



LIZARD

Landscape Design and Ecology

LANDLINK ESTATES LIMITED

Drove Lane, Yapton, West Sussex

- Ecological Design Strategy
- Habitat and Ecology Enhancement Management Plan

Planning Issue

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Figure No. 1 – Ecological Enhancement Plan



SUMMARY

Lizard Landscape Design and Ecology has been commissioned by Landlink Estates Ltd to provide an Ecological Design Strategy including a Habitat and Ecological Enhancement Management Plan for land at Drove Lane, Yapton, West Sussex (*Grid Reference: SU 974 031 – hereafter referred to as 'the site'*). A Preliminary Ecological Appraisal Survey and Detailed Reptile Survey have previously been carried out in September 2016 and October 2016 respectively. The Ecological Design Strategy has been based on data from these protected species surveys and previous reports, which established the baseline ecological conditions.

The site is comprised of a large continuous arable field and a small pastoral field separated by a footpath and native hedgerow. The majority of the site comprises an arable field with thin field margins and was assessed as having a 'low' ecological value.

Ecological constraints within the site that were identified during the PEA concerned reptiles, breeding birds and bat flight paths. Mitigation measures for these protected species involved the retention and enhancement of the field margins, retention of the hedgerows and scattered trees along the north east and south east boundaries and the use of a sympathetic lighting system including recommendations for additional habitat creation and enhancement.

Ecological enhancements that are considered to be achievable within the proposed scheme; include the integration of bat and bird boxes into the new dwellings; creation of freshwater habitat in the form of a pond; wetland grassland habitat; native tree, shrub and hedgerow planting; creation of wildflower meadows; log piles and compost heaps; and maintaining connectivity through the housing area with the use of hedgehog tunnels.

In order to ensure the long term viability of these measures, a habitat and ecology enhancement management plan has been detailed.

1.0 INTRODUCTION

1.1 Lizard Landscape Design and Ecology has been commissioned by Landlink Estates Ltd to provide an Ecological Design Strategy including a Habitat and Ecological Enhancement Management Plan for land at Drove Lane, Yapton, West Sussex (*Grid Reference: SU 974 031 – hereafter referred to as 'the site'*).

1.2 Lizard Landscape Design and Ecology has previously carried out and produced the following reports on this site.

- *Preliminary Ecological Appraisal Survey (PEA) – undertaken on 13th September 2016;*
- *Detailed Reptile Survey Report – undertaken during October 2016.*

1.3 This report has been based on data from these previous protected species surveys and reports. The report was undertaken and prepared by Louise Mandry (*MRes; Project Ecologist; Lizard Landscape Design and Ecology*). The report has been reviewed by Joe Jackson; (*Principal; Landscape Architect BA (Hons) LA DipLA CMLI; Lizard Landscape Design and Ecology*).

Site Description

1.4 The site is comprised of a large, continuous arable field measuring approximately 11.5 hectares (*ha*) and a small pastoral field measuring approximately 0.83 *ha*. These fields are separated by a footpath, native hedgerow and bramble. The site is fairly level and approximately 5.0 metres (*m*) above sea level.

1.5 Habitats within the site include an arable field, improved grassland, tall ruderal vegetation, native and mixed hedgerows, scattered trees and bracken.

Surrounding Landscape

1.6 The landscape surrounding the site, to the west, south, east and north-east, is dominated by arable land. The village of Yapton is located adjacent to the east of the site. There are numerous drainage ditches within the wider landscape.

Development Proposals

- 1.7 The development proposals include the construction of approximately 250 no. dwellings with associated gardens and hard landscape areas and public open spaces.

2.0 SCOPE OF THE SURVEY

- 2.1 The aim of the Ecological Design Strategy has been to;
- *To describe baseline ecological conditions including site potential and ecological constraints;*
 - *To describe mitigation, compensation, enhancement and restoration measures;*
 - *To provide a Habitat and Ecology Enhancement Management Plan;*
 - *To provide an Ecological Enhancements Plan.*

3.0 BASELINE ECOLOGICAL CONDITIONS

- 3.1 The majority of the site comprises an arable field with thin field margins. This was assessed as having a 'low' ecological value, and therefore, there are few ecological constraints associated with it and there are opportunities for ecological enhancement.
- 3.2 The ecological constraints regarding protected species that were identified during the PEA concerned protected species of reptiles, breeding birds and bat flight paths.

