



PRIMARY ROUTE
SITE WIDE ECOLOGICAL CONSERVATION MANAGEMENT PLAN

COUPRO-CLAFAR-1839-ECMP

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CONTENTS

	PAGE
SITE DETAILS	3
INTRODUCTION	5
NOMENCLATURE	10
AIMS AND OBJECTIVES OF THE NATURE CONSERVATION MANAGEMENT PLAN	11
DESCRIPTION OF MANAGEMENT SITE AND RELEVANCE OF KEY HABITAT COMPONENTS	13
WOODLANDS/PLANTATIONS	13
GRASSLAND	15
HEDGEROWS	16
WATER BODIES AND ASSOCIATED FEATURES	17
MANAGEMENT SITE: MANAGEMENT AREAS AND HABITAT COMPONENTS	19
MANAGEMENT PRESCRIPTIONS	20
THE BUILT DEVELOPMENT	20
HOBSON'S BROOK AND ASSOCIATED FEATURES	39
THE GREEN CORRIDOR	50
BIRD MITIGATION AREA	64
RESPONSIBILITIES	72
SPECIES SPECIFIC CONSIDERATIONS	73
RECOMMENDED WORKS SCHEDULES	79
REFERENCES/BIBLIOGRAPHY	91

SITE DETAILS

SITE NAME	CLAY FARM, CAMBRIDGE
OWNERSHIP	COUNTRYSIDE PROPERTIES, THE PEMBERTON TRUSTEES AND HOBSON'S BROOK TRUSTEES
CENTRAL GRID REFERENCE	TL 451 545
AREA	108HA
LOCAL PLANNING AUTHORITY	CAMBRIDGE CITY COUNCIL
CONSERVATION STATUS	<p>THREE CONSERVATION DESIGNATIONS FALL WITHIN THE SITE BOUNDARY, INCLUDING:</p> <p>HOBSON'S BROOK CITY WILDLIFE SITE, WHICH CROSSES THROUGH THE MIDDLE OF THE SITE IN A NORTH-SOUTH ALIGNMENT; LONG ROAD PLANTATION CITY WILDLIFE SITE, WHICH FORMS PART OF THE NORTHERN BOUNDARY OF THE SITE; AND</p> <p>TRUMPINGTON DISMANTLED RAILWAY COUNTY WILDLIFE SITE AND CITY WILDLIFE SITE, WHICH CROSSES THE SITE IN A SOUTH-WEST TO NORTH-EAST ALIGNMENT</p>
RESPONSIBILITIES	<p>IMPLEMENTATION OF THIS DOCUMENT IS THE RESPONSIBILITY OF COUNTRYSIDE PROPERTIES, OR THEIR SUCCESSORS IN TITLE, THROUGH A MANAGEMENT COMPANY AND WILL BE UNDERTAKEN BY SUITABLY QUALIFIED APPROVED CONTRACTORS AND SITE STAFF</p> <p>COUNTRYSIDE PROPERTIES, OR THEIR SUCCESSORS IN TITLE, WILL BE RESPONSIBLE FOR THE MANAGEMENT OF ALL MANAGEMENT AREAS, EXCEPT HOBSON'S BROOK (WHICH WILL CONTINUE TO BE MANAGED AND MAINTAINED BY</p>

	HOBSON'S BROOK TRUSTEES), UNTIL ADOPTION OF RESPONSIBILITY BY CAMBRIDGE CITY COUNCIL (ANTICIPATED TO BE TAKE PLACE ONE YEAR AFTER PRACTICAL COMPLETION)
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INTRODUCTION

- I. This site wide Ecological Conservation Management Plan (ECMP) has been prepared by ecosulis ltd on behalf of Countryside Properties and will be applied to the site of Clay Farm, Cambridge. The Plan addresses Condition 42 which is to be attached to the outline planning permission for Clay Farm, which states:

“Prior to or concurrently with the submission of the first reserved matters application(s) for residential development for the site, a site wide Ecological Conservation Management Plan shall be submitted to the local planning authority for approval. The Plan shall accord with and give effect to the principles for such a Plan proposed in the Environmental Statement submitted with the application.

