

LAND OFF HORNDEAN ROAD EMSWORTH

ECOLOGICAL MITIGATION AND ENHANCEMENT PLAN



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Date:	March 2017
Ref:	BELL21129
Revision:	C 04.06.21

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1.0 INTRODUCTION

1.1 Outline planning permission has been granted for 125 residential units and a water retention area at Land West of Horndean Road, Emsworth. This Ecological Mitigation and Enhancement Plan has been written to satisfy the parts of condition 19 that relate to ecology and will be submitted as part of a reserved matters application:

Condition 19

“ No development shall take place until the proposed realigned watercourse and newly created wetlands, (formed of the Wetland Retention Area and Flood Compensation Area), are constructed in accordance with a scheme and method statement to be submitted to and approved in writing by the local planning authority. The scheme shall include the following:

- *The timing of works*
- *Cross sections of the proposed realigned watercourse and proposed wetlands*
- *The measures to be used during the development in order to minimise environmental impact of the works (considering both potential disturbance and pollution)*
- *The ecological enhancements as mitigation for the loss of habitat resulting from the development*
- *A map or plan showing habitat areas to be specifically protected (identified in the ecological report) during the works*
- *Any necessary mitigation for protected species*
- *Construction methods*
- *Any necessary pollution protection methods*
- *Details of the exact realignment of the watercourse and details of any bed material that may be imported into the site. We would expect to see a two stage channel with wetland berms creating a sinuosity and providing some natural variability rather than a linear, uniform channel. The works shall be carried out in accordance with the approved method statement.*
- *Method to ensure topsoil conservation for flood compensation area which is to remain as agricultural land.”*

2.0 BACKGROUND INFORMATION

- 2.1 The ecological interest of the site is set out in the Ecological Appraisal and Protected Species Survey Reports produced by Azure ecology (now trading as The Ecology Co-operation Ltd) which were produced between 2013 and 2016. Phase II surveys have been conducted for great crested newts, bats, reptiles, water voles, rare flora and wintering waders/Brent geese.

Protected Species

- 2.2 No evidence of great crested newts, Brent geese, or water voles was recorded on site. There is a small population of common lizards along some grassland buffer strips that border the arable field. These reptiles were translocated in 2016 to an onsite receptor area. Limited bat activity was recorded during a survey in September 2013 and no evidence of roosting bats was found in the trees to the east of the proposed wetland area in September 2014. An owl pellet was recorded at the base of a tree adjacent to the ditch.

Habitats

- 2.3 The pond was suspected to be no more than 40cm deep at its deepest point and was found to have dried out in the summer months. The pond was found to have a large area of yellow flag *Iris pseudacorus* iris growing around the pond margins and extending into the pond. Other vegetation present included water mint *Mentha aquatica* and redshank *Persicaria maculosa*, although as much as 70% of the pond banks lacked suitable leafy aquatic vegetation.
- 2.4 The wet ditch was found to have steep sided banks on both sides and a slow flowing shallow water body running through it, which is not more than 40cm wide along most of the ditches length.
- 2.5 An NVC survey concluded that whilst no high value plant communities were present, there was some value in a variety of flowering plants for pollinating insects.

Mitigation and Enhancements

2.6 The baseline audit has recommended the creation of new wildlife habitats within the site;

- Creation of a new wetland habitat with value for wetland birds and other aquatic wildlife;
- Creation of new wildflower grassland habitats, including dry grassland, wet grassland and woodland mixture;
- Enhancements to the existing pond including increasing light levels, improving the permanence of the pond and plug planting new pond plants of notable value;
- Bird Boxes; and
- Bat Boxes.

2.7 The aim of these ecological enhancements is to provide a net increase in biodiversity on site by providing suitable habitats for wildlife.

3.0 HABITAT CREATION & MANAGEMENT

Creation of Low Flowing Ditch

- 3.1 The proposed low flow drainage ditch will be dug prior to the infilling of sections of the existing ditch. The new ditch will be profiled as shown in the detailed cross sections in Appendix 1. The structure of the new ditch will provide a greater variety of habitats for aquatic plants and wildlife. Ditch banks will have a gentle gradient (maximum 45 degrees) to provide shallow water shelves (berms) which will increase the diversity of wildlife and plants within the ditch. The banks of the new ditch will be stabilised with coir rolls if necessary. The new ditch and surrounding wetland area will be fenced to prevent unnecessary disturbance from the public and dogs and new tree and hedgerow planting along the western boundary will help to buffer the wetland from the adjacent farmland.

