



## Ecological Design Strategy

### Land at Bilsham Road, Yapton

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### LIABILITIES:

Whilst every effort has been made to guarantee the accuracy of this report, it should be noted that living animals and plants are capable of migration/establishing and whilst such species may not have been located during the survey duration, their presence may be found on a site at a later date.

This report provides a snap shot of the species that were present at the time of the survey only and does not consider seasonal variation. Furthermore, where access is limited or the site supports habitats which are densely vegetated only dominant species maybe recorded.

The recommendations contained within this document are based on a reasonable timeframe between the completion of the survey and the commencement of any works. If there is any delay between the commencement of works that may conflict with timeframes laid out within this document, or have the potential to allow the ingress of protected species, a suitably qualified ecologist should be consulted.

It is the duty of care of the landowner/developer to act responsibly and comply with current environmental legislation if protected species are suspected or found prior to or during works.

## **1.0 Introduction**

### **Background**

- 1.1 The Ecology Partnership was commissioned by Gleeson Strategic Land to provide a technical review with regards to the site SD7 Yapton and the evolution of the master plan. The Ecology Partnership has provided ecological information with regards to the Bilsham Road section of the site, under Gleeson's control, see figure 1. The remainder of the allocation is under the ownership of Landlink Estates. The ecologists, Lizard Landscape Designs, have been consulted in order that a comprehensive green infrastructural plan can be developed, and that ecological enhancements are robust across the entire allocation.
- 1.2 This technical note has been prepared to respond to amendments to the illustrative masterplan following discussions with the council. This note presents the results of The Ecology Partnership's surveys in and around the site, and provides the details of the enhancements to the site and the overarching green infrastructural design.

### **Site Context and Status**

- 1.3 The site is situated along the southern boundary of the West Sussex village of Yapton. The site is set within a semi-rural landscape surrounded by agricultural land as well as commuter towns and villages. The immediate surroundings consist of residential dwellings to the north and east, and arable fields with hedgerows to the south and west. The site was dominated by arable land with one field considered to be semi improved grassland. The grid reference is SU 9702 4989.
- 1.4 The approximate red line boundary of the site is shown below in Figure 1 overleaf.



*Figure 1: Approximate location of the redline boundary.*

### **Description of Proposed Development**

- 1.5 The strategic allocation SD7 in the local plan is for up to 550 dwelling with public open space provision. The master plan includes provision areas for recreation and children's play, enhancing the pedestrian and cyclists connectivity through the site, provision of landscape structure and the creation of new focal green spaces.
- 1.6 The site was surveyed to assess its ecological value and to ensure compliance with national and local plan policies. The reports were produced with reference to current guidelines for preliminary ecological appraisal (PEA) (CIEEM 2013) and in accordance with BS 42020:2013 Biodiversity – Code of Practise for Planning and Development.

## 2.0 Surveys and Results

- 2.1 A PEA was conducted on the 25<sup>th</sup> October 2015 and 16<sup>th</sup> August 2016 and was supported by a desk top study, with both on line mapping services and through the purchase of biological records from Sussex Biological Records Centre.
- 2.2 Biological records identified the presence of slow worms, common lizards, grass snake and water voles within 1.5km of the site. GCNs and dormice records were located over 2km from the site. Bat species included serotine, natterer's bat, noctule and common pipistrelle.
- 2.3 The PEA identified that the site was dominated by arable land, with a single field within the red line boundary supporting semi improved grassland habitat. Grassy buffers were located around the edges of the arable fields. Hedgerows and tree lines, including mature oak, were present. These features were considered the most significant in terms of the habitats on site.
- 2.2 As a result of the PEA, the following species specific surveys were conducted across the site.