As a matter of principle, the Plan shall set out an objective of enhancing the net biodiversity of the site as a result of development and shall include:

- a) Contractor responsibilities, procedures and requirements.
- b) Full details of appropriate habitat and species surveys (pre and post-construction), and reviews where necessary, to identify areas of importance to biodiversity.
- c) Details of measures to ensure protection and suitable mitigation to all legally protected species and those habitats and species identified as being of importance to biodiversity both during construction and post-development, including consideration and avoidance of sensitive stages of species life cycles, such as the bird breeding season, protective fencing and phasing of works to ensure the provision of advanced habitat areas and minimise disturbance of existing features.
- d) Identification of habitats and species worthy of management and enhancement together with the setting of appropriate conservation objectives for the site. Prescriptions shall be provided to detail how habitat and species management and enhancement shall be provided alongside measures to provide habitat restoration and creation to deliver targets in the Cambridgeshire and UK Biodiversity Action Plans such as: the provision of bat and bird boxes on buildings and on trees around the site; the provision of other nesting features for bird species such as bird ledges; reptile hibernacula including small log and rubble piles; the creation of new aquatic habitats where possible with permanent areas of open water of minimum depth 0.5m; the provision of wetland margins and habitat islands; the management of grassland; enhancements to Hobson’s

Brook to improve its value to wildlife; the provision of buffer zones alongside the woodlands/plantations, the Cambridgeshire Guided Busway and Hobson's Brook, including rough grassland strips, scrub and shrub planting and pollard willows.

- e) A summary work schedule table, confirming the relevant dates and/or periods that the prescriptions and protection measures shall be implemented or undertaken by within.
- f) A programme for Monitoring/Environmental Audits to be carried out four times annually during the construction phase, which shall include a further survey of fauna within Hobson's Brook.
- g) Confirmation of suitably qualified personnel responsible for over-seeing implementation of the EMP commitments, such as an Ecological Clerk of Works, including a specification of role.
- h) A programme for long-term maintenance, management and monitoring responsibilities for a period of 12 years to ensure an effective implementation of the Ecological Conservation Management Plan ensuring periodic review of the objectives and prescriptions.

No development shall commence until such time as the Ecological Conservation Management Plan has been approved in writing by the Local Planning Authority. All species and habitat protection, enhancement, restoration and creation measures shall be carried out in accordance with the approved Ecological Conservation Management Plan, unless otherwise agreed in writing by the Local Planning Authority”.

2. The ECMP has been prepared following ecological surveys and consultation and is in accordance with the following: Planning Policy Statement 9 for Biodiversity and Geological Conservation (PPS9); Regional Planning Guidance for East Anglia (RPG6); Cambridgeshire and Peterborough Structure Plan 2003; Cambridge Local Plan: Adopted by Cambridge City Council 2006; UK Biodiversity Action Plan; Cambridgeshire Biodiversity Action Plan; Cambridgeshire District Council's *SUDS Draft design guide – Biodiversity*; and South Cambridgeshire District Council Biodiversity Strategy 'a vision for the conservation of the District's biodiversity 2006-2009', adopted by the Council in 2006.
3. This ECMP provides a scheme of capital and annual management works for the retained and created ecological features within the management site. The

management site can be divided into four distinct but interlinked areas, namely: the Built Development; Hobson's Brook and Associated Features; the Green Corridor (excluding the Bird Mitigation Area); and the Bird Mitigation Area. A plan of the management site, showing the four management areas, is given in Figure 1.

4. The ECMP provides all necessary scientific information, prescriptions and programmes relating to the agreed conservation, enhancement, management and monitoring of habitats and biodiversity. The Plan aims to safeguard the existing ecological value of the site, to enhance the ecology value of the site and to maintain the ecological benefits that will have been achieved.
5. Ecological surveys were undertaken by ecosulis ltd between 2002 and 2006 and reported as part of the Environmental Statement accompanying the planning application. A summary of the surveys, results and assessment is provided in Table 1 below.