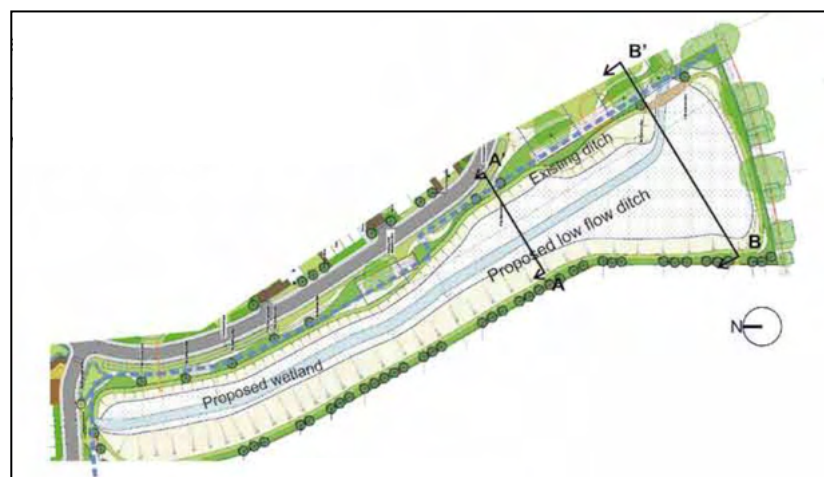


Figure 1: Proposed wet ditch

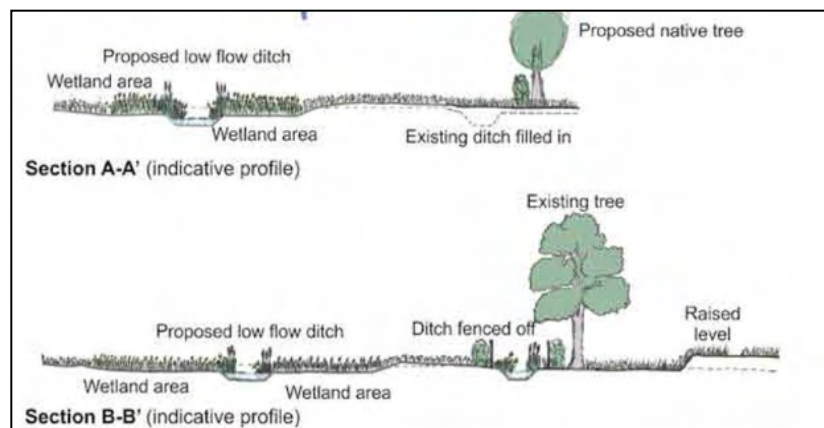


Figure 2: Cross sections of proposed wetland habitat

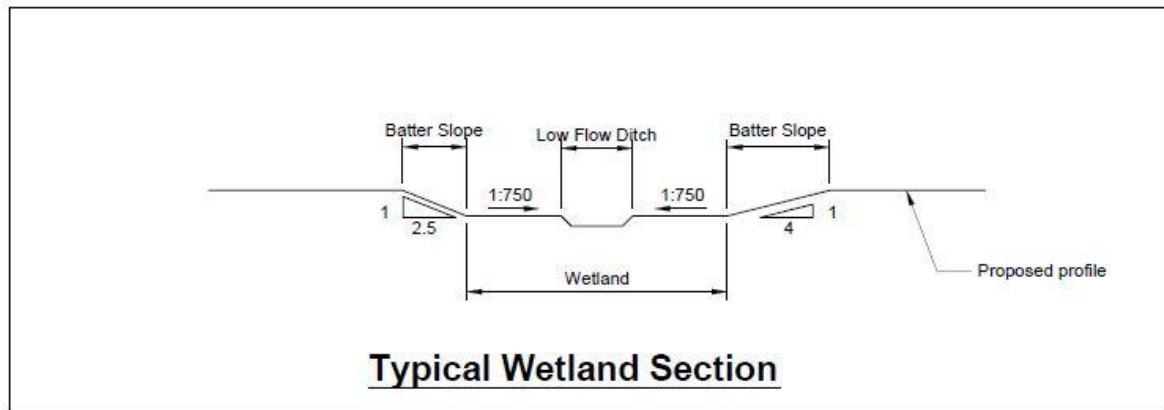


Figure 3: Cross section of proposed wet ditch

- 3.2 Flow deflectors will be installed at strategic points within the ditch to promote flow diversity and help to minimise siltation. This can be achieved by using tree trunks pinned to the ditch floor with pegs, positioned perpendicular to the flow. The best timber to use is Ash, beech, elm or other wood that are durable but will not produce new shoots (unlike alder and willow). Alternatively, large stones placed in the ditch channel can have the same effect. Management of the new ditch should not commence until the ditch is successfully colonised by plants. Twice yearly monitoring of the ditch should be conducted by a suitably qualified ecologist and a suitable long term management plan should be created.



