Kingsmere ecological management plan 2009 - 2019

Countryside Properties (Bicester) plc

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creating successful environments

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1. Introduction

1.1 Outline planning permission has been granted for a mixed-use development on land surrounding Whitelands Farm, south-west of Bicester, Oxfordshire (see figure 1: location plan). The development will comprise 1,585 new homes, a primary and secondary school, a mixed-use local centre, commercial/ employment development, healthcare development and public open space.

1.2 This document describes the biodiversity enhancements proposed for the site and sets a ten-year ecological management plan (EMP) for all retained and newly created habitats. The EMP, which is a requirement of the Section 106 agreement, takes into account relevant UK and local biodiversity action plans (BAPs) and should be read alongside the design code.

1.3 The EMP is a strategic level document, which sets out the principles for biodiversity management. The plan lists the aims and key actions required over a 10-year period. Details, such as planting plans for individual development parcels, will be provided by each developer at the reserved matters application stage for each phase of the project.

1.4 The plan is split into five parts, as follows:

- Section two sets the context of the site and surrounding area, listing the key biodiversity features present
- Section three evaluates the importance of biodiversity features, with regard to their status in the local, county or UK BAP
- Section four describes the proposals for creation of new habitats and maintenance of existing ones, i.e. sets the management objectives
- Section five details how the management objectives will be achieved, by setting detailed management prescriptions, or projects
- The final section sets out how the success of these projects will be monitored.

2. Site description

Location, site setting and development proposals

2.1 The site is bounded to the east by the A41, to the north by the B4030 (Middleton Stoney Road) and the west by the A4095. The application area extends to some 117.6ha. Prior to development, the site comprised arable farmland with some areas of permanent pasture (semi-improved and improved grasslands). Other habitats include hedgerows, three copses and a stream, Pingle Brook, which runs across the north-east corner of the site (see figure 1).

2.2 The master plan includes 17.29 ha of formal open space, consisting of retained vegetation, proposed planting and sports facilities. An additional 14.88 ha of informal space is included, which link together through the site. The network of existing habitat features, such as Pingle Brook, hedgerows, trees and woodland will be largely retained but some stretches of hedges need to be removed to accommodate the layout (see figure 2: biodiversity plan). These retained features will be enhanced and new wildlife habitats created.

Site context

2.3 In terms of geology, the site is underlain by rocks of the Jurassic Period with overlying superficial deposits of alluvium along the routes of local streams. Generally the strata covering this site consist of alluvial deposits (peat, sand and soft clay), gravel with limestone cobbles, stiff clay (becoming mudstone with depth) or a clay overlying limestone Cornbrash.

2.4 There are no statutory designated wildlife sites (e.g. SSSIs) on site or within 2km. One non-statutory site, Gravenhill Wood county wildlife site, an ancient semi-natural woodland lies within 1km.

2.5 In terms of the Oxfordshire Wildlife and Landscape Study (OWLS), a three year landscape and biodiversity appraisal of the county, the site lies within two landscape character areas, namely, the wooded estatelands and clay vale. The relevant county and local BAPs are the Oxfordshire BAP and the Cherwell BAP. The site lies within the Thames and Avon Vales Natural Area (English Nature, 1993).

Habitats and species

2.6 A desktop study, protected species and vegetation surveys were carried out to inform the EIA. The full results are provided in the environmental statement (chapter 14, natural heritage). The protected species surveys targeted breeding birds, bats, badgers, great crested newts, water voles, otters, crayfish and wall whorl-snail. Additional pre-construction surveys were carried out for bats, badgers, reptiles and amphibians in 2007.

2.7 The majority of the site comprises arable farmland. The following section summarises the biodiversity features of the site prior to development:

Habitats

- Improved grassland in the fields to the south and east of Whitelands Farm (the ridge and furrow fields)
- A mixture of improved grassland, semi-improved calcareous grassland and rush pasture in the two fields at the north-east corner of the site
- An area of wet woodland, adjacent to Pingle Brook, near to the eastern site boundary
- A semi-natural, ash dominated woodland (Foxey Leys Copse) and two unnamed planted copses, comprising sycamore and horse chestnut
- A network of hedges, largely dominated by hawthorn, blackthorn and

English elm, with occasional mature trees
- Pingle Brook and associated aquatic vegetation.

Species

- A number of trees with features that could be used by roosting bats (holes, rot cavities, splits etc) were identified. The bat activity surveys recorded limited foraging activity
- Common frog, common toad and smooth newt were recorded in the rush pasture field
- Old burrows, potentially made by water vole, were recorded on the banks of Pingle Brook
- 38 species of breeding farmland birds
- Butterfly Conservation supplied information relating to five UK BAP priority species (white-letter hairstreak, brown hairstreak, small heath, grizzled skipper and small blue) at or near to the site.

2.8 The surveys recorded no signs of wall whorl-snail, crayfish, water vole, otter, reptile or great crested newt. There are no badger setts located within the development area.

3. Evaluation of biodiversity features

3.1 Prior to development, the site was under intensive agricultural land use, with habitats present generally being of low biodiversity value. The habitats include:

Calcareous grassland

3.2 A calcareous grassland sward has become established on earth mounds within the old limestone quarry at the north-east of the site. The sward is characterised by fescue grasses, ladies bedstraw and salad burnet. It occurs within a large expanse of improved grassland.

3.3 Calcareous grassland is a UK BAP habitat. The type present at Bicester is relatively species poor. Because of the district scarcity of the habitat, it is of local biodiversity value.

Other grassland types

3.4 Rush pasture, dominated by hard rush and Yorkshire-fog (the National Vegetation Community, or NVC type MG10b) was recorded in the field to the east of the calcareous grassland. The vegetation is classified under the UK BAP as coastal and floodplain grazing marsh and the Cherwell BAP as grassland, grazing marsh and heathland. The type present on site is a common habitat in lowland England, so is considered to be of local importance. The improved grasslands are of low to negligible interest.