| Faunal Group           | Survey Methodology                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Guidance                                                                                                                          | Results                                                                                                                                                                                                                                                                         |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bats – tree inspection | <p>As part of the habitat surveys, any trees supporting particular features likely to be of value to bats, such as splits, cracks, rot holes, coverings of ivy, peeling bark or similar, were recorded.</p> <p>The potential for the trees to support roosting bats has been assessed in accordance with the criteria set out in the Bat Conservation Trust guidelines (BCT, 2012 and subsequently 2016)</p> <p>Conducted:</p> <p>October 2015<br/>August 2016</p> | <p>Bat Surveys – Good Practice Guidelines' (Bat Conservation Trust, 2012);</p> <p>The surveys followed BCT guidelines (2016).</p> | <p>English oak trees located on the edges of the fields (target noted on the habitat map) were considered to have bat potential due to their age and features present. A willow tree, located on the western aspect of the site, was also considered to have bat potential.</p> |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bats – activity surveys | <p>Several dusk surveys and the use of remote recording (anabat surveys) across the site using transect methods and stops for recording activity as per Bat Conservation Trust guidelines (BCT, 2016)</p> <p>Conducted:</p> <p>May, July, August and September 2016</p> <p>Anabat Express was deployed on site in May, July and September 2016</p>                                                                                                                                                                                                                                                                                                                                                                                                                          | The surveys followed BCT guidelines (2016).                                                                                 | <p>The site was found to support a range of bat species. The majority of bat passes were from common pipistrelles. Lower levels of soprano pipistrelles, noctule, <i>Myotis spp.</i> and serotine activity was also observed by the surveyors. These species of bat were not considered to be utilising the site as key foraging or commuting areas. The Anabat surveys displayed evidence of greater use of the site by bats than the activity transects suggest. A greater diversity of species were recorded, as well as a significantly higher frequency of bat passes than the activity transects. The remote bat recording also indicated common pipistrelles as being the most dominant species, however there was also a high frequency of <i>Myotis spp.</i> passes on certain nights of recording. Soprano pipistrelle, nathusius pipistrelle, serotine, noctule and brown long-eared bat species were recorded in lower frequencies. Barbastelle bats were recorded in May only.</p> |
| Reptiles                | <p>The refugia were placed around the edges of the site adjacent to areas of scrub, hedgerow and within the more developed grassland field margins.</p> <p>Mats were set up prior to the commencement of the reptile survey. A total of seven survey visits were made to the site to check the refugia for the presence of reptiles during each survey. Visits were only carried out if the weather conditions were suitable for locating reptiles. On each visit to the site, a minimum of one circuit to check all refugia was carried out.</p> <p>Natural refugia were also surveyed during these visits. Any natural refugia, such as log piles and brash piles, were lifted and hand searched for evidence of reptiles.</p> <p>Conducted:</p> <p>May and July 2016</p> | The timing and number of surveys completed were based on guidelines produced by Froglife (1999) and Gent and Gibson (1998). | <p>The maximum number of slow worm adults/sub-adults identified in one survey visit was 63, therefore the site is considered to support an 'exceptional' population of slow worms. It was estimated that over 288 individuals were recorded during the 14 visits (7 to each portion of the site), of which about 102 were adults, 81 were sub-adults and 105 were juveniles. No other reptile species were found on-site and it is considered that no other species would be present within the red line boundary</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Water voles             | <p>The presence/likely absence of water voles and otters is largely determined by field signs. With regard to water voles, this includes:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Strachan, R. <i>et al</i> (2011) <i>Water Vole Conservation</i>                                                             | Ditches appeared to be too shallow, and held very small quantities of water. No emergent or bankside vegetation present.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | <ul style="list-style-type: none"> <li>• Latrines;</li> <li>• feeding stations of neatly piled food cuttings;</li> <li>• burrows;</li> <li>• short grazed 'lawns' close to burrows;</li> <li>• runways in vegetation;</li> <li>• footprints;</li> <li>• sightings or sounds of water voles entering the water; and</li> <li>• nests consisting of finely shredded grasses or reeds.</li> </ul> <p>Conducted</p> <p>October 2015<br/>August 2016</p> | <p><i>Handbook.</i></p> <p>Wildlife<br/>Conservation<br/>Research Unit,<br/>Oxford.</p>                                                        | <p>No evidence of latrines, burrows or feeding remains found.</p>                                                                                                                                                                                                                                                                                                                                                                  |
| Badgers        | <p>During the survey, all habitats potentially suitable for badgers were systematically examined for evidence of badger activity. Particular attention was paid to areas where the vegetation and/or the topography offered suitable sett sites such as embankments and wooded areas.</p> <p>Conducted</p> <p>October 2015<br/>August 2016</p>                                                                                                      | <p>The evaluation of badger activity was based on methodology developed for the National Survey of Badgers (Creswell <i>et al.</i>, 1990).</p> | <p>No setts, snuffle holes, latrine or dung pits were located within the red line boundary.</p>                                                                                                                                                                                                                                                                                                                                    |
| Breeding birds | <p>The site was visited once monthly. A British Trust for Ornithology (BTO) Breeding Birds Atlas method (Balmer <i>et al.</i> 2013) was followed, adapted, through the sub-division of observations by habitat type, to provide information on breeding species and activity for each of the habitats within the site.</p> <p>Conducted:</p> <p>April, June, July 2016</p>                                                                          | <p>BTO</p>                                                                                                                                     | <p>The survey recorded a total of 21 bird species that were considered to breed or hold territory in habitats within or fringing the site. No annex 1 or schedule 1 species were recorded. Three species were BOCC red list (and UK BAP) were song thrush, starling and house sparrow. With BOCC amber list species swift, common gull and dunnock. No ground nesting birds were recorded, albeit skylark were noted off site.</p> |