Figure 4: Example use of flow deflectors

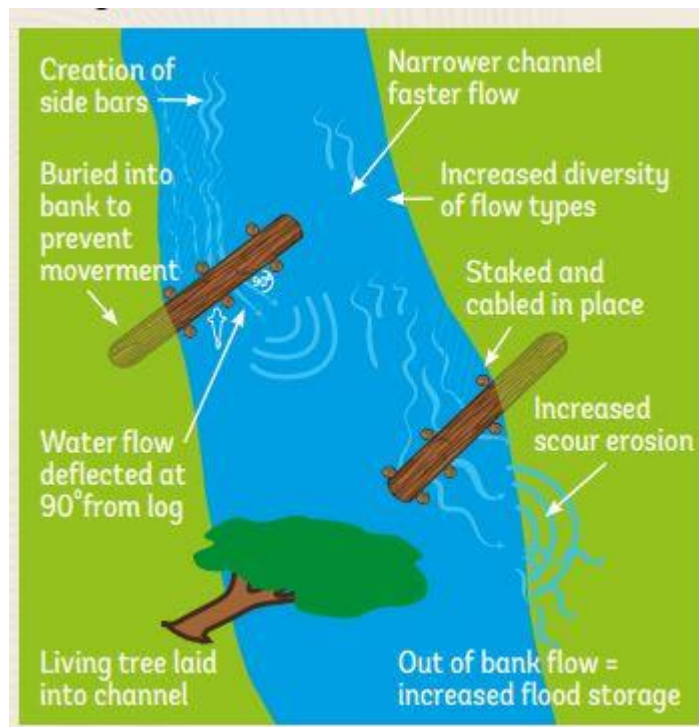


Figure 5: Diagram of flow deflectors (Woodland Trust 2016)

- 3.3 The new ditch will be largely left for the first year to allow vegetation to establish, however it will be monitored for the presence of invasive species such as Himalayan balsam and giant hogweed. Long term, the ditch will be managed sparingly to minimise the disturbance on wildlife. The cutting of vegetation will take place in the autumn, winter or early spring so that important cover, food and nectar sources are not removed during the summer. To reduce the impact on wildlife, stretches of bankside and emergence vegetation should be left uncut, applying a two year rotation with alternate banks cut each year. An example management regime is outlined below.