Table 1. Ecological Baseline Information for the Management Site

Survey	Results	Assessment (based on a range between Negligible and International value (IEEM 2006))
Extended Phase I Habitat survey	Arable: A Cambridgeshire Biodiversity Action Plan habitat, but poor example on site being heavily managed and typical of wider area	Site value
	Hedgerows: Low number, species-poor and heavily managed. Several hedgerows are 'important' as defined by the Hedgerow Regulations 1997	Local value
	Water bodies: Rivers, streams and standing water and canals feature as habitat types in the UK and Cambridgeshire Biodiversity Action Plans, but poor examples on site being periodically dry, heavily managed ditches Hobson's Brook is a City Wildlife Site	District value
	Woodland/Plantation: Isolated patches of woodland providing habitat and refuge in an otherwise open landscape Long Road Plantation is a City Wildlife Site and is covered by three group Tree Protection Orders (TPOs) Three other plantations occur: One running parallel and adjacent to Hobson's Brook in the north of the site (Plantation I); one approximately equidistant between	District value

	Long Road Plantation in the north and Trumpington Dismantled Railway in the south, this plantation is covered by one group TPO (Plantation 2); and one running parallel and adjacent to the southern half of Trumpington Dismantled Railway County and City Wildlife Site (Plantation 3; refer to Figure 1 for the locations of these plantations)	
	Trumpington Dismantled Railway County and City Wildlife Site: Features neutral grassland habitat, woodland and scrub, and supports common species of reptiles and foraging/commuting bats	District value
Badger (<i>Meles meles</i>) surveys	Two active badger setts and two disused setts. Site likely to be used by badger as foraging and commuting habitat	Local value
Reptile survey	Low and medium sized populations of grass snake (<i>Natrix natrix</i>) and common lizard (<i>Lacerta vivipara</i>) using Trumpington Dismantled Railway and Hobson's Brook corridor	Local value
Bat surveys	Low diversity, but moderate numbers of common species of bats using the site for commuting and foraging, particularly Hobson's Brook corridor Roost sites unknown, but limited suitable habitat present	Local value
Breeding bird surveys	Diverse range of bird species use the site, including good numbers of skylark (<i>Alauda arvensis</i>)	Local to District value
Winter/passage bird surveys	Provides component of winter habitat for large flocks of lapwing (<i>Vanellus vanellus</i>) and golden plover (<i>Pluvialis apricaria</i>)	County value

Water vole (<i>Arvicola terrestris</i>) and otter (<i>Lutra lutra</i>) surveys	Hobson's Brook has records of low numbers of water vole (the Wildlife Trust, 2006, at grid reference TL 455 543) but connecting ditches generally unsuitable. Water vole is a UK and Cambridgeshire Biodiversity Action Plans species No evidence of otter	District value
Great crested newt (<i>Triturus cristatus</i>) survey	No great crested newts recorded on site or known to be present in the vicinity	N/A
Aquatic Invertebrate surveys	Moderate diversity of invertebrates recorded in Hobson's Brook (bullhead (<i>Cottus gobio</i>) fish also recorded)	Local value

NOMENCLATURE

6. The common name and Latin name of flora and fauna species is given in the main text of this ECMP in the first instance, after which only the common name is used. All plant names follow the nomenclature of Stace (1997).