### **3.0 Site Design**

#### **Consultation**

- 3.1 The environment officer reviewed the ecological submission (15<sup>th</sup> January 2018 for Y/91/17/OUT). The officer was happy with the proposed mitigation measures for the reptile surveys, agreed with recommendations with regards to bats (including lighting, commuting corridors), reiterated breeding bird season. Finally enhancements were recommended to be included in a 'habitat and ecological enhancement plan'.
- 3.2 Further recommendations from the officer included; dark corridor for bats creation of freshwater habitats, creation of wetland grasslands, wildflower meadows, strengthening the site's boundary with wildflower edges, retaining hedgerows, inclusion of native species planting, creation of log piles and compost heaps for reptiles, and the use of hedgehog tunnels, nesting boxes for birds and bat tiles, boxes and bricks

#### **Green Infrastructure Development**

- 3.3 The allocation falls under two separate ownerships / planning applications, however, ensuring the allocation incorporated a strategic level of green space and green linkages, was considered to be essential ensuring a landscape level approach to green infrastructure. In addition to the creation of a robust infrastructural network, the creation of amenity parks and focal green spaces are also developed within the design, inducing a large central green space within the allocated site.
- 3.4 The recommendations in the original ecological reports produced by The Ecology Partnership, are still considered to be valid. However, the recommendations are to include the wider allocation site ensuring a robust ecological enhancement strategy is achievable. The ecology team, Lizard Landscape Design and Ecology, for the adjacent application have provided an ecological design strategy (July 2018). This report includes a reptile mitigation strategy, the creation of wildflower areas, log piles, the use of bird and bat boxes, and the recommendations for planting native hedgerow species and trees.

- 3.5 These ecological enhancements recommended by Lizard Landscape Design and Ecology and The Ecology Partnership form a cohesive strategy across the whole of the allocation. Details of the strategy are provided in section 4 of this technical note.
- 3.6 As such the design of the allocation has included a range of features which are considered to be both of high biodiversity interest, as well as providing strong green infrastructural linkages to the wider landscape and provides high amenity value. The plan provides:
- Rural edges – this provides an ecotone between the built environment and the rural adjacent habitats. The rural edges are to provide new habitats within the site boundaries, such as wildflower areas and feature native tree planting.
  - Retaining hedgerows – these are being retained around the field systems of the Bilsham Road site. A small section of the hedgerow running between the two application areas will be removed, to allow for a central green space and road linkages. However, the retained hedgerows are to be managed sensitively and planted with new species of native value.
  - Retaining TPO trees – mature oaks and other species such as ash, are present within the field edges. These are to be protected and retained within the scheme. These trees are of intrinsic value but also provide a maturity to the landscape and are of high amenity value.
  - Provides new grassland areas / wildflower areas – these are to be provided with the SUDS / swale features and will be seeded with wildflower mixtures suitable for attenuation areas. In addition wildflower areas will be provided. These meadow features provide suitable foraging habitat for a range of bird species and invertebrates, which are not currently present within the red line boundary.
  - Tree lined streets – new tree planting along the new roads will be native and provide green stepping stones within the residential development.
  - Focal green spaces (amenity / recreational) – whilst these are to be largely recreation focused, native tree planting within the focal greens, including specimen planting of mature trees, will provide green linkages across the green spaces and additional habitat for a range of species.
  - Dark corridors – these will extend around the rural edge of the site, which covers the whole of the south eastern aspect of the site and the northern boundary. This

will ensure that the landscape features created can be utilised by a range of protected species and species of interest.