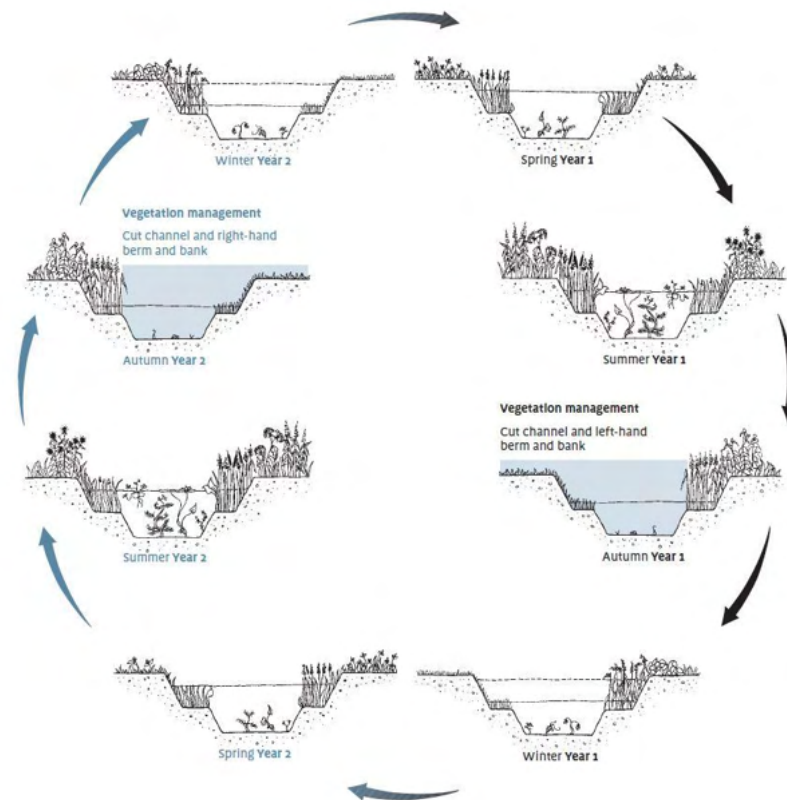


Figure 6: Example two year management regime for wet ditch

Infilling Existing Ditch

- 3.4 The sections of the existing ditch to be filled in will firstly be managed to decrease their suitability for wildlife. In the weeks preceding infilling, a specialist bankside machine with a weed cutting bucket will be used to maintain the bankside vegetation to 10cm. This will ensure any amphibians present are unharmed but are encouraged to move into the sections of the ditch which are being retained.
- 3.5 An ecologist will be present on site during both the digging of the new ditch and the infilling of the existing ditch. The existing ditch will be infilled in the summer, when it is at its driest. If there is water in the ditch, it may need to be progressively drained using sand bags and a pump /generator, with a wire mesh filter fitted to protect wildlife. Prior to infilling, an ecologist will conduct a hand search along the lengths of ditch to be in filled to check for amphibians, reptiles and nesting birds. A digger

with a toothed bucket will be used to scrape the top 20cm of topsoil from the ditch banks. This earth will be piled in close proximity to the sections of the ditch that are being retained to enable any wildlife, if present, to move into suitable habitat. An ecologist will oversee the scraping of the ditch. When the ditch is bare earth, it will be in filled.

- 3.6 Two sections of the existing ditch, which lie within the root protection zones of the trees along the ditch are being retained. These sections of the ditch will be cleared using hand tools only and any works within these ditches will be carried out by hand to prevent disturbance to the tree roots.

Wetland

- 3.7 The area surrounding the ditch will be managed as wet grassland to provide a valuable habitat for wading birds, foraging bats, a variety of invertebrates and plants. In order to create suitable ground conditions for the wetland, 4,800m³ of topsoil and 15,953m³ of subsoil will be excavated and stored within an area just to the west of the wetland on site. The top 20cm of topsoil will be stripped using a toothed bucket in a staged process. 5m strips of topsoil will be removed starting in the west of the wetland to encourage any amphibians present within the existing grassland to move into the newly created ditch and the sections of retained ditch.
- 3.8 To successfully establish the wetland habitats within a short time frame, a combination of seeding (Emorsgate EM8), plug planting and natural colonisation will be used.
- 3.9 Within the main body of the wetland basin, the planting will need to be tailored towards those species that can cope with waterlogged soils as the water levels will rise within the wetland during periods of prolonged rainfall. In order to ensure healthy and quick establishment of vegetation it is suggested that this area should be sown late in August, well before the risk of any heavy rainfall that could see water levels rise and any scattered seed or young seedlings washed away. It is also recommended to use a combination of seeding and plug planting, with an Emorsgate seeds wetland mixture (EM8) and plug planting to include the following plugs 80 hard rush *Juncus inflexus*, 20 wild angelica *Angelica sylvestris*, 100 great

burnet *Sanguisorba officinalis*, 50 marsh foxtail *Alopecurus geniculatus* 50 purple loosetrife *Lythrum salicaria* and 50 marsh mallow *Althaea officinalis*. This combination has been selected for its combined value for binding soil, value for pollinating insects and for its regional provenance within Hampshire, although alternatives could be chosen of similar value, particularly if a local donor site is available.