Woodland, hedges and trees

3.5 Hedges on site vary from intact, species rich to species-poor and fragmented. Ancient and/ or species rich hedgerows are on the original UK list of BAP habitats, published in 1994. Some of the better quality hedges, which occur mainly towards the periphery of the site, could be classified as species rich. A wide range of hedge types is included in the revised UK action plan for hedges.

3.6 At a local level, hedges are also included in the farmland habitat action plan (HAP) of the Cherwell BAP. As most of the hedges have been ploughed to their margins, they are valued as a feature of local interest. A number of mature hedgerow trees have been noted with bat roost potential. The hedges also provide habitat for breeding farmland birds and act as a wildlife corridor for other species, such as small mammals.

3.7 The historic removal and neglect of hedges has led to a large decrease in the extent of this habitat in the UK. Generally, hedges may also be adversely affected by over management, including cutting too frequently or the use of herbicides, pesticides or fertilisers up to the bases. The removal of hedges for development is also cited in the UK BAP as a contributory factor to their loss during past decades.

3.8 The woodlands on site comprise three copses and the wet woodland adjacent to Pingle Brook (see biodiversity and wildlife plan). These woodlands are classified under the local and UK BAP as lowland mixed deciduous woodland.

Pingle Brook

3.9 The watercourse supports a good cover of emergent vegetation. As the plant communities present are widespread, the stream is considered be a feature of local interest. Rivers, streams and ditches are included in the aquatic HAP of the Cherwell BAP.

3.10 The Cherwell BAP describes the Oxford Canal as county stronghold for water vole. Records of water vole near to Bicester dated 1998 - 2003 are presented in the Cherwell BAP. The UK BAP describes habitat loss, fragmentation, inappropriate management of riparian habitats, pollution and predation by mink as factors contributing to the decline of water vole populations. It is possible that the damage to the banks caused by cattle may have caused the habitats at Pingle Brook to become unsuitable for water voles. No water voles were recorded on site during survey work undertaken for the Environmental Statement (see paragraph 2.8).

4. Management objectives and opportunities for enhancement

4.1 This section reviews the proposals for enhancing the biodiversity value of the site, by improving the management of existing habitats and creating new habitats. The management objectives have been grouped into three broad habitat types: grassland, woodland and hedges, and wetland habitats.

Ecological processes will overlap between these habitats, e.g. bats will roost in woodlands but may forage over grassland or wetlands.

4.2 The following paragraphs set out the rationale for management. The details (e.g. number of bird boxes, seasonal timing for habitat creation or management) are provided in section 5 (management prescriptions).

1. Grassland habitats

4.3 The calcareous grassland has not been retained *in situ* but was successfully translocated to a suitable receptor site in early April 2008 (see figure 2). The translocation enabled the archaeological investigation of this area to be undertaken without damaging this habitat. The full methodology for the translocation is set out in the ecological report submitted to Cherwell District Council in October 2007. Once re-established, the management of the sward will aim to replicate the effects of seasonal grazing, which the grassland was previously subject to.

4.4 Where underlying soils are suitable, additional informal open space areas will be sown with a calcareous grassland seed mix, to increase the extent of this habitat type. New areas of calcareous grassland in the area of the Pingle Brook are shown on the landscape plans submitted to Cherwell District Council by Dave Fountain Designs Limited. The food plants of three UK BAP butterflies, the small blue (kidney vetch), the grizzled skipper (salad burnet) and the small heath (bent, fescue and meadow grasses) will be included in the seed mixture.

4.5 The sown calcareous grasslands will be managed to provide a range of habitats for butterflies, bumblebees and other invertebrates, and for small mammals. This will be achieved by implementing a mowing regime with areas cut at different times of the year and at different frequencies, to provide a matrix of sward heights.

4.6 The existing grassland to the south and east of Whitelands Farm (the ridge and furrow fields) will be incorporated into Whitelands Park. It will be possible to manage part of this area as tall grassland, to provide habitat for insects and mammals etc. Further areas of tall grasslands will also be established along the edges of the recreational grasslands, along habitat corridors and habitat links.

4.7 This will be achieved through changing the current management (in retained grasslands) or sowing a seed mix appropriate to the condition and situation. For instance, a hedgerow mix will be used along the base of hedges, (such as Emorsgate EH1, or equivalent), open areas will be seeded with a general purpose meadow mix and an amenity grassland mix will be used in areas that will be subject to frequent trampling.

4.8 A matrix of sward heights will be provided within other grassland areas to create the best conditions for wildlife. Areas of tall sward, managed at over 50cm will be established to provide cover and shelter for a range of invertebrates and small mammals, such as harvest mice. This will be subject to

an annual cut in the spring, to provide stems and dead flower heads for over wintering insects. A shorter sward height (e.g. 20 - 30cm) will be maintained in other areas, which will further grade into lower, tightly mown swards along paths and in more formal areas.

4.9 The establishment of calcareous and other grasslands will contribute to the broad objective of the Cherwell HAP for *grassland, grazing marsh and heathland* to encourage the re-creation of grassland and heathland.

4.10 The management objectives for grasslands are:

- 1a. To successfully re-establish the calcareous grassland within a suitable receptor site, which will remain free of built development
- 1b. To achieve a net gain in the calcareous grassland habitat resource through sowing of a calcareous meadow mix in appropriate informal open space areas
- 1c. To put in place a management regime which will enable a herb-rich calcareous grassland to become established
- 1d. To establish a network of wildflower meadows, herb-rich hedgerow margins and tall grasslands throughout the development
- 1e. To put in place a management regime in the retained ridge and furrow grassland and newly created grasslands to benefit a wide range of species.

2. Woodland and hedges

4.11 The three copses, the wet woodland and many of the existing hedges will be incorporated into the development. These are shown on figure 2. New areas of native hedge and woodland planting will be created along the habitat corridors, perimeter road and habitat links.