Reptiles

- 3.3 The PEA assessed the rough grassland and herbaceous vegetation around the margins of the field to be likely to support species of reptile. Phase 2 Reptile Surveys were recommended to ascertain the presence or absence of reptiles. A detailed reptile survey carried out during October 2016, found a 'low' population of slow worms (*Anguis fragilis*) along the north eastern boundary of the site where the rough grassland abuts the hedgerow. The low numbers of reptiles found within this area is likely to be attributable to the limited extent of the field margins.

Breeding Birds

- 3.4 The north east and south east boundaries of the site comprised mixed native hedgerows, scrub and scattered trees. These were assessed as being suitable for supporting common and widespread species of nesting birds.

Bat – Flight Paths

- 3.5 The native hedgerow along the north eastern boundary of the site appeared to be long-established. In addition to hedgerow species, this hedge line contained scattered trees including mature pedunculate oak (*Quercus robur*) trees. These trees were assessed for potential roost features for bats. Two pedunculate oak trees were assessed as having a 'moderate' potential for roosting bats and one mature hawthorn (*Crataegus monogyna*) was assessed as having a 'low' potential for roosting bats. The linear and long-established nature of this hedgerow indicates that it is likely to be used by bats for commuting and foraging.
- 3.6 The habitat areas for the protected species outlined above have a commonality in terms of location and therefore measures to protect one of these protected species would have the effect of protecting all of them.

4.0 ECOLOGICAL MITIGATION AND ENHANCEMENT MEASURES**4.1 Ecological Mitigation**

- 4.1.1 The boundary / field margin habitat along the north east and south east of the site was identified in the PEA as having the potential to support reptiles, breeding birds and commuting / foraging bats. This habitat including the hedgerows and field margins will be retained during and post construction. Mitigation measures for these protected species are outlined below. Further ecological enhancements that will result in biodiversity gains are also detailed.

Reptiles

- 4.1.2 Reptiles were recorded along the north east boundary adjacent to the hedgerow. It is expected that these field margins be retained throughout the construction of the development proposals. Should any areas of suitable habitat require removal or disturbance an avoidance strategy (as previously detailed in the Detailed Reptile Survey Report) should be implemented in order to prevent any potential harm to reptiles. This will involve the timing of any works to be within the reptile active season (*March to October*); all clearance to be supervised by a *Suitably Qualified* Ecologist; removal of logs, tree limbs, rubble or stone piles by hand; phased vegetation clearance with an initial strim to 15.0 centimetres (*cm*) followed by a further strim to less than 5.0 *cm* once the area has been inspected for the presence of reptiles; removal of any arisings from the site; maintenance of cleared vegetation at a height of less than 5.0 *cm* before and during any construction activities.
- 4.1.3 It is recommended that this habitat is enhanced by widening the margin around the site to 3.0 *m* and by planting a suitable wildflower mix such as *Emorsgate EM2 Standard General Purpose Meadow Mixture* in order to enhance existing habitats for protected species of reptile.
- 4.1.4 It is also recommended that the margin along the south east boundary of the site is enhanced and planted with a wildflower seed mix in order to provide further suitable habitat for reptiles. This area is subject to shading from the hedge / tree line and therefore a seed mixture consisting of shade-tolerant species (such as *Emorsgate EW1 Woodland Mixture* or *EH1 Hedgerow Mixture*) is recommended.

Breeding Birds

- 4.1.5 The hedgerows and scattered trees along the north east and south east boundaries provide suitable habitat for nesting birds. This vegetation should be retained within the proposed development to continue to provide a nesting and foraging resource for birds.

- 4.1.6 In addition to the retention of vegetation suitable for nesting birds it is recommended that bird boxes are installed on the new dwellings and within existing trees. These should be suitable for a range of bird species including Sussex Biodiversity Action Plan (BAP) species such as the house sparrow (*Passer domesticus*), dunnoek (*Prunella modularis*), starling (*Sturnus vulgaris*) and spotted flycatcher (*Musciapa striata*).

Bats – Flight Path

- 4.1.7 The long-established hedgerow and scattered trees along the south eastern boundary of the site have been assessed as having potential for roosting / foraging / commuting bats. It is recommended that this hedgerow is retained and a 'Dark Corridor' is implemented along the south-eastern boundary of the site in order to maintain bat flight paths.
- 4.1.8 This would be achieved by utilising a sympathetic lighting strategy both during and post construction. The minimum level of lighting that is required should be used and lighted should be directed away from potential flight paths (*in this case the hedgerow / scattered trees along the south east boundary*) and bat roost exit points.
- 4.1.9 The opportunities for roosting bats can be increased through the incorporation of integrated bat boxes within some of the dwellings within the proposed scheme. It is recommended that boxes are installed on dwellings along the north east and south east boundaries of the site. These should be installed on the aspect facing the boundary to allow any bats to easily access them. The 2FR Schwegler Bat Tube would be a suitable choice for this being easily installed and not requiring maintenance or cleaning.