AIMS AND OBJECTIVES OF THE ECOLOGICAL CONSERVATION MANAGEMENT PLAN

AIMS

7. The principal aim of the ECMP is to secure the adoption of a coherent, strategic and integrated approach to management and maintenance, which protects and enhances nature conservation interests within the management site, taking into account the following:
- Relevant Broad Cambridgeshire Biodiversity Action Plan Habitat Action Plans including: Broad-leaved, mixed and yew woodland; built up areas and gardens; rivers and streams; and standing open water and canals. Relevant Local Cambridgeshire Biodiversity Action Plan Habitat Action Plans including: Drainage ditches; parks, shelter belts and open spaces; and ponds. Relevant Priority Cambridgeshire Biodiversity Action Plan Habitat Action Plans including: Ancient and/or species rich hedgerows; chalk rivers; lowland meadows; and lowland calcareous grassland
 - Cambridge City Local Plan 2006, which includes a number of policies relating to nature conservation and biodiversity (for details reference must be made to the policies themselves) including:
 - *4/6 Protection of Sites of Local Nature Conservation Importance*
 - *4/7 Species protection*
 - *4/8 Local Biodiversity Action Plans*
 - *4/14 Pollution and amenity*
 - South Cambridgeshire District Council Local Development Framework, which includes a number of policies relating to nature conservation and biodiversity (for full details reference must be made to the policies themselves) including:
 - *Policy NE/5 Countryside Enhancement Areas – any development which would materially affect a Countryside Enhancement Area will be expected to mitigate its impact, or enhance the area, as part of the planning proposal*

Hobson's Brook falls within the South Cambridgeshire District Council Biodiversity Strategy Countryside Enhancement Area and Wildlife Corridor

OBJECTIVES

8. The objectives of the ECMP have taken the Cambridgeshire Biodiversity Action Plan objectives for the relevant Broad, Local and Priority Habitat Action Plans and planning policies into consideration and are as follows:
- To retain, enhance and ensure establishment of hedgerows, tree belts, and water bodies, and to ensure the establishment of new woodland/plantation and grassland
 - To ensure provision within new and existing habitats for wildlife
 - To protect identified habitat elements of the management site during construction
 - To ensure long-term management of retained and created habitats to maintain quality and offer suitable habitat for wildlife
 - To maximise the longevity and quality of vegetation retained/created within the management site
 - To protect and enhance the nature conservation value of existing and new habitats on the management site and, where appropriate, within the locality generally
 - To fulfil all the legal requirements in relation to the protection, management and enhancement of the ecological features within the management site, in particular, those that relate to nature conservation
 - To ensure provision for target species/groups, including birds, bats, badgers, reptiles and invertebrates
 - To contribute to Cambridgeshire Biodiversity Action Plan targets and strategies, by increasing net biodiversity within the management site
 - To provide a mechanism for monitoring and reviewing the ECMP and the operations contained therein

DESCRIPTION OF MANAGEMENT SITE AND RELEVANCE OF KEY HABITAT COMPONENTS

9. The management site lies to the east of the district of Trumpington, Cambridge and comprises around 108ha. The management site is delineated by Long Road to the north beyond which lies Cambridge, an active railway line to the east and residential housing to the west with arable fields beyond these immediate boundaries to the south and east.
10. Currently the management site consists of large field units, formerly arable habitat, with small woodland/plantation blocks, a number of hedgerows and standing and flowing water within ditches and Hobson's Brook. Hobson's Brook, which crosses the site in a south/north alignment is notable as a chalk brook and notified as a City Wildlife Site. This feature is managed and maintained by the Hobson's Brook Trustees. Trumpington Dismantled Railway, which crosses the site in a south-west/north-east alignment features woodland/plantation, scrub and neutral grassland. The dismantled railway line provides the site of the Cambridge Guided Bus (CGB) route, which falls outside the scope of this ECMP. The woodland/plantation blocks, hedgerows, ditches and Hobson's Brook will be retained within the management site. The relevance of these existing habitats is provided below.