Hedges

4.12 Native species will be used for new hedgerow planting and the planting up of any gaps in retained hedges within the informal open space and along the main roads. The species mix will contain a significant amount of blackthorn, elm, oak and ash, to benefit white-letter hairstreak and brown hairstreak. Both butterflies are priority UK BAP species.

4.13 Generally, hedges that are bushy, with few gaps along their length are of greatest value for wildlife, as they provide plenty of shelter. Good wildlife hedges should also contain a range of food sources, supporting several woody species and berry producing shrubs. Occasional hedgerow trees and a rough grassland strip or tall herbs at their base also add value.

4.14 In terms of hedge management, the aim is to provide a range of hedge types on site through appropriate management. Hedge forms will range from well-trimmed hedges in formal areas, to hedges that are less frequently cut and managed for biodiversity purposes. The growth of scrambling and climbing plants, such as bramble, ivy and honeysuckle will be encouraged within the

more informal hedges. Such species provide cover and a good food source. Ivy berries are a particularly valuable food source for birds in winter and the flowers provide a useful nectar source late in the year.

4.15 The frequency and timing of hedgerow management and species chosen for the new planting will ensure that a range of fruit, berry and nectar sources are available throughout the year and that habitat will be available for over wintering insects.

Copses

4.16 The structure of all three woodland copses will be improved. This will be achieved by thinning some of the areas of younger growth (e.g. dense stands of ash seedlings) and replanting with species, such as holly, hazel and hawthorn, to provide a more diverse shrub/ understorey layer, or by planting such species within any significant existing gaps. Some existing or created gaps will be planted up with appropriate tree species, which will eventually diversify the age structure of the canopy. Some open areas will be retained to provided as much habitat diversity as possible within the copses.

4.17 Where space is available, shrub species will be planted at the edges of the copses, to create woodland edge habitat, which is a valuable habitat for birds. This planting may also limit access into certain parts of the copses, creating areas of relatively undisturbed woodland.

4.18 Any dead wood already present or timber derived through woodland management should be retained to provide a habitat for invertebrates, such as saproxylic beetles. Dead wood may be used for shelter by other animals, e.g. hedgehogs, newts and common toads. Log stacks, felled trees or standing dead wood/ dying branches and trunks are all valuable habitats and should be retained if present or created, where possible.

Wet woodland

4.19 An area of wet woodland lies to the north of Chesterton Services (see figure 2). At present the woodland is in poor condition, with much dead elm and alder and the predominance of scrub and dense ruderal vegetation at ground level.

4.20 The structure of this woodland will be improved by clearing pockets of low value scrub and ruderal species, followed by replanting of native trees suited to the wet conditions. The planting will diversify both the structure and age of the woodland.

4.21 Any existing trees that are in good condition will be retained, to provide areas of mature habitat. In the future, coppicing of a selection of newly planted trees could be introduced in order to improve the woodland structure and to prolong tree life. Species that respond well to such management include ash, oak and willow. Dead wood will be provided as wildlife habitat.

Bat, bird and insect boxes

4.22 Purpose built boxes are an effective means to provide roosting sites for the majority of bat species, which will readily adopt artificial boxes if they are of an appropriate design and placed in the correct location. Box materials range from wood, brick, woodcrete (wood sawdust and concrete), concrete and clay. The woodcrete, or Schwegler, boxes are often used, as these are long-lasting.

4.23 Bat boxes need to be placed in appropriate places, to ensure they will be found. They are best positioned in the mature hedges, copses or the wet woodland (see figure 2), ideally on, or near to a mature tree and away from brightly lit areas.

4.24 Boxes can be used for increasing nesting opportunities for birds. Different styles of nest box suit different species of bird, so consideration should be given to the species of bird to be attracted and whether they are known to use the site already, or have been recorded in the surrounding area. Boxes may be placed in mature hedges, copses or in the wet woodland.

4.25 Insects are a crucial food source for birds and bats and are important components of a healthy ecosystem. They can be encouraged by providing insect boxes, which create the structural diversity and shelter they need. Insect boxes may be placed in mature hedges, copses or in the wet woodland.

Species mix

4.26 Elm, the food plant of the white-letter hairstreak butterfly and blackthorn, the food plant of the brown hairstreak will be included in the planting mix. Guidance published by Butterfly Conservation suggests that white-letter hairstreak has a preference for Wych elm, but will also make use of English and small-leaved elm. Field maple and ash also provide important habitat and lime trees may be used as a nectar source.

4.27 The enhancements to woodland habitats will contribute to the broad aim of the Cherwell woodland HAP to encourage sympathetic management of existing woodland sites. Bats require a network of well connected hedges for commuting/ foraging and woodland bird species, such as song thrush and bullfinch, require good woodland cover. Both groups are likely to benefit from the enhancements to woodlands and hedges.

4.28 The management objectives for woodland and hedges are:

- 2a. To carefully integrate existing hedges, copses and trees into the development
- 2b. To enhance the biodiversity value of hedges through new native planting and appropriate management
- 2c. To enhance the biodiversity value of the copses and wet woodland through appropriate understorey planting and management
- 2d. To enhance the biodiversity value of woodland and hedges by providing bat, bird and invertebrate boxes.

3. Wetland habitats

4.29 Wetland habitats are shown on the biodiversity plan (figure 2). These comprise two areas: Pingle Brook, which is situated at the north-east corner of the site and two ponds, which are to created at the south-east corner of the site. David Fountain Designs Limited has prepared detailed landscaping proposals for Pingle Brook.

Pingle Brook

4.30 Pingle Brook will be retained and incorporated into an area of informal open space. The straightened section of stream will be realigned, to create a more natural meandering course. Two new balancing ponds will be created alongside Pingle Brook, which will form part of the sustainable drainage scheme.

4.31 Wetland habitats will be created, such as open water, submergent and emergent vegetation, reedbeds and wet meadow. These will be planted up with native species appropriate to the degree of wetness.

4.32 Informal paths will be created alongside the wetlands for recreation. Features such as log stacks, stone piles and compost heaps will be provided in less disturbed areas, creating shelter for amphibians, reptiles, insects and mammals.