4.2 Ecological Enhancement

- 4.2.1 Due to the 'low' ecological value of the site prior to development, opportunities for ecological enhancement within the site are outlined below. These are considered to be achievable within the proposed development scheme.

Creation of Freshwater Habitat

- 4.2.2 The creation of freshwater habitat provides benefits to biodiversity. As well as befitting the local amphibian assemblage, ponds support a range of invertebrates, provide a source of drinking water for mammals and birds and increase the biodiversity through supporting wetland plants.
- 4.2.3 The proposed scheme includes a number of sustainable urban drainage systems (SUDS) in the form of attenuation basins. A pond could be created from one of these SUDS by the incorporation of a pond liner into the construction method. An overflow pipe / channel would direct any excess water into the surrounding permeable attenuation basins. It must be ensured that the pond location is at an appropriate elevation with regards to the surrounding SUDS.
- 4.2.4 Freshwater plants such as the common reed (*Phragmites australis*) can provide water filtering as well as providing suitable habitat for wildlife. Further native freshwater plants can be used within the pond to create a habitat that is both aesthetically attractive and of benefit to wildlife. Suitable plants can be selected from the Sussex Wildlife Trusts Pond Creation and Enhancement for Landowners Guidance Note (Mar 2014) and can include oxygenators; floating plants; emergent plants; marginal plants; and marsh and fen plants such as:
- Hornwort (*Ceratophyllum demersum*);
 - Water Violet (*Hottonia palustris*);
 - Amphibious bistort (*Polygonum amphibian*);
 - Water crowfoot (*Ranunculus aquatilis*);
 - Yellow Flag (*Iris pseudocorus*);
 - Bogbean (*Menyanthes trifoliata*);
 - Marsh Marigold (*Caltha palustris*);
 - Water Plantain (*Alisma plantago-aquatica*);
 - Creeping Jenny (*Lysimachia nummularia*);
 - Rushes and sedge sp. (*Juncus spp* and *Carex spp*);
 - Common Reed (*Phragmites australis*).

Creation of Wetland Grassland Habitat – SUDS Features

- 4.2.5 The creation of wetland grassland habitat within / around the SUDS in the north west and south west boundaries of the site can be achieved through the use of species which are suitable for seasonally wet soils based on traditional floodplain and water meadows. *Emorsgate EM8 Meadow Mixture for Wetlands* would be an appropriate choice.

Native Planting

- 4.2.6 Wherever possible within the proposed scheme, native trees, shrubs and hedgerows should be used in order to enhance boundary features and within areas of public open space including new landscape features providing connectivity through the site; with a range of species used in order to increase foraging and resting habitat for wildlife both in terms of variety and seasonality. Suitable varieties include:

Native Trees:

- *Holly (Ilex aquifolium)*;
- *Hornbeam (Carpinus betulus)*;
- *Rowan (Sorbus aucuparia)*;
- *Silver Birch (Betula pendula)*;
- *Willow sp. (Salix sp.)*.

Native Shrubs:

- *Gelder Rose (Viburnum opulus)*;
- *Blackthorn (Prunus spinosa)*;
- *Spindle (Euonymus europaeus)*;
- *Crab Apple (Malus sylvestris)*.

Native Hedging:

- *Field Maple (Acer campestre)*;
- *Dogwood (Cornus sanguinea)*;
- *Hawthorn (Crataegus monogyna)*;
- *Hazel (Corylus avellana)*;
- *Dog-Rose (Rosa canina)*.

Creation of Wildflower Meadows

- 4.2.7 Any unused areas of land within the proposed development could be seeded with a suitable wildflower mix (such as *Emorsgate EM2 Standard General Purpose Meadow Mixture*) providing additional wildlife habitat. The land surrounding the SUDS would appear to have some potential for use as wetland wildflower meadows. A suitable seed mix for this area would be *Emorsgate EM8 Meadow Mixture for Wetlands*.