WOODLANDS/PLANTATIONS

11. Woodlands are found throughout Cambridgeshire, their nature and extent varying according to soil type and the influence of past and present management. Woodlands are a highly valued feature of the landscape for biodiversity and as an important recreational and educational resource. Woodlands provide habitat for a range of local wildlife, such as breeding and foraging birds, roosting and foraging bats and invertebrates. The roots of trees overhanging watercourses and lakes can provide shelter for a range of aquatic fauna, such as invertebrates, fish and water vole.
12. Woodlands can be included under national and international designations as Special Areas of Conservation (SAC) and Sites of Special Scientific Interest (SSSI) and local designations, such as County and City Wildlife Sites. Woodlands are included under a number of local and national strategies/policies:
- Working with the Grain of Nature: A Biodiversity Strategy for England (Defra, 2002)
 - The England Forestry Strategy

- 'Woodland for Life' Regional Woodland Strategy for the East of England
 - National Planning Policy Statement 9 (PPS9) and regional policy
13. Trees are distinctive landscape features, which provide an important ecological resource for a range of local wildlife. Mature trees can contain significant amounts of deadwood, which provides suitable habitat for invertebrates and fungi. Trees offer nesting sites for birds and can include features such as splits, cavities and ivy providing suitable roosting sites for bats, which feed on the invertebrates that the trees support.

Existing Habitats

14. The management site contains four areas of woodland/plantation; all lie within the Built Development (refer to Figure 1 for the locations of these plantations). Long Road Plantation City Wildlife Site (covered by three group TPOs) is a narrow shelterbelt, approximately 50m in width, consisting of semi-mature, broad-leaved woodland that separates the Built Development from Long Road to the north. This plantation is dominated by sycamore (*Acer pseudoplatanus*) and features oak (*Quercus* species), ash (*Fraxinus excelsior*), horse-chestnut (*Aesculus hippocastanum*) and wych elm (*Ulmus glabra*). The understorey comprises sycamore saplings, hawthorn (*Crataegus monogyna*), bramble (*Rubus fruticosus* agg.), elder (*Prunus spinosa*), English elm (*Ulmus procera*), holly (*Ilex aquifolium*) and wild privet (*Ligustrum vulgare*). Ivy (*Hedera helix*) is the dominant species in the ground layer and also extends up into the tree canopy. Cow parsley (*Anthriscus sylvestris*), common nettle (*Urtica dioica*), lords-and-ladies (*Arum maculatum*), herb-Robert (*Geranium robertianum*), and scattered patches of bluebell (*Hyacinthoides non-scripta*), and the introduced few-flowered garlic (*Allium paradoxum*) occur in the field layer.
15. The three other areas of woodland include Plantation 1 along Hobson's Brook, Plantation 2 to the west of Plantation 1 (covered by one group TPO) and Plantation 3 along the Trumpington Dismantled Railway. These were planted around 20 years ago and are predominantly broad-leaved, comprising; oak, ash, sycamore, field maple (*Acer campestre*), silver birch (*Betula pendula*) and hazel (*Corylus avellana*) with dog-rose (*Rosa canina*). Aspen (*Populus tremula*) also occurs within Plantation 3 along the Trumpington Dismantled Railway, and alder (*Alnus glutinosa*) within Plantation 1 along Hobson's Brook. Bramble, cow parsley, ivy and common nettle dominate the ground layer of these woodlands.

16. The plantations represent isolated patches of woodland, but they provide important habitat in an otherwise open landscape.

New Habitats

17. Across the management site, patches of tree and shrub planting will occur, for example, adjacent to Hobson's Brook, within the Green Corridor, open spaces within the Built Development and along new roads within the Built Development, primarily along the Spine Road (primary route), and secondary and tertiary routes. Patches of new woodland/plantation blocks are proposed within the Green Corridor adjacent to the active railway line that forms the eastern boundary of the management site. Existing plantations within the Built Development (Long Road Plantation and Plantations 1-3) will be enhanced, including understorey and edge planting to deter access to the plantations and increase structural diversity, and thinning to promote woodland ground flora. Woodland planting mix will consist of existing species forming the canopy within the plantations, including oak, ash and silver birch, with mixed understorey planting comprising some or all of the following species; field maple, hazel, wayfaring-tree (*Viburnum lantana*), yew (*Taxus baccata*), dogwood (*Cornus sanguinea*), blackthorn (*Prunus spinosa*), hawthorn, elder, spindle (*Euonymus europaea*), bramble and holly.
18. Adjacent to roads, tree planting will include silver lime (*Tilia tormentosa*), Oliver's lime (*Tilia oliveri*), white ash (*Fraxinus excelsior*), one-leaved ash (*Fraxinus diversifolia*), black walnut (*Juglans regia*), snake-bark maple (*Acer davidii*), amur maple (*Acer ginnala*), striped maple (*Acer pennsylvanica*), hupeh rowan (*Sorbus hupehensis*) and ornamental apple (*Malus tschnoskii*).