4.33 The wetland vegetation and ponds created at Pingle Brook could support small mammals, grass snake and insects (e.g. dragonflies and damselflies). It will provide habitat for common species of amphibian, which are included in the Cherwell BAP. The most likely species to benefit is the common frog but the seasonal wetness of the ponds may suit newts. The wetland habitat may also benefit other Cherwell BAP species, such as reed bunting and sedge warbler. Bats are likely to use the wetland for foraging, as it develops and attracts insect populations.

Ponds at the south-east corner

4.34 The two attenuation ponds, which will be created in the south-eastern corner of the site, will form part of the drainage scheme. The ponds are likely to benefit many of the species described above. The larger pond could potentially attract wetland birds. The quality of this habitat can be enhanced by establishing areas of common reed, which will provide cover for these species.

4.35 The management objectives for wetlands are:

- 3a. To enhance existing riparian habitats and to create new wetlands
- 3b. To manage all wetland habitats to encourage a range of species, such as amphibians, mammals, aquatic insects and birds

5. Management prescriptions

5.1 This section describes how the management aims will be realised through a number of projects. The project title, objectives satisfied, timescales, responsibility and details of any constraints are provided.

5.2 The prescriptions are split into the three habitat types: grasslands, woodland and wetlands.

1. Grassland habitats

Project 1.1	**Establishment and management of relocated calcareous grassland**
EMP objective(s)	1a
UK BAP habitats and species	Lowland calcareous grassland
Constraints	High fertility of soil
Season	Spring
Year(s) of plan	2009 - 2019
Responsibility	The translocation has already been carried out by Countryside Properties (Bicester) plc (CP). CP will carry out the mowing during the establishment phase, then management responsibilities will be passed on to the relevant authority
Details	• The grassland was translocated in early April 2008, as set out in the translocation plan. • Spot treatment of ruderal weeds will be carried during the initial establishment phase (first two growing seasons). • The translocated grassland will be mown three times in the initial establishment phase (end of June, end of August and end of September). • In subsequent years, mowing will take place five times a year, at the end of May, June, July, August and September, to replicate the summer grazing conditions, which will benefit low growing rosette forming species present in the original grassland.

Project 1.2	**Establishment and management of areas sown with a calcareous meadow mix**
EMP objective(s)	1b, 1c
UK BAP habitats and species	Lowland calcareous grassland. Small heath, small blue and grizzled skipper butterflies
Constraints	High fertility of soil
Season	Various
Year(s) of plan	2009 – 2019
Responsibility	CP will be responsible for sowing and initial establishment, then management responsibilities will be passed on to the relevant authority
Details	• Following ground preparation, an Emorsgate EM6, or equivalent mix will be sown at suitable locations at 1, 3 and 10. Kidney vetch, salad burnet, plus bent, fescue and meadow-grasses will be included to benefit BAP butterflies. A sample species list is included at appendix I. • Once established, areas sown with a calcareous meadow mix will be managed according to three treatments: - a: mowing in 1/3 of the meadows will cease at the end of July to favour late summer flowers - b: mowing in 1/3 of the meadows will not start until the end of September to favour spring/ early summer flowers - c: 1/3 will be cut in February / March to provide habitat for over wintering insects. • Arisings will be removed to reduce fertility and prevent smothering of the sward.

Project 1.3	**Establishment and management of rough grasslands and other types of meadows**
EMP objective(s)	1d, 1e
UK BAP habitats and species	Lowland meadows
Constraints	High fertility of soil
Season	Various
Year(s) of plan	2009 – 2019
Responsibility	CP will be responsible for sowing (where appropriate) and initial establishment, then management responsibilities will be passed on to the relevant authority
Details	• Following ground preparation, an Emorsgate EM10 or equivalent mix suitable to the local conditions will be selected and sown in areas to be managed as tall grassland / meadow surrounding the recreational grasslands, along the habitat corridors and habitat links. The use of an EH1 mix or equivalent will be appropriate along some of the hedges. A sample species list is provided at appendix I. • The ridge and furrow fields south and east of Whitelands Farm will be retained and not re-sown. The majority of this area will be managed as tall sward (over 50cm). This will be achieved through an annual cut early in February / March. Informal paths will be mown through the fields each year. It is recommended that the course of these paths be varied annually, to prevent erosion. The paths will be regularly cut during the growing season. A verge, varying in width (generally 2-5m) will be maintained alongside each path. This will be cut three times a year, in May, July and September, with the aim to manage the sward height at 20 - 30cm. The sward will further grade into lower, tightly mown grasslands along paths and in more formal areas. • Once established, the habitat corridors, links and the margins of the recreational grasses will be managed as above. • Arisings will be removed from mown areas to reduce fertility and encourage a diverse range of plant species to become established.

2. Woodland and hedges

Project 2.1	**Management of retained and planted hedges**
EMP objective(s)	2a, 2b
UK BAP habitats and species	Hedgerows. White-letter and brown hairstreak butterflies
Constraints	Disturbance to breeding birds
Season	October to February for hedgerow management work
Year(s) of plan	2009 - 2019
Responsibility	CP will be responsible for planting (where appropriate) and initial establishment, then management responsibilities will be passed on to the relevant authority
Details	• Existing hedges will be retained, wherever possible. Any gaps in retained hedges will planted up with native species and new hedges will also be planted. A sample species list is included at appendix I. • The planting mix used for new hedges and filling in of gaps in retained hedges will contain a significant amount of blackthorn, wych elm, oak and ash, to benefit BAP butterflies. • The management prescriptions for each hedge will take account of their current structure and their context in the surrounding environment. For instance, some hedges will need to be regularly trimmed, especially those adjacent to footpaths and roads etc. • A network of hedges that are managed for biodiversity purposes will be established. These hedges will be situated within informal open space areas. They will be managed according to a rotational program of cutting, with less than one-third of all hedges cut in any one year. Hedge management will be carried out between November and February.