Creation of Log Piles and Compost Heaps

- 4.2.8 The creation of log piles and compost heaps would provide a food source for invertebrates and resting and hibernation habitat for amphibians, reptiles and mammals within grassland / under storey shrub planting areas.

Hedgehog Tunnels

- 4.2.9 In order to maintain connectivity for mammals such as hedgehogs, it is recommended that 13 x 13 centimetre (*cm*) holes are cut into the bottom of fences through the housing area. 'Hedgehog Highway' labels can be installed to ensure residents are aware of their use and do not block these important features.

5.0 HABITAT AND ECOLOGY ENHANCEMENT MANAGEMENT PLAN

- 5.1 In order to ensure the long term viability of the ecological mitigation and enhancement measures outlined above, detailed prescriptions for initial maintenance requirements and long term management are provided within this section.

5.2 Wildflower Meadows

Proposal

5.2.1 Areas of wildflower meadow to increase the amount of reptile habitat within the site to be used along the north east and south east boundaries to a width of 3.0 m. Further unused areas within the site can be planted with a wildflower mix to further increase biodiversity. It is recommended that mixtures suitable for the conditions within each area are used. *Emorsgate EM2 Standard General Purpose Meadow Mixture* is recommended along the north east boundary and other general areas; *Emorsgate EW1 Woodland Mixture* or *EH1 Hedgerow Mixture* along the south east boundary; and *Emorsgate EM8 Meadow Mixture for Wetlands* is recommended around the SUDS areas within the attenuation basins.

5.2.2 For the best and most successful results, careful implementation will be required (*as described in the following sections*). The first and second year's management is critical to the success of these meadows. Once the native meadow is established, traditional meadow management could be adopted. Where appropriate, the use of conservation grazing can be used to maintain wildflower meadows as an alternative to mowing / cutting.

Sowing – Year 1

5.2.3 It is recommended that the ground is cleared of all weeds and vegetation and cultivated prior to sowing. Care must be taken along the north east boundary not to disturb the existing vegetation which exists as suitable reptile habitat. In this location, the seedbed shall be created outside of the existing field margin.

5.2.4 Seeds require warmth and moisture in order to germinate and therefore August – September and March – April are generally the best times to sow. The seed shall be sown at a rate of 2 – 4 grams / m².

Cutting – Year 1.0 Onwards

5.2.5 Wildflower meadow areas shall be cut once the flowers have dropped seed and the arisings collected and removed after any cut to avoid nutrient enrichment. Any bare patches can be reseeded as and when needed.

Additional Yellow Rattle

- 5.2.6 Yellow rattle (*Rhinanthus minor*) is a root hemiparasite which parasitises the roots of meadows plants such as grasses and legumes, thereby impeding their growth. The additional sowing of yellow rattle can be used after the final cut to suppress any vigorous grass growth.

5.3 Native Trees, Hedges and Shrubs*Proposal*

- 5.3.1 It is recommended that hedgerows and scattered trees along the north east and south east boundaries are retained. Additional planting of native trees, shrubs and hedgerows shall be carried out where possible to the site boundaries; through the site area; and within areas of public open space within the proposed scheme. Where required, these shall be maintained in a way that benefits wildlife.

Planting

- 5.3.2 Planting pits shall be excavated to a depth and size that contains the plant's root system and allows the collar of the plant (*the mark on the tree where it has been growing above ground*) to be level with the top of the soil. The soil shall be carefully backfilled in layers, ensuring the plant is held upright, and each layer should be carefully firmed down.

Watering – Years 1 - 3

- 5.3.3 The plants should be watered weekly from May to September for a minimum of three years to ensure they establish.

Pruning / Trimming - Ongoing

- 5.3.4 Pruning and trimming of trees, shrubs and hedgerows should be carried out outside of the bird breeding season (*March – August inclusive*). Trees and shrubs should be checked bi-annually for shape, form and size, and pruned accordingly whilst they are still in leaf. Hedges should be cut in alternate years if possible to allow species such as guelder rose and hawthorn to flower and fruit on the previous year's growth. Pruning of hedgerows should be carried out in such a way to achieve a dense hedgerow.

Weeding - Ongoing

- 5.3.5 Areas around the new plants should be kept clear of weeds to allow the plants to establish by weeding twice a year in the Spring and Autumn.

5.4 Freshwater Habitat*Proposal*

- 5.4.1 It is proposed that a pond is created within the SUDS area to create a freshwater habitat supporting the local amphibian assemblage, a range of invertebrates and wetland plants and providing a drinking source for mammals and birds. The location of this pond must be at an appropriate elevation with regards to the surrounding SUDS.