GRASSLAND

19. Relevant Priority Cambridgeshire Action Plan Habitat Action Plans include pastures and meadows. These grasslands have become scarce and fragmented mainly linked to changes in agricultural practices and conversion of pasture to arable land. Unimproved grassland is generally species-rich and supports rich associated assemblages of invertebrates, some of which are rare in the county. Lowland grassland features prominently throughout the SSSI series in Cambridgeshire. The County Structure Plan and district Local Plans include priorities to protect grassland.

Existing Habitats

20. Trumpington Dismantled Railway City Wildlife Site supports neutral grassland habitat (as well as scrub and woodland). Scarce plants such as perennial flax (*Linum*

perenne), which has a Species Action Plan within the Cambridgeshire Biodiversity Action Plan, and spreading hedge-parsley (*Torilis arvensis*; a notable species), have been recorded. Trumpington Dismantled Railway is the site of the CGB and is therefore not included within this ECMP.

21. Small strips of generally species poor grassland occur at the narrow edges of the arable field margins adjacent to the woodland/plantation, hedgerows and ditches. No other grassland habitats currently exist within the management site.

New Habitats

22. In line with objectives of the Cambridgeshire Biodiversity Action Plan to create new areas of neutral grassland, two Landscape and Ecological Mitigation Areas (LEMs) are proposed within the Green Corridor to replace the neutral grassland along Trumpington Dismantled Railway that will be lost as a result of the construction of the CGB. The management of these areas, as well as scrub and woodland along the railway, will be undertaken as part of the CGB development, therefore whilst these areas are provided within the Green Corridor, their management falls outside the scope of this ECMP.
23. Sowing and patch planting of wildflower grassland will occur both within the understorey and on the periphery of the existing plantations, and new tree belts and hedges within the Built Development and within the buffer adjacent to Hobson's Brook. A large area of grassland will be created within the Green Corridor and wet grassland will be created around new water bodies forming part of Sustainable Drainage Systems (SUDS) for the Built Development, notably water body 1 within the Bird Mitigation Area, and water bodies 2 and 3.
24. New grassland will be created within the Built Development in association with the areas of public open space. Amenity grassland will be established adjacent to footways and roads and will be patch planted with a variety of native bulbs. Although these grassed areas will generally be subject to an intensive cutting regime relative to other areas of the management site (Hobson's Brook and Associated Features, the Green Corridor and Bird Mitigation Area) so that these areas can be used for recreation, in places the height of the sward can be varied for aesthetic and nature conservation benefits.

HEDGEROWS

25. Ancient and/or species rich hedgerows are a Priority Cambridgeshire Biodiversity Action Plan Habitat Action Plan. Many hedgerows in Cambridgeshire are not ancient

or species rich. Ancient or species-rich hedgerows tend to be those which support the greatest diversity of plants and animals.

Existing Habitats

26. Hedgerows form a low proportion of the field boundaries within the site. The majority of these hedgerows are species-poor, being dominated by hawthorn and lacking standard trees. The management site has several 'important' hedgerows as defined by the Hedgerow Regulations (1997; either for historical and/or wildlife/landscape value).

New Habitats

27. Existing hedgerows will be incorporated into buffers where no built development will occur. New hedgerows will be established within the Built Development, for example, to define the edges of the plantations (along with scrub planting) and new native planting carried out around the site. New hedgerow planting will consist of native species including some or all of the following; hawthorn, beech, hornbeam, field maple, dogwood, spindle, holly, blackthorn, hazel and elm. The planting mixes will provide all year round interest to users and will provide a species-rich hedgerow network across the management site. Species-rich hedgerows provide shelter and a foraging resource to a wide range of animals including birds, amphibians, reptiles and invertebrates and provide connectivity to similar habitats in the surrounding area.