Project 2.2	**Management of copses**
EMP objective(s)	2a, 2c
UK BAP habitats and species	Lowland mixed deciduous woodland. White-letter and brown hairstreak butterflies
Constraints	Disturbance to breeding birds
Season	October to March
Year(s) of plan	2009 – 2019
Responsibility	CP or individual developers will be responsible for planting (where appropriate) and initial establishment, then management responsibilities will be passed on to the relevant authority
Details	• Within all three copses, pockets of young growth (e.g. dense stands of ash seedlings) will be cleared and a better shrub layer created by planting holly, hazel, hawthorn. • Further shrub species will be planted at the edges of the copses, to create woodland edge habitat. Species planted will include holly, hazel, hawthorn, field maple, wayfaring-tree and dogwood. • A selection of existing or created gaps will be planted up with appropriate tree species. These will be protected by 1.2m tree shelters. • One or two open areas will be retained or created to provide as much habitat diversity as possible within the small copses. • Any dead wood already present, or any timber derived through, woodland management will be retained and at least two log piles will be created in each copse. If safe to do so, standing dead wood habitats will be retained or created through ring barking.

Project 2.3	**Management of wet woodland**
EMP objective(s)	2a, 2c
UK BAP habitats and species	Lowland mixed deciduous woodland
Constraints	Disturbance to breeding birds
Season	October to March
Year(s) of plan	2009-2019
Responsibility	CP or individual developers will be responsible for planting (where appropriate) and initial establishment, then management responsibilities will be passed on to the relevant authority
Details	• Any existing trees in good condition will be retained, but pockets of scrub and ruderal species will be cleared, followed by replanting with native species, including oak, alder, downy birch, ash and willows. The newly planted trees will be managed to ensure they become fully established e.g. protected by 1.2m tree guards. • Future coppicing of a selection of willow, oak and ash will be introduced. For conservation purposes it is generally recommended that ash and willow are coppiced at 7-10 year intervals. • Dead wood will be retained and log piles created.

Project 2.4	**Erection of bat, bird and invertebrate boxes**
EMP objective(s)	2d
UK BAP habitats and species	Bats and bumblebees (several species of each group are priority BAP species)
Constraints	Habitat disturbance during management works
Season	Winter
Year(s) of plan	2009-2010
Responsibility	CP
Details	• The precise locations for the bat, bird and insect boxes will need to be determined when they are being installed (orientation etc is important). Although no seasonal restrictions envisaged, it is best that they are installed in winter, so they are in place ready for the following spring/ summer breeding season. It is advised that boxes should be installed after any works to existing trees (removal, pruning etc) is completed, to ensure that boxes are not damaged or lost. • 30 Schwegler 2F type bat boxes will be installed. This type is attractive to the smaller British bats. The Bat Conservation Trust guidance regarding the positioning of boxes will be followed (see references). It is preferable to arrange two or three boxes at different orientations around the trunks of mature trees, at a height of 5m, if possible. 15 of the boxes will be placed in trees within the copses, with the remainder placed in mature hedgerow trees, ideally away from areas that are currently lit or frequently disturbed, or will be post-construction. • 30 bird boxes will be placed in mature hedges, copses and in the wet woodland (15 will be placed in hedges and the remainder within the copses and wet woodland). Ten traditional woodland boxes with a 32mm hole (which will favors a range of woodland and garden birds) and ten 25mm diameter traditional boxes (favored by smaller tits) will be selected. The remainder will comprise a variety of other box types, such as the Schwegler 2H open fronted boxes (attractive to robins and wrens), 1B or 2M bird boxes, which are available with 26mm or 32mm holes. RSPB guidance will be followed when positioning the boxes (see references). • Eight invertebrate boxes will be placed in mature hedges, copses and the wet woodland. The boxes used will include wooden insect houses (for over wintering lacewings and ladybirds), woodcrete insect nests (for bees and solitary wasps), bug boxes (solitary bees and ladybirds), red mason bee nest and hornet box. Guidance on the optimum location and orientation should be available from the suppliers and this will be followed when positioning the boxes.

3. Wetland habitats

Project 3.1	**Creation and planting up of new wetland habitats**
EMP objective(s)	3a, 3b
UK BAP habitats and species	Standing open water and canals Rivers
Constraints	None
Season	Winter/ spring
Year(s) of plan	2009 – 2019
Responsibility	CP will be responsible for construction works, sowing (where appropriate) and initial establishment, then management responsibilities will be passed on to the relevant authority
Details	• A range of water depths will be provided in ponds with permanent water and the shallow areas maximised, to benefit biodiversity. During construction, disturbance at Pingle Brook will be restricted to the part of the stream to be re-aligned and the new ponds. • Largely open conditions and rough grassy banks will be provided along Pingle Brook, to create suitable conditions for dragonflies, small mammals and grass snakes. Therefore new tree and shrub planting will be limited along the banks of Pingle Brook, but the provision of a few scattered willows, hawthorn and elder will benefit some species, by providing cover and food sources. • Where possible, natural colonisation will be encouraged at Pingle Brook, but some planting will be required in the ponds, both at Pingle Brook and the wetlands at the south-east of the site. The wetland planting will take place once the wetland zones have become established/ stabilised. Native species appropriate to the degree of wetness will be selected. At Pingle Brook there will be a preference for species already present at the stream. A sample species list is provided at appendix I. • Wet meadows will be created at the periphery of the ponds. Species such as cuckoo-flower, ragged robin, purple-loosestrife and meadow foxtail will be established in these areas. A more comprehensive list of suggested species for each wetland habitat (e.g. submergent, emergent, wet meadow) based on Natural England guidance is included at appendix I.

