Rowden Park, Chippenham:

Providing a Net Biodiversity Gain

December 2015
1. Introduction

Crest Nicholson and Redcliffe Homes are promoting the development of a new Garden Village and Riverside Park on land to the South of Chippenham (Application Reference 14/12118/OUT). The objectives in the outline Landscape and Ecological Management Strategy prepared for the development are:

I. to provide a safe and pleasant environment for residents within the Rowden Park Garden Village; and
II. to manage the Riverside Park primarily for the benefit of heritage, ecology, landscape and with recreational users in mind.

The substantial amount of green space at Rowden Park provides an opportunity to enhance to enhance the biodiversity of the site. Natural England have commented that managing the development’s effect on foraging bats, particularly greater horseshoe bats, is likely to be important in ensuring that the development achieves a net biodiversity gain.

This document contains a quantitative and qualitative assessment of the site’s current value (particularly for foraging bats) prior to any development, a measure of the net effect of the development on this value, and the design and landscaping options that will provide a net gain for foraging bats.

The biodiversity offsetting approach has been used to provide a quantitative framework for assessing whether the development can provide a net enhancement. As biodiversity offsetting is strongly habitat focused, the process has been adapted to take greater account of the importance of habitats for bats.
The Rowden Park site comprises approximately 125 ha of large fields of agriculturally improved pasture, separated by mature hedgerows. The improved grassland is grazed by low numbers of dairy cattle on a rotational system and the sward is short, uniform and with low plant species diversity. Although approximately 78 ha of the grassland is set aside for cattle grazing, not every field was used in any given year. This type of intensively managed agricultural grassland typically supports a low diversity and abundance of invertebrates and is not of high value for foraging bats compared with species-rich, traditionally managed grasslands.

The site is located within the range of the greater horseshoe bat, one of Britain’s rarest species of bat. The closest known greater horseshoe bat maternity roost to Rowden Park is the Bath and Bradford on Avon SAC (Box Mine Component), which lies approximately 7 km south west from the site.

Livestock grazed pasture is particularly important within 4 km of greater horseshoe maternity roosts as juvenile greater horseshoe bats are dependent upon the small dung beetle (*Aphodius rufipes*), which is their key prey item when they first start to forage (mid July – September). The close proximity of livestock grazed pasture to maternity roosts also reduces the commuting distances for lactating females to reach optimum foraging areas (Ransome, 1996).

The greater horseshoe bats’ diet comprises mainly moths, (which are most abundant in broadleaved woodland with grassy rides) and scarabaeid beetles (notably *Aphodius* spp.), (which are at their highest densities in livestock grazed pasture) at about 40% each. Tipulids, which are common in freshwater, semi aquatic habitats and damp grasslands/ woodland and small dipterans, which are frequent in a range of habitats, comprise the remainder of their diet.
Greater horseshoe bats key prey items change through the summer, beginning with Geotrupes (the larger dung beetle), which relies on livestock grazed pasture in March/April. From April to July the Cockchafer (Melolontha melolontha), which requires grassland for egg laying and oak trees for feeding, and moths are the principle prey item. In August and September the key prey item for mother greater horseshoe bats is moths whilst juvenile bats rely on the small dung beetle (Ransome, 1996). The majority of horseshoe bat prey items require either tree-leaf food supplies or dung and the majority need short grassland for oviposition.

Surveys at Rowden Park in 2013 and 2014 recorded moderate levels of bat activity, and low levels of greater horseshoe bat activity. Greater horseshoe bats were only recorded flying along hedgerows - none were recorded foraging over grazed grassland. As the site is not within the range of juvenile and mother bats, the grassland is intensively-managed, and there was only low levels of bat activity, the grasslands are currently not of high value for foraging greater horseshoe bats. The most effective way of offsetting the loss of this type habitat is to provide a mosaic of species-rich grassland, woodland and wetland that will support a greater diversity and abundance of invertebrates and therefore be of high value for foraging bats.
To assess the effect of development, the biodiversity offsetting methods were used to calculate a quantitative measure of the loss of habitats (Table 1).

Table 1. Calculating Biodiversity Offsetting Units by Habitats Lost within the Development Area

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Area (ha)</th>
<th>Distinctiveness</th>
<th>Condition</th>
<th>Offset Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle-grazed Grassland</td>
<td>39</td>
<td>High</td>
<td>Poor</td>
<td>234</td>
</tr>
<tr>
<td>Hedgerows</td>
<td>0.25</td>
<td>High</td>
<td>Good</td>
<td>4.5</td>
</tr>
<tr>
<td>Mixed Woodland</td>
<td>0.1</td>
<td>Medium</td>
<td>Moderate</td>
<td>0.8</td>
</tr>
<tr>
<td>Total Offset Units</td>
<td></td>
<td></td>
<td></td>
<td>239.3</td>
</tr>
</tbody>
</table>
4. Providing a Net Enhancement for Biodiversity

The strategy for offsetting the habitat lost to the development is to provide high quality habitats in the Riverside Park. Table 2, below, uses the biodiversity offsetting metrics to illustrate the quantum of habitat required to provide an offset.