WATER BODIES AND ASSOCIATED FEATURES

28. Relevant Broad Cambridgeshire Biodiversity Action Plan Habitat Action Plans include rivers and streams and standing open water and canals. Relevant Cambridgeshire Local Habitat Action Plans include drainage ditches and ponds. Relevant Cambridgeshire Priority Habitat Action Plans include chalk rivers.
29. Streams are very important for wildlife and in the UK support some of our most threatened animals, such as water vole, kingfisher (*Alcedo atthis*), white-clawed crayfish (*Austropotamobius pallipes*) and otter, and flora, such as water-crowfoot (*Ranunculus*) species, as well as a diversity of aquatic macrophytes. Chalk streams are vulnerable to a variety of threats including excessive water abstraction, physical modification, pollution and unsympathetic management. Hobson's Brook (chalk stream) forms a major landscape feature through the management site.
30. Ditches and associated bankside vegetation can offer value to ground nesting birds such as corn bunting (*Miliaria calandra*), reed bunting (*Emberiza schoeniclus*) and yellow wagtail (*Motacilla flava*), which have been recorded on site.

Existing Habitats

31. Hobson's Brook is designated a City Wildlife Site as a notable chalk brook and is highlighted in the Cambridge Local Plan as an important wildlife corridor. It is also a designated urban green space. Hobson's Brook Trustees manage and maintain this watercourse and will continue to do so during and after development. Based on survey findings (local Wildlife Trust, 2006), Hobson's Brook supports a low population of water vole. A low number of ditches on site feed into Hobson's Brook.

New Habitats

32. The Green Corridor will support all new water bodies proposed within the management site. In total, four water bodies will be created (1-4 on Figure 1); one of these forms the Bird Mitigation Area (wetland; water body 1) amounting to 5ha in area. Associated features include wet grassland, scrapes, reedbeds and floating islands.
33. The ditches on site will be retained. One ditch within the Green Corridor and ditches within the Built Development will be re-profiled. Re-profiling will aim to improve the local water system, create diversity within the channel and enhanced habitat for wildlife.
34. The design of the water bodies will contribute towards promoting the proliferation of the more sensitive species recorded in the area, primarily wading birds. Species such as water vole and aquatic invertebrates will be protected and where possible, opportunities will be provided to boost numbers, and extend range and subsequent population stability to buffer the effects of elevated levels of disturbance associated with the change in land use of the management site.

MANAGEMENT SITE: MANAGEMENT AREAS AND HABITAT COMPONENTS

35. The four key areas (the Built Development, Hobson's Brook and Associated Features, the Green Corridor and Bird Mitigation Area) making up the management site, comprise a number of separate but interlinked components (refer to Figure 1 for the location of these management areas):

The Built Development

- Plantations
- Amenity spaces
- Community garden
- Tree-lined streets and other tree planting
- Hedges
- SUDS
- Species-specific enhancements

Hobson's Brook and Associated Features

- Hobson's Brook (management and maintenance of the brook will continue to be the responsibility of Hobson's Brook Trustees)
- Buffer (between the brook and Built Development of minimum width 20m)
- Connecting ditch (located within the Green Corridor)
- Crossing points
- Species-specific enhancements

The Green Corridor

- Grassland
- Water bodies (2-4) and associated habitats
- Woodland and trees
- Hedges and scrub
- Allotments

Bird Mitigation Area (including water body 1)

- Water bodies (permanent open water and shallow scrapes)
- Floating islands
- Reedbeds
- Roosting areas
- Footpaths, boardwalks and hides
- Wet grassland
- Shrub-covered bunds

MANAGEMENT PRESCRIPTIONS

36. The management objectives for each area are delivered through each component habitat (or feature). For each habitat, management practices are defined and ongoing management requirements identified for a period of 12 years (the term of this Plan).
37. Species list are provided within the relevant sections of this ECMP, taken from Cambridgeshire County Council's *SUDS Draft Design Guide – Biodiversity*. These species lists should be used as a guide with exact species mixes dependent on site conditions. In some cases this will only be determined once habitat creation, such as new water bodies, has been completed.