Project 3.2	**Management of wetland habitats**
EMP objective(s)	3b
UK BAP habitats and species	Standing open water and canals Rivers
Constraints	None
Season	Summer/ autumn
Year(s) of plan	2009 – 2019
Responsibility	Management responsibilities will be passed on to the relevant authority
Details	The banks of Pingle Brook will be managed as follows: • Informal paths should be set back at least 2 metres from Pingle Brook, to allow establishment of an undisturbed bank side habitat. • An annual cut of bank vegetation will be carried out in late autumn, winter or early spring, when most species are dormant / hibernating or are less active. • Several large sections of uncut vegetation will be left on each bank, alternating the cutting regime annually to ensure that scrub growth is prevented. As a minimum, strips of 5 m should be left uncut in every 20m section. If this is not possible then one whole bank will be left uncut and the opposite bank cut, with this cutting regime rotated in the following year. • Handheld strimmers rather than flail mowers will be used to avoid damage to the banks. The new ponds will be managed as follows: • A margin of tall herbs and long grassland will be allowed to grow at the periphery of the ponds. This will be subject to an annual cut in the autumn. The width of this margin will vary, but will be a minimum of 2m. • Two compost bins will be created at undisturbed locations in the informal grasslands near to the wetlands. These will receive some of the grass clippings from the site. These compost bins will provide potential breeding habitat for grass snakes. A minimum of two log and two boulder piles will also be created to provide habitat for invertebrates and shelter for amphibians and reptiles. • The pond will be subject to occasional cutting or removal of emergent vegetation in the autumn/ winter, as necessary. Cut material should be removed from the pond. • Areas of shorter grassland and informal paths will meander close to the ponds for recreational purposes, whilst still retaining some areas that will be subject to low levels of disturbance.

6. Monitoring

6.1 An ecologist (ecological clerk of works) will be appointed to oversee the implementation of the ecological management plan. The ecologist will carry out and report on all ecological monitoring that will take place. The section 106 agreement requires the submission of written reports to the planning authority every six months. The first report has to be provided six months after commencement of development, with the final report due one year after completion of the construction phase.

6.2 The monitoring program will comprise the following elements:

1. Habitat monitoring

6.3 The aim will be to monitor the establishment of areas sown with the meadow mixes, the implementation of the woodland and hedgerow management proposals and the formation of the new wetland habitats. Once habitats have been created or the new management regimes have been commenced for existing habitats, annual surveys involving quadrat based vegetation sampling and photographic monitoring will be carried out between May and August. This will continue until one year after completion of the construction phase.

6.4 Data collected will include species lists for each quadrat, including abundance values (using the DOMIN or DAFOR scale). Other relevant information, such as average sward height will be collected. A cumulative species list for each habitat type will also be noted. A fixed-point photographic monitoring program will be set up. This type of monitoring is useful to help detect habitat changes that might not be picked up by the vegetation sampling, such as the development of a rough tussocky grass sward, or the establishment of a scrubby woodland edge habitat.

6.5 The findings of the quadrat surveys will be reviewed annually and the management regime re-evaluated to ensure that the management aims and objectives are being achieved.

6.6 The monitoring will comprise:

- 6 2x2m quadrats will be established within the translocated calcareous grassland, with species lists compiled and abundance values recorded. A species list for the whole habitat will be created and fixed photographic monitoring points will be established.
- 20 2x2m quadrats will be established in other informal grasslands and at the margins of the recreational grassland area, with species lists compiled and abundance values recorded. A species list for the whole habitat(s) will be created and fixed photographic monitoring points will be established.
- Four 10x10m woodland quadrats (one quadrat in each of the three copses and one quadrat in the wet woodland) will be set up, with species lists created for the quadrat and the whole copse. Species abundance values will be noted and fixed photographic monitoring

points will be established.

- Eight lengths of hedges will be subject to a 'Hedgerow Regulations' type survey. Photographic monitoring of the survey hedges will also be carried out.
- 16 fixed point photographic monitoring points will be established in the wetland areas, eight at Pingle Brook and eight within the wetland to the south of the site. Species lists and abundance values will also be recorded for these areas.

2. Monitoring of species

6.7 Incidental records of all fauna species, e.g. mammals, butterflies, birds etc will be noted every year by the surveyor carrying out the vegetation surveys. A program of targeted fauna surveys is also proposed, as follows:

- A bird survey of the site will be carried out every other year between the months of March and June. This will continue until one year after completion of the construction phase. The number of occupied bird boxes and species using them will be noted during these surveys.

- A bat survey will be carried every other year between May and September. This will continue until one year after completion of the construction phase. A bat ecologist will walk transects across the site and bat boxes will be inspected.

- As the meadows mature and the changes to hedgerow and woodland management take effect, increases in populations of insects can be expected. Butterflies have been chosen as an indicative group to monitor this, due to the presence of five BAP species in the local area. A transect route will be chosen and walked during suitable weather, recording all butterflies. This will be carried out in May, July and September every other year. This will continue until one year after completion of the construction phase.

