction/operational phase compliance-checking*

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