- 3.10 The wet grassland area will be managed annually in September/ October with a cutting bar.

Pond

- 3.11 To enhance the pond for wildlife a planting scheme is proposed. An example wildlife pond is shown in Appendix 2. New planting will help to ensure that the pond is well oxygenated and that a natural filtering system ensures that the pond is not adversely affected by suspended sediments and possible pollutants that might be entering the pond from the drainage sources.

1. A channel will be created where the Horndean Road drainage water enters the pond. The channel will be at least 2 metres wide and three metres long and should have a depth of not more than 30cm water when the pond is full. This channel will be planted with common reed *Phragmites australis* at a density not less than five rhizomes per square metre.
2. Plug planting of some pond edge plants will be undertaken to speed up the restoration of the pond as well as to incorporate new species for wildlife interest. Planting will include branched bur-reed *Sparganium erectum*, purple loosetrife *Lythrum salicaria*, water forget-me-not *Myosotis palustris*, meadowsweet *Filipendula ulmaria* as well as aquatic plants such as rigid hornwort *Ceratophyllum demersum*, broadleaved pondweed *Potamogeton natans*, native water lily *Nymphaea alba* and water moss *Fontinalis antipyretica*.
3. As the pond is presently heavily shaded on all sides, some thinning of the surrounding tree canopy should be undertaken, so that at least 50% of the pond is not shaded between 10am and 3pm in the summer.

- 3.12 The pond will be checked three times a year to monitor water levels following establishment of the new vegetation and drainage systems. If required, de-silting will be carried out.

Dry Grassland

- 3.13 Areas of grassland around the pond and wetland area will be enhanced. The floristic interest associated with this area of grassland is moderate and using a light harrow and seeding method could easily be enhanced to support as much as twice the number of wildflower and grass species that are currently present. Some of this grassland will be mown regularly so it has amenity value for residents, whilst other areas will be enhanced through seeding and managed with a cut-and gather management regime in the autumn and early spring.
- 3.14 The sowing process will be undertaken between late August and mid-October during mild and wet weather best suited to seedling establishment. The process of harrowing the grassland should aim to create approximately 50% bare ground, so that the existing grassland diversity is still retained. Immediately following harrowing, a suitable seed mixture should be sown across the ground at a density of four grams per square metre. A suitable seed mixture should include at least 13 wildflower species, four grass species and all seeds must be of native British origin. If possible, seed from a local donor site would be ideal, but Emorsgate Seeds mixture EM4 would be suitable. Around the trees bordering the pond an area of woodland wildflowers will be sown so that species best adapted to low light levels (Emorsgate seeds EW1) will be incorporated following the thinning and removal of some of the trees bordering the pond.

Native Hedgerow and Tree Planting

- 3.15 A native hedgerow will be planted along the edge of the wetland area to the east and west to provide a visual screen and noise buffer around the wetland. This will increase the likelihood that farmland birds and wading birds will use the wetland habitats for feeding and nesting. The native hedge should be left to grow tall and bushy and should include only native trees and shrubs.