- Wildlife boxes – bird and bat boxes will be included within the development. This will include the use of integral boxes within the built environment. Hedgehog friendly fencing will also be included across the whole of the development.

#### **4.0 Enhancement Details**

4.1 The aims of the planting scheme are to:

- Provide for the ‘gapping up’ of the hedgerow edges;
- To provide new tree cover within the site, both as street trees and within the open space;
- To provide new grassland habitat of higher ecological interest, through the use of wildflower mixtures;
- Create biodiversity interest within gardens and amenity areas, including parks;
- Create new nesting opportunities for birds and roosting opportunities for bats;
- The creation of ‘dark corridors’ around the edges of the site;
- The creation of suitable reptile receptor sites;
- Provision of features such as log piles and hedgehog homes.

#### **Habitats / Planting**

##### *Hedgerows and Trees*

4.2 The hedgerows are to be maintained along the edge of the Bilsham Road site where possible. New hedgerow planting will occur on the edges of the wider site and where the housing development abuts the site and ‘gapping up’ of existing hedgerows will also occur. This will help to improve wildlife corridors around the site for species such as badgers, reptiles, amphibians, small mammals and birds. It is recommended that native species be used including:

- Hazel (*Corylus avellana*)
- Hawthorn (*Crataegus monogyna*);
- Blackthorn (*Prunus spinosa*);
- Field maple (*Acer campestre*);

- Holly (*Ilex aquifolium*);
- Elder (*Sambucus nigra*);
- Privet (*Ligustrum vulgare*);
- Dog rose (*Rosa canina*);
- Honeysuckle (*Lonicera periclymenum*).

4.3 Planting the bases of hedgerows with herbaceous plants and bulbs will attract bees, butterflies and other insects as well as providing ground cover for smaller animals. Seeds that are tolerant of semi-shade should also be used. Appropriate seed mixes can be purchased from native species stockists but usually include the following species:

- Yarrow (*Achillea millefolium*)
- Agrimony (*Agrimonia eupatoria*)
- Garlic mustard (*Alliaria petiolata*)
- Common knapweed (*Centurea nigra*)
- Wild basil (*Clinopodium vulgare*)
- Hedge bedstraw (*Galium album*)
- Wood avens (*Geum urbanum*)
- Oxeye daisy (*Leucanthemum vulgare*)
- Ribwort plantain (*Plantago lanceolata*)
- Cowslip (*Primula veris*)
- Selfheal (*Prunella vulgaris*)
- Red campion (*Silene dioica*)
- Hedge woundwort (*Stachys sylvatica*)
- Upright hedge parsley (*Torilis japonica*)
- Tufted vetch (*Vicia cracca*)

4.4 Any new tree planting within gardens and along the street should use native species of value to wildlife, including:

- Oak (*Quercus robur*)
- Ash (*Fraxinus excelsior*)
- Hazel (*Corylus avellana*)
- Beech (*Fagus sylvatica*)
- Cherry (*Prunus sp.*)

- Hornbeam (*Carpinus betulus*)
- Rowan (*Sorbus aucuparia*)
- Wild service tree (*Sorbus torminalis*)

#### *Wildflower Areas*

4.5 The wildflower areas are proposed around the 'rural edge' of the site. And include the dry SUDs basins The creation of wildflower areas would provide opportunities for a range of species, notably invertebrates, birds and common reptiles. is recommended that the area be sown with a native wildflower seed mix to increase plant diversity and the nectar resource available to insects throughout the year. This mix should be tailored according to the soil type present. A general seed mix should include species such as:

- Yarrow (*Achillea millefolium*)
- Common bent (*Agrostis capillaris*)
- Sweet vernal-grass (*Anthoxanthum odoratum*)
- Betony (*Betonica officianalis*)
- Common knapweed (*Centaurea nigra*)
- Greater knapweed (*Centaurea scabiosa*)
- Wild carrot (*Daucus carota*)
- Foxglove (*Digitalis purpurea*)
- Red fescue (*Festuca rubra*)
- Lady's bedstraw (*Galium verum*)
- Perforate St John's-wort (*Hypericum perforatum*)
- Oxeye daisy (*Leucanthemum vulgare*)
- Common bird's-foot-trefoil (*Lotus corniculatus*)
- Musk mallow (*Malva moschata*)
- Black medick (*Medicago lupulina*)
- Field forget-me-not (*Myosotis arvensis*)
- Ribwort plantain (*Plantago lanceolata*)
- Hoary plantain (*Plantago media*)
- Smooth meadow-grass (*Poa pratensis*)
- Tormenitl (*Potentilla erecta*)
- Salad burnet (*Poterium sanguisorba*)