Table 2. Calculating the Biodiversity Offsetting Units that Can be Provided in the Riverside Park

<table>
<thead>
<tr>
<th>Baseline Habitat</th>
<th>Area (ha)</th>
<th>Target Habitat</th>
<th>Re-creation Difficulty Multiplier</th>
<th>Time to Create Habitat Multiplier</th>
<th>Units Available from this Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle-grazed Improved Grassland in Riverside Park</td>
<td>41</td>
<td>Species-rich Meadow</td>
<td>Medium</td>
<td>5</td>
<td>273</td>
</tr>
<tr>
<td>Un-grazed Improved Grassland</td>
<td>2.5</td>
<td>Mixed Woodland</td>
<td>Low</td>
<td>15</td>
<td>11.8</td>
</tr>
<tr>
<td>Un-grazed Improved Grassland</td>
<td>0.5</td>
<td>Ponds</td>
<td>Low</td>
<td>5</td>
<td>7.9</td>
</tr>
<tr>
<td><strong>Total Offset Units Provided</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>292.7</strong></td>
</tr>
</tbody>
</table>

It would be possible to deliver a net enhancement (measured with biodiversity offsetting calculations) by providing 41 ha of species rich grassland. To provide an enhancement tailored to greater horseshoe bats, the actual enhancement would be made up of a mixture of different habitats.
Illustrations of the Effects of the Development and Enhancement on Habitat Value for Bats

The Existing Site

The Habitats After Development

The Habitats After Mitigation
5. Creating and Managing Habitats for Biodiversity

The following sections provide an overview of the creation and management of habitat for the enhancement of biodiversity. As this development proposal is an outline application, these are not detailed prescriptions. All that was required for this document was to assess and demonstrate that the development could deliver a net biodiversity gain, and the area and quality of habitats that would be required to achieve this.

Woodland

The Riverside Park currently comprises large, open improved grassland fields, which are of low quality for foraging bats. Making the fields will be made smaller with new woodland and hedgerow planting will improve the biodiversity value of the site. Woodland is essential for greater horseshoe bat foraging because:

- Greater horseshoe bats hunt via hawking and perching, both of which take place close to woodland or hedgerows. About 95% of all hawking occurs within 10 meters of hedgerows or woodland edge; and

- Greater horseshoe perch feeding is at about 1.5-2 meters from the ground, and sheltered by an overhead screen, such as the leaf canopy.

All woodlands would be diversified with grassy rides and glades to provide suitable conditions for moths etc. The new woodland and hedgerow planting would increase the amount of edge habitat that promotes bat foraging by creating the physical conditions that enhance insect concentrations and reduce wind speeds for economical hunting flight.
Hedgerows

Planting new hedgerows will be planted within the riverside park and development site would divide the large grassland fields into smaller compartments. New hedgerows would be connected with existing hedgerows to provide a greater number of ecological corridors through the site, and to facilitate the movement of wildlife (particularly greater horseshoe bats), within and across the site:

- A variety of locally native hedgerow species would be planted and carefully managed to establish a wide hedgerow that is at least 3 meters tall;
- Specimen trees would be planted at intervals throughout the hedgerows to provide further foraging and roosting opportunities for bats; and
- Once established the hedgerows would be managed through flailing every two or three years to maintain a bushy structure.

The existing hedgerow network will be maintained on a rotational basis, so that no hedge is trimmed more frequently than once every three years. This would allow a varied age and size structure to develop. Mature hedgerow trees will be retained and young saplings will be encouraged to provide feeding perches for greater horseshoe bats.
Wetland Habitats

A series of ponds will be created to increase the invertebrate assemblage on site by supporting insects that have an aquatic larval stage such as caddis flies, crane flies, midges and mosquitos:

- The ponds will be designed to have good water quality and wide drawdown zones; and
- They will be connected to woodland corridors and trees will be planted around the pond edges.

Re-profiling the banks of the River Avon could be used to manage flooding and to encourage a greater diversity of vegetation along the banks. This could incorporate:

- Reedbeds with around 25-30% open pools, 40-50% wet reed, 15-25% drier reed and 5% scrub;
- These habitats can be created with little need for planting or seeding, as they are already connected with an existing wetland system.
- Wet grassland habitats can created by removing topsoil and sowing suitable seed. Scrapes would be created to establish suitable ground conditions for a variety of habitat types;
- The maximum diversity of invertebrates is supported by reedbeds with damp, but not flooded, litter layer and an abundance of other reedbed herb species;
- Sections of the western bank of the River Avon can be planted with new trees to create a darker corridor for bats to commute and forage along.
Species-rich Grassland

Areas of improved and amenity grassland will be enhanced by adapting the current mowing/grazing regime. Measures to improve species-richness include reducing soil fertility (deep ploughing) and introducing new plant species (seeding / green hay / plug planting).

- Long grass at the edges of some fields in 6 m field margins, would be managed as rough grassland habitat, being cut once per year (in late winter) to provide a year-round habitat for invertebrates;
- Deep ploughing will initially be used to reduce soil nutrient levels, following which the area will be sown with a suitably diverse, local species rich, grassland seed mix. Following seeding in the Autumn or Spring, areas will require watering as necessary during any prolonged dry period. Growth and establishment of wild grasses may be slow initially however topping will be required to control weed growth and arisings will be removed; and
- Once established, the new species rich grassland will be managed by twice yearly mowing in late June – July and September.
- The sward will be maintained at varied heights to provide various habitat niches for different invertebrate groups.
- Once cut, the arisings will be removed and composted, to maintain low nutrient levels.

Bat Roosts

Three WWII bunkers, which are located in the eastern half of the Riverside Park will be converted into bat hibernacula and occasional summer roosts for various species of bat including greater horseshoe bats.

- The internal temperatures of the bunkers will be stabilised along with the interior humidity, air flow and light levels;
- The firing slits will be blocked off with 100mm thick medium density concrete blocks; and

Extra roosting sites will be made from wooden battens and tiles. A security grill will be fitted to prevent public access.