4.0 POLLUTION PREVENTION METHODS

- 4.1 The pond, wet ditch and proposed wetland area will be protected during the construction phase of the development with a buffer zone, which will be fenced off using netlon-type fencing to prevent accidental damage, and to restrict access during the works. Appropriate pollution control measures will be implemented to avoid pollution of the wet ditch and pond during construction operations.
- 4.2 Construction Site drainage will be designed to include treatment and attenuation of run-off from infrastructure roads and hard surfaces through the use of balancing and pollution control mechanisms.
- 4.3 Any containers of contaminating substances on site will be leakproof and kept in a safe and secure building or compound from which they cannot leak, spill or be open to vandalism. The containers will be protected by temporary impermeable bunds with a capacity of 110% of the maximum stored volume. Areas for transfer of contaminating substances will be similarly protected.
- 4.4 All refuelling, oiling and greasing will take place above drip trays or on an impermeable surface which provides protection to underground strata and watercourses and away from drains as far as reasonably practicable. Vehicles will not be left unattended during refuelling.
- 4.5 Only construction equipment and vehicles free of oil/fuel leaks which could cause material contamination will be permitted on site. Drip trays will be placed below static mechanical plant.
- 4.6 All wash down of vehicles and equipment will take place in designated areas and washwater will be prevented from passing untreated into watercourses and will comply with EA's Pollution Prevention Guidance (PPG) note PPG13.
- 4.7 EA note PPG 23 will be followed when carrying out maintenance of structures over water. As far as reasonably practicable, only biodegradable hydraulic oils will be used in equipment working in or over watercourses.
- 4.8 Appropriate measures to be taken to protect erodible earthwork surfaces.

5.0 ECOLOGICAL MITIGATION

Amphibians

- 5.1 In order to ensure that the road separating the pond and wetland does not become an impassable barrier for reptiles and amphibians, dropped curbs or ramps must be fitted at regular intervals along the road between the pond and the wetland area to prevent reptiles and/ or amphibians from getting stuck on the road.
- 5.2 Gully pots will be fitted with escape ladders¹ to assist any animals that fall into gully pots.

Bats

- 5.3 The planting plans have incorporated new hedgerow and tree planting which will provide improved flight paths for foraging and commuting bats. At present the wet ditch along the western boundary has four mature oak trees along the edge of it, which during a bat survey assessment in September 2013 showed no signs of activity by foraging and commuting bats.
- 5.4 A sympathetic lighting scheme has been designed to avoid impacts on bats. Artificial lighting has been minimised within the scheme and new lighting will have hoods and cowls to minimise light spill either into the sky or onto trees or boundary habitats. Consideration should be given to:
- Lighting will only be installed where there is significant need, a minimal amount of light should be used and lighting should be dimmed during periods of low public use;
 - Avoid the use of high pressure sodium lights, white LED broad spectrum lights HPS and short wavelength 'blue' white sources throughout the site
 - Using low spectrum lights with no UV content such as low pressure sodium and warm white LED;

¹ <https://www.thebhs.org/the-bhs-amphibian-gully-pot-ladder>

- Light must have focussed luminance on their target area preventing light pollution into other areas, for example using directional downlights, illuminating below the horizontal plane; using the lowest necessary lighting column and ideally achieve beneath 3 lux at ground level;
- A no-light zone must be established to protect the existing mature trees on site and the pond around the site centre from any artificial light. No lamp posts or other artificial lights should be positioned within this area; and
- 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 horizontal.

Badgers

5.5 The site is likely to be used by foraging and commuting badgers. Therefore, good practice activities will be adopted during the construction phase. These include:

- Lighting required during construction work must be turned off overnight so as not to disturb nocturnal badgers foraging;
- Trenches will be covered at the end of the working day;
- Any temporary pipes will be capped to prevent badgers gaining access during the night; and
- If badgers or any signs of sett excavation are encountered on site at any time during demolition or construction, the advice of an ecologist should be sought.

Birds

5.6 The removal of all vegetation suitable for nesting birds should be undertaken outside the bird nesting season (generally taken to be March to August inclusive). If vegetation removal must be undertaken during the bird nesting season, the area must be checked in advance by an ecologist for the presence of nesting birds. If there is no evidence of nesting birds, the clearance work must be completed within

48 hours of inspection. If any active nests are identified, vegetation clearance must cease and an appropriate buffer zone must remain until it has been confirmed that the young have fledged and the nest is no longer in use.

6.0 ECOLOGICAL ENHANCEMENTS

6.1 The National Planning Policy Framework encourages development to provide net gains in biodiversity where possible. The following enhancements have been included within the site, the locations of which are shown in Appendix 3. The specifications of the artificial habitats are detailed in Appendix 1 and the locations are detailed on the landscape proposals (BELL21129_11, Sheets 1 7).