- Cowslip (*Primula veris*)
- Selfheal (*Prunella vulgaris*)
- Bulbous buttercup (*Ranunculus bulbosus*)
- Common sorrel (*Rumex acetosa*)
- Wild clary (*Salvia verbenaca*)
- Red campion (*Silene dioica*)
- White campion (*Silene latifolia*)
- Night-flowering catchfly (*Silene noctiflora*)
- Devil's-bit scabious (*Succisa pratensis*)
- Goat's-beard (*Tragopogon pratensis*)

4.6 Before sowing, the ground needs to be prepared by removing weeds and scoring the ground. Seeds are best sown in March-April or August-September. Plug plants can be used for species that are difficult to establish from seed such as meadow cranesbill (*Geranium pratense*), field scabious (*Knautia arvensis*) and clustered bellflower (*Campanula glomerata*). These should be planted in weed-free soil in late March-April and should be well-watered.

4.7 Log piles (see details below) will be included within the wildflower meadow area to provide new features of interest for local wildlife.

#### *Amenity Grassland / Gardens / Green Space*

4.9 Newly formed areas of amenity grassland, such as those along the street and within gardens, should be supplemented by integrating a variety of native plant species. Wildflower seed mixes should be bought from native species stockists and can be tailored according to soil type and shading. These should be sown in areas where mowing is less frequent such as the edges of the gardens and areas in front of the house. Species-rich turf can be sourced to increase the botanical diversity of the gardens. These usually consist of a range of grass species as well as low-growing herbs which are more tolerant of regular mowing.

4.10 Additional habitat can be created for species such as birds and insects in the form of green walls. Climbing plants can be grown onto trellis along the fence line dividing the two gardens. Species which can be planted include:

- Honeysuckle (*Lonicera japonica*; *L. fragrantissima*; *L. standishii*);
- Clematis (*Clematis vitalba*, *C. armandii*, *C. alpina*, *C. montana*, *C. tangutica*);
- Ivy (*Hedera helix*);
- Climbing hydrangea (*Hydrangea petiolaris*);
- Dog rose (*Rosa canina*).

4.11 New gardens will be created as part of the scheme and these should be planted with species of value to wildlife. Shrubs species which are recommended include those which produce flowers and berries such as:

- Box (e.g. dwarf sweet box *Sarcococca hookeriana*);
- Bilberry (*Vaccinium myrtillus*);
- Wayfaring tree (*Viburnum lantana*);
- Sweet briar (*Rosa rubiginosa*);
- Wild privet (*Ligustrum vulgare*);
- Buckthorn (*Rhamnus cathartica*);
- Yew (*Taxus baccata*);
- Various hebes.

4.12 Herbs should include species which provide nectar opportunities for invertebrates such as lavender, jasmine, chamomile, fennel, oregano, evening primrose, thyme, mint and heather.

### Wildlife Boxes

4.13 The use of bird boxes on trees within the development will provide new nesting opportunities on site. A combination of the following should be erected:

- Schwegler 1B Nest Box – This box will attract a wide range of garden birds and is made from Woodcrete to ensure that it lasts for decades. Different entrance hole sizes can cater for different species.

- Schwegler 2M Nest Box – This box is similar to the 1B nest box but differs in that it can be freely suspended which protects against predators e.g. cats.

4.14 To enhance the local bat population and provide roosting opportunities within the new development, it is recommended that integrated bat boxes/tubes be incorporated into the structure of the new buildings (Figure 2). The bat tubes should be inserted as high up as possible in the brickwork. Habibat, in association with the Bat Conservation Trust, provide a range of boxes which are unfaced for render or designed to match the brickwork of the building (Figure 2).