Creation of Pond

- 5.4.2 An area within the SUDs shall be lined using either clay or a suitable pond liner. The pond should have gently sloping sides with varying depths present from shallow to over 1.0 m. An overflow system should be installed to divert any excess water into the surrounding permeable SUDS.

Planting

- 5.4.3 Once the pond has filled with water, planting can be carried out using native plants. Common Reed (*Phragmites australis*) may be used around the edge of the pond to provide some filtration properties. The surrounding areas of the pond can be planted with a Wetland Wildflower mix as specified in Section 4.1.

Long Term Ongoing Maintenance

- 5.4.4 Any maintenance work should be carried out during the autumn and winter to avoid disrupting the pond. Any vegetation that is growing too abundantly can be pulled out and divided when needed to maintain open water areas of between 10 – 30%. Any vegetation that is removed should be banked for a few days to allow any trapped wildlife to return to the pond. A certain amount of dead organic matter is useful within a pond, however it will lead to silting which will require removal approximately every five years.

5.5 Bird and Bat Boxes

Proposal

- 5.5.1 Bird and bat boxes shall be installed on the new dwellings to provide additional nesting and roosting sites within the proposed scheme. It is recommended that a variety of bird boxes are provided to appeal to a range of species.

Specification

- 5.5.2 Bird boxes that are integrated within the building are available. The *1SP Schwegler Sparrow Terrace* provides three adjacent nesting boxes suitable for house sparrows; the *Vivaro Pro Woodstone Starling Box* is suitable for starlings; The *Schwegler Brick Nest Boxes* are suitable for dunnocks (*Type 24*) and spotted flycatchers (*Type 26*). These boxes are also suitable for a variety of other bird species and do not require maintenance or cleaning.
- 5.5.3 The *2FR Schwegler bat tube* is designed to be integrated into a building. These have transverse connecting holes allowing several tubes to be placed adjacent to each other. These bat tubes do not require maintenance or cleaning.

Siting

- 5.5.4 Bird boxes should be installed at a minimum height of 2.5 m on either the north, east or west aspects of the dwellings.
- 5.5.5 Bat boxes should be installed on the buildings at a height of between 3 – 6 m. They should be installed on the south east and south west elevations, which face the vegetated boundaries of the site.

Maintenance – Long Term

- 5.5.6 The bat and bird boxes specified above do not require any cleaning. A visual inspection should be carried out annually to ensure the boxes are secure.

5.6 Compost Heaps and Log Piles

Proposals

- 5.6.1 The creation of log piles and compost heaps within areas of grassland or understorey shrub planting would provide a food source for invertebrates and resting and hibernation habitat for amphibians, reptiles and mammals.

Creation and Maintenance

- 5.6.2 A log pile can be of any size and constructed from piling logs up horizontally. Log piles can be created using any type of wood, although it would be advantageous to utilise any pruning matter on an ongoing basis. Compost heaps can also be of any size and constructed from organic matter including grass cuttings. Once established, these can be maintained using cuttings from wildflower areas.

5.7 Hedgehog Tunnels

Proposal

- 5.7.1 It is recommended that Hedgehog tunnels are used to maintain connectivity between residential gardens within the proposed scheme throughout the housing areas.

Creation and Maintenance

- 5.7.2 Holes are to be cut at the base of fences to provide connectivity throughout the site. These should be 13 x 13 cm and can be marked using a 'Hedgehog Highway' sign (*available from www.hedgehog street.org*) to ensure residents are aware of them. These hedgehog tunnels should be kept open and free from vegetation.

6.0 CONCLUSION

- 6.1 This report has specified an Ecological Design Strategy that takes into account mitigation measures for protected species as well as ecological enhancements for wildlife within the proposed scheme. Mitigation measures were required for reptiles, breeding birds and bat flight paths. These measures included the retention and strengthening of field / site margin and the retention and enhancement of hedgerows and scattered trees along the boundaries.
- 6.2 The site is predominately an arable field of 'low' ecological value and therefore further biodiversity gains would be easily achieved. Ecological enhancements that could be incorporated into the proposed housing scheme have been detailed within this report and include the creation of freshwater habitat; the use of native planting, creation of wildflower meadows, compost heaps, log piles and hedgehog tunnels and the installation of bird and bat boxes.

7.0 REFERENCES

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