7. References

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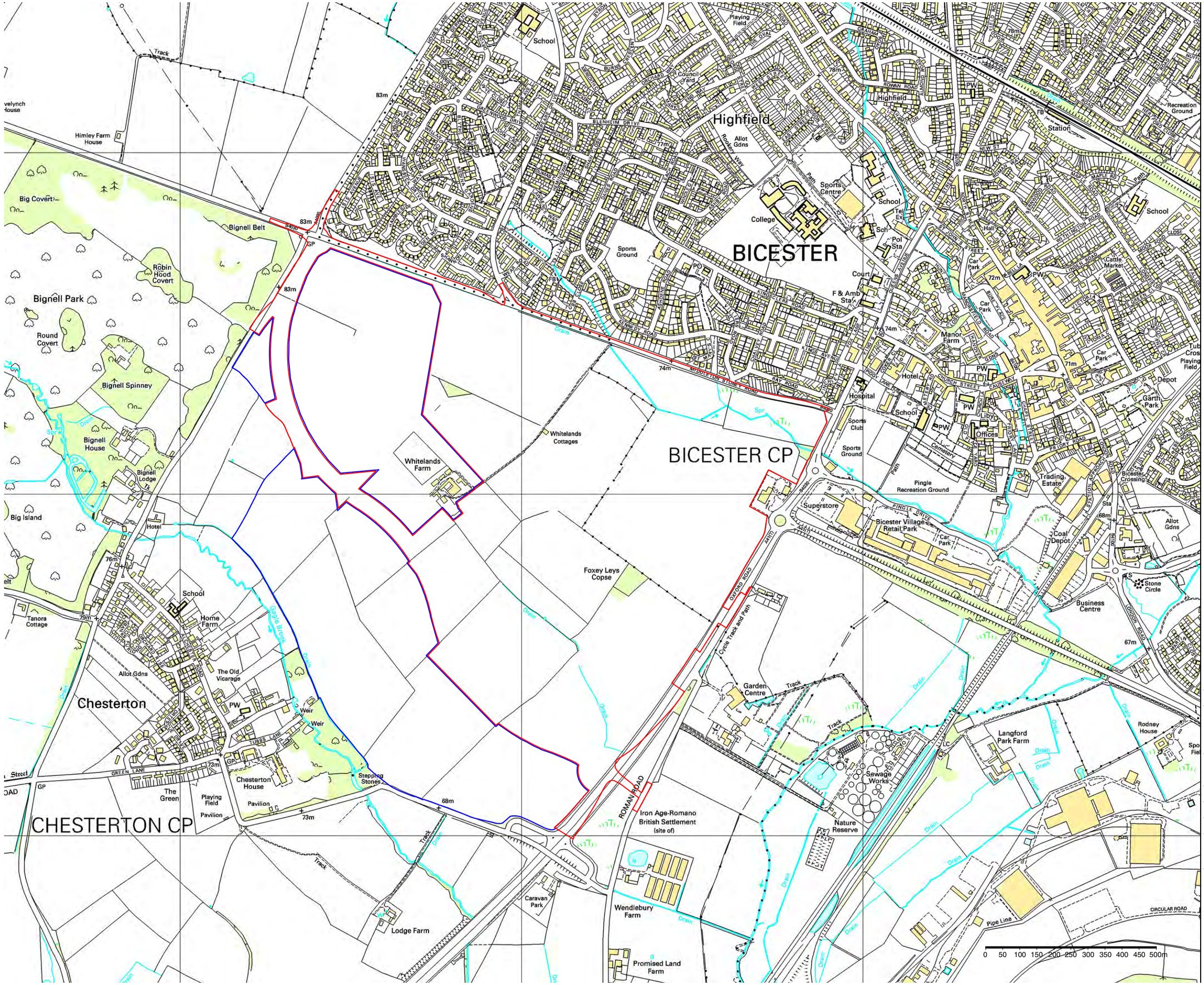

status

- Application boundary
- Other land in applicant's ownership

status

client / project
Countryside / South West Bicester

drawing title
Location Plan

scale	*drawn by*
1:10000 @ A3	SWD
date	*checked by*
April 2006	JP
drawing no.	*revision no.*
1806.01/01	

revisions

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status

client / project
Countryside / South West Bicester

drawing title
Biodiversity plan

scale	*drawn by*
NTS	SWD
date	*checked by*
Feb 09	RB
drawing no.	*revision no.*
1806.01/DC/BDP	

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Appendix I: List of native species to be included in the planting

Calcareous grassland
(Emorsgate EM6 chalk and limestone mix, or equivalent)

Common bird's-foot trefoil *Lotus corniculatus*
Common knapweed *Centaurea nigra*
Cowslip *Primula veris*
Creeping bent *Agrostis capiliaris*
Crested dog's-tail *Cynosurus cristatus*
Field scabious *Knautia arvensis*
Greater knapweed *Centaurea scabiosa*
Hoary plantain *Plantago media*
Kidney vetch *Anthyllis vulneraria*
Ladies bedstraw *Galium verum*
Meadow buttercup *Ranunculus acris*
Mouse-ear hawkweed *Pilosella officinarum*
Oxeye daisy *Leucanthemum vulgare*
Quaking grass *Briza media*
Red clover *Trifolium pratense*
Red fescue *Festuca rubra*
Rough hawkbit *Leontodon hispidus*
Salad burnet *Sanguisorba minor*
Selfheal *Prunella vulgaris*
Sheep's-fescue *Festuca ovina*
Small scabious *Scabiosa columbaria*
Smaller cat's-tail *Phleum bertolonii*
Sweet vernal-grass *Anthoxanthum odoratum*
Wild basil *Clinopodium vulgare*
Wild carrot *Daucus carota*
Wild marjoram *Origanum vulgare*
Wild mignonette *Reseda lutea*
Yarrow *Achillea millefolium*
Yellow oat-grass *Trisetum flavescens*

Meadows/ long Grasslands
(Emorsgate EM10 tussock mix, or equivalent)

Agrimony *Agrimonia eupatoria*
Cock's-foot *Dactylis glomerata*
Common knapweed *Centaurea nigra*
Common vetch *Vicia sativa ssp nigra*
Crested dog's-tail *Cynosurus cristatus*
Great mullein *Verbascum thapsus*
Greater knapweed *Centaurea scabiosa*
Hedge bedstraw *Galium mollugo*
Meadow cranesbill *Geranium pratense*
Meadow fescue *Festuca pratensis*
Meadow foxtail *Alopecurus pratensis*
Meadow vetchling *Lathyrus pratensis*

Oxeye daisy *Leucanthemum vulgare*
Perforate St John's-wort *Hypericum perforatum*
Red campion *Silene dioica*
Red fescue *Festuca rubra*
Ribwort plantain *Plantago lanceolata*
Tall fescue *Festuca arundinacea*
Tufted hair-grass *Deschampsia cespitosa*
Tufted vetch *Vicia cracca*
Upright hedge-parsley *Torilis japonica*
Wild carrot *Daucus carota*
Wild teasel *Dipsacus fullonum*
Yarrow *Achillea millefolium*
Yorkshire-fog *Holcus lanatus*

Woodland / hedgerow margins
(Emorsgate EH1 hedgerow mix, or equivalent)