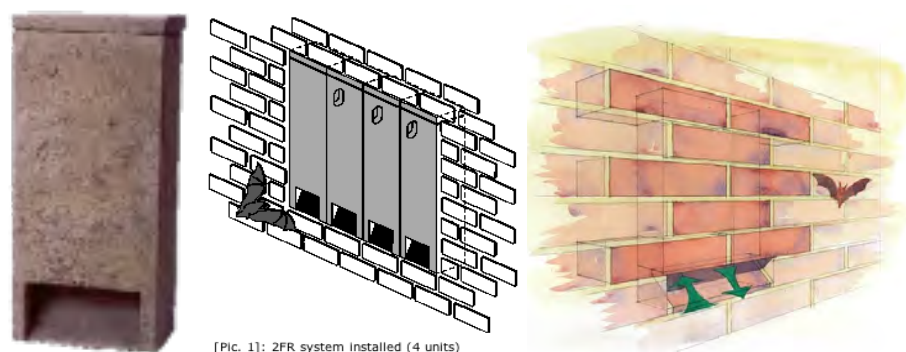


*Figure 2: Bat tubes incorporated into the wall of a building to provide roosting space*

4.15 Additional roosting opportunities can be provided by hanging bat boxes on retained mature trees around the site. One of each of the following boxes will be installed:

- Schwegler 2F Bat Box – This box is attractive to small bats such as pipistrelles and long-eared bats (Figure 3).
- Schwegler 1FD Bat Box – This box has been designed specifically for smaller bats and provides opportunities as a maternity roost (Figure 3).



*Figure 3: Schwegler 2F (left) and 1FD (right) bat boxes*

- 4.16 A booklet should be created for future home owners informing them what the different type of boxes are for and the legal protection surrounding bat roosting sites.

### Log piles

- 4.17 Log and brash piles have been recommended for the site to provide refugia and hibernacula for reptiles, amphibians and small mammals. They are also important for saprophytic bryophytes and saprophytic insects. They should be placed in a variety of locations (damp and sunny spots) and next to existing vegetation, such as the hedgerows and orchard edge, so that there is cover immediately adjacent. They should contain a mixture of log piles and shapes with some small diameter material to create a diverse structure. Logs from the sycamore to be felled can be incorporated.



*Figure 4: Examples of log and brush piles*

### Hedgehogs

- 4.19 This species has suffered substantial decline in recent decades for a variety of reasons, one of which is a decline in suitable habitat and connectivity around developments. Hedgehogs make use of natural log and brash piles in woodland to hibernate in the winter months and so supplementary log piles are to be established around the edges of the site, as well as a number of specific 'hogitat' boxes (as pictured in figure 5) to help

hedgehogs find protection from predators. The boxes should be placed on the edges of scrub habitat and partially hidden under brash.



*Figure 5: Hedgehog house*

4.20 Hedgehogs also suffer decline due to isolation of habitats. As such it is recommended that hedgehog friendly fencing be applied across the site (figure 6 below).



*Figure 6: Examples of hedgehog friendly fencing*

### **Lighting Strategy**

4.21 The areas that should be maintained as 'dark corridors' are the rural edges of the site, around the entire edge of the allocation. Maintaining these areas as 'dark corridors' will encourage nocturnal fauna such as bat species away from the lit areas or around lit obstacles such as the internal road network (Stone, 2013). To maintain these areas as 'dark corridors' the following recommendations will be adhered to:

- Lighting will only be installed if there is a significant need, no lighting will be installed along the southern, eastern or western boundaries. Any lighting installed within adjacent areas will have a focused luminance on the target area preventing light spill and unwanted sky glow. It is important to avoid lighting above 90° and 100° with an ideal angle of less than 70°;
- A Variable Lighting Regime (VLR) will be employed across the site where lighting is installed. Lighting will be switched off or significantly dimmed during periods of low human activity (23.30 – 05.30).
- Low-level lighting will be installed which will reduced the volume of the illuminated space (Stone, 2013). Bat species will also be able to fly over the light units within the dark space above.
- Light intensity will be kept low though the use of low pressure sodium lamps or high sodium lamps instead of mercury or metal halide lamps where glass glazing is preferred due to its uv filtration characteristics;

## 5.0 Conclusions

- 5.1 The site has been subject to a range of ecological surveys. These surveys have identified the species using the site and have provide the baseline for the range of enhancements which have been included within the design strategy. This technical note has been prepared to respond to the revised illustrative masterplan submitted to the council.
- 5.2 The development would provide robust habitat networks which will ensure continual species use and provide biodiversity gains within the scheme.
- 5.3 It is considered that the development and revised masterplan would result in a net gain in biodiversity if the recommendations within this report are supported.

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