Bats

6.2 In order to provide a net gain for roosting bats within the development bat boxes will be erected on the walls of buildings and hung on suitable trees within the site:

- Eighteen bat boxes (Schwegler 2F or similar) on the existing mature trees on-site;
- Seven bat boxes (Schwegler 1FF or similar) fitted to south facing elevations of plots - 19, 44, 57, 69, 70, 83, 85; and
- A pole mounted 'large colony' bat box installed within the new hedgerow, halfway along western boundary.

Birds

6.3 The site provides potential for foraging and breeding common bird species. Three bird boxes have been recommended to enhance the site for birds:

- One Schwegler 2GR Oval Hole Nest Box;
- One Schwegler 1MR AVIANEX Nest Box; and
- One Schwegler 17A Swift Box.

6.4 The type of bird boxes specified produces a variety of opportunities for bird species within the area. The 2GR Oval Hole and 1MR Avianex provide nesting opportunities for a variety of common nesting birds. In addition the oval hole design provides enhanced protection from predatory species and mammals. The 17A Swift box is specifically designed to attract a small colony of swifts and can be fitted onto an external wall of a building.

- 6.5 The bird Schwegler 1MR Avianex bird box should be located 2-5m above the ground on a north or north-easterly elevation of a mature tree.
- 6.6 The Schwegler 17A bird box should be located on a north or easterly elevation, under the eaves of a building. These boxes should be located away from windows in order to reduce the disturbance levels.
- 6.7 The Schwegler 2GR bird box should be located on a suitable mature tree. There should be a clear flight path into the box, which may require pruning of some low hanging branches around the boxes that are to be fixed to trees. This box should be located 2-4m above ground level.
- 6.8 Bird boxes should not be placed on boundary or garden walls or fences where birds could be caught by cats.

Other Enhancements

- 6.9 Three overground bee boxes will be installed around the pond in the centre of the site to provide suitable habitat for solitary bees. Solitary bees have been recorded in the local area and are suffering major population declines. They are non-aggressive bees and so are safe to encourage into gardens.
- 6.10 Hedgehog holes will be installed in the fence panels between plots 113 125, 44 47, 59 63 to allow the movement of wildlife between gardens by either raising close board fencing above the ground or by cutting small holes cut in the fencing gravel boards allowing continued access for small wildlife such as hedgehogs.

APPENDIX 1: ARTIFICIAL HABITATS

Product	Image	Specification
Schwegler 2F Bat Box		Dimensions: Height 33cm, Diameter 16cm Weight: 4kg Material: Schwegler Woodcrete Colour: Black with grey front panel Supplied with: Hanger and aluminium tree-friendly nail
Schwegler 1FF Bat Box		Dimensions: 43 x 27 x 14cm Entrance hole dimensions: 12cm x 24cm Weight: 9.5kg Material: Schwegler Woodcrete Colour: Black with stable hard-wearing wooden insert Supplied with: Galvanised steel hanger and aluminium tree-friendly nail
Pole mounted 'large colony' bat box		Material: Plywood with ceramic inserts Height: 4m pole Box dimensions: 78cm H x 34cm W x 13cm D Weight: 16kg
Schwegler 2GR Oval Hole Nest Box		Material: Woodcrete External dimensions: 31 x 20 x 27cm (height x width x depth) Internal dimensions: 14 x 19cm (width x depth) Entrance hole: 30 x 45mm (oval) or 27mm diameter (3 x round) Weight: 6.7kg

Product	Image	Specification
Schwegler 1MR AVIANEX Nest Box		Height: 27cm Width: 19cm Depth: 23cm Entrance diameter: 32mm Weight: 5.2kg
Schwegler 17A Swift Box		Material: Plant fibre and wood-concrete (100% asbestos-free) Internal dimensions: 14 x 14 x 30cm External dimensions: 15 x 15 x 98cm Weight: 7.1kg
Bee Bricks		Made and designed by Green and Blue in the UK Material: Polished cast concrete Dimensions: 215mm x 105mm x 65mm
Jacksons Hedgehog friendly fencing		Hedgehog Gravel Board for Use With Slotted Posts 1.83m x 150 x 28mm

APPENDIX 2: EXAMPLE WILDLIFE POND



Established wildlife pond.



Plug plants embedded in coir mats.