Agrimony *Agrimonia eupatoria*
Common bent *Agrostis capillaris*
Common knapweed *Centaurea nigra*
Cowslip *Primula veris*
Crested dog's-tail *Cynosurus cristatus*
False-brome *Brachypodium sylvaticum*
Garlic mustard *Alliaria petiolata*
Hedge bedstraw *Galium mollugo*
Hedge woundwort *Stachys sylvatica*
Oxeye daisy *Leucanthemum vulgare*
Pheasant's-eye *Adonis annua*
Red campion *Silene dioica*
Red fescue *Festuca rubra*
Ribwort plantain *Plantago lanceolata*
Selfheal *Prunella vulgaris*
Sweet vernal-grass *Anthoxanthum odoratum*
Tufted hair-grass *Deschampsia cespitosa*
Tufted vetch *Vicia cracca*
Upright hedge Parsley *Torilis japonica*
White campion *Silene latifolia*
Wild basil *Clinopodium vulgare*
Wood avens *Geum urbanum*
Wood meadow-grass *Poa nemoralis*
Yarrow *Achillea millefolium*

Native hedgerow and woodlands species

Alder *Alnus glutinosa*
Ash *Fraxinous excelsior*
Blackthorn *Prunus spinosa*
Crack willow *Salix fragilis*
Crab apple *Malus sylvestris*
Dog rose *Rosa canina*

Dogwood *Cornus sanguinea*
Elder *Sambucus nigra*
Field maple *Acer campestre*
Guelder rose *Viburnum opulus*
Hawthorn *Crataegus monogyna*
Hazel *Corylus avellana*
Holly *Ilex aquifolium*
Pedunculate oak *Quercus robur*
Small-leaved Lime *Tilia cordata*
Spindle *Euonymus europeans*
Sweet briar *Rosa rubiginosa*
Wayfaring tree *Viburnum lantana*
White willow *Salix alba*
Whitebeam *Sorbus aria*
Wild cherry *Prunus avium*
Wych elm *Ulmus glabra*
Yew *Taxus baccata*

Wet grassland
(Emorsgate EM8 meadow mixture for wetlands, or equivalent)

Betony *Stachys officinalis*
Common Bent *Agrostis capillaris*
Common Knapweed *Centaurea nigra*
Common Sorrel *Rumex acetosa*
Crested Dogstail *Cynosurus cristatus*
Devil's-bit scabious *Succisa pratensis*
Great Burnet *Sanguisorba officinalis*
Greater Birdsfoot Trefoil *Lotus pedunculatus*
Meadow Buttercup *Ranunculus acris*
Meadow Foxtail *Alopecurus pratensis*
Meadowsweet *Filipendula ulmaria*
Oxeye Daisy *Leucanthemum vulgare*
Pepper-saxifrage *Silaum silaus*
Ragged Robin *Lychnis flos-cuculi*
Red Fescue *Festuca rubra*
Ribwort Plantain *Plantago lanceolata*
Sweet Vernal-grass *Anthoxanthum odoratum*
Tufted Hair-grass *Deschampsia cespitosa*
Tufted Vetch *Vicia cracca*
Yellow Rattle *Rhinanthus minor*

Floating pond plants

Broad-leaved pondweed *Potamogeton natans*
Curled pondweed *Potamogeton crispus*
Floating sweet-grass *Glyceria fluitans*
Fringed water-lily *Nymphoides peltata*
Frogbit *Hydrocharis morsus-ranae*
Rigid hornwort *Ceratophyllum demersum*

Water crowfoot *Ranunculus aquatilis*
Water milfoil *Myriophyllum spicatum*
Water soldier *Stratiotes aloides*
Water starwort *Callitriche stagnalis*
White water-lily *Nymphaea alba*
Yellow water-lily *Nuphar lutea*

Emergent pond plants

Amphibious bistort *Persicaria amphibia*
Arrowhead *Sagittaria sagittifolia*
Bogbean *Menyanthes trifoliatea*
Branched bur-reed *Sparganium erectum*
Brooklime *Veronica beccabunga*
Common reed *Phragmites australis*
Flowering rush *Butomus umbellatus*
Fools water-cress *Apium nodiflorum*
Greater pond-sedge *Carex riparia*
Lesser bulrush *Typha angustifolia*
Lesser spearwort *Ranunculus flammula*
Lesser water-parsnip *Berula erecta*
Spearwort *Ranunculus lingua*
Water figwort *Scrophularia auriculata*
Water forget-me-not *Myosotis scorpioides*
Water mint *Mentha aquatica*
Water plantain *Alisma plantago-aquatica*

Pond margin and bog plants

Bugle *Ajuga repens*
Great willowherb *Epilobium hirsutum*
Hard rush *Juncus*
Hemp agrimony *Eupatorium cannabinum*
Lady's smock *Cardamine pratensis*
Marsh marigold *Caltha palustris*
Marsh woundwort *Stachys palustris*
Purple-loosestrife *Lythrum salicaria*
Ragged-robin *Lychnis flos-cuculi*
Yellow flag *Iris pseudacorus*
Yellow loosestrife *Lysimachia vulgaris*

Appendix II: Species and habitats that may benefit from implementation of the management plan

Cherwell BAP habitats present on site
Aquatic
Farmland (hedgerows)
Grassland, grazing marsh and heathland
Wetland
Woodland

Cherwell/ UK BAP Species present on site
Common frog
Common toad
House martin
House sparrow
Bats
Smooth newt
Song thrush

Cherwell/ UK BAP species not recorded on site but could benefit
Great crested newt
Harvest mouse
Otter
Reed bunting
Sedge warbler
Water vole
Marsh Fritillary
White-letter hairstreak
Brown hairstreak
Small blue
Grizzled skipper
Small heath
Grass snake
Slowworm

Other species not recorded but could benefit
Common species of dragonflies and damselflies
Wetland birds

Figures:

Figure 1: location plan
Figure 2: biodiversity plan