THE BUILT DEVELOPMENT

38. The Built Development occupies the western half of the management site, to the west of Hobson's Brook. It comprises residential areas, schools, amenity spaces and retained plantations and hedgerows. The Spine Road, which is aligned north/south through the site, forms the primary access road, linking the CGB in the south to Long Road in the north.

General Management Objectives for the Built Development

39. This part of the management site primarily has amenity function with pockets of green spaces provided across the area linked by linear features, such as tree-lined streets, hedges with buffers, and the plantations. Ecological management objectives within these areas are:
- To maximise the ecological value of green spaces taking into account their predominant amenity function, for example, by sensitive management and promoting deadwood habitats where health and safety allows

- To ensure that new and existing features continually offer a habitat resource for wildlife
- To manage hedgerows and trees to develop landscape connectivity and to enhance their value for associated species
- To protect and enhance existing tree and woodland habitat (plantations) within the Built Development
- To maintain the screening value of the plantations and new trees and their contribution to the structure of the Built Development
- To ensure ongoing ecological monitoring and reactive management

Plantations

40. Four plantations occur within the Built Development; these are Long Road Plantation and Plantations 1-3. For details of all capital and annual works relating to these features reference must be made to CBA Trees reports (reference CBA7113wmpSep2008Railway02 for Plantation 3, referred to in CBA Trees report as Disused Railway Plantation, and reference CBA7113wmpSep2008JnctLongRd01 for Long Road Plantation). These reports are in response to planning conditions 13 and 15 of the outline permission. A summary of management prescriptions and consideration to ecology is provided below. The management strategy for the plantations is for a 25-year period.

Management Objectives

41. The principal objectives for the plantations with respect to ecology are:
- To ensure the integrity and inherent value of these features is not compromised
 - To ensure satisfactory establishment and development of new planting
 - To ensure that the choice of species within the woodland/woodland edge planting mixes (i.e. native species characteristic of the region using stock of local provenance where possible) enhances the wildlife value of the plantations and subsequently the Built Development
 - To minimise disturbance on the plantations from adjacent land uses

Capital Works

42. For the plantations, capital works are for years one to five of the overall 25-year management strategy. The following will be undertaken in the first five years:

- Tree felling in areas affected by access (Spine Road)
 - Re-planting in cleared areas
 - Planting of understorey and edges
 - Replacing losses of new planting, as required
 - Removal of dominant ivy cover by 50%
 - Selective thinning of approximately 15% of plantation
 - Health and safety inspections
43. Where tree felling is required, an ecologist will first survey the area to assess any potential considerations with regard to protected species, namely bats, badgers and nesting birds, prior to felling. Further surveys may be required prior to works to fully assess status of species and to provide recommendations to ensure compliance with current legislation.
44. Re-planting will comprise pedunculate oak (*Quercus robur*) and ash to form the canopy with holly, guelder-rose, hazel, rowan (*Sorbus aucuparia*), field maple and hawthorn forming the shrub layer. Scrub/shrub planting will be carried out immediately adjacent to the woodland edges to reinforce the boundaries and deter public access (other than via public footpaths). The scrub planting will enhance the value of the woodland edges as foraging habitat for bats and birds as well as Badger, providing a mosaic of open and closed vegetation. Scrub will provide the transition between woodland and adjacent grassland habitat through a gradation of vegetation from mature trees to shrubs/scrub and grass sward. The wider spacing of re-planting (between 2.5m for shrub planting and 5m for canopy planting) will maximise wildlife value, allowing a more diverse ground flora to establish.
45. Rough grassland strips will be retained along the woodland edges amongst the shrub planting. Currently of low species diversity, sowing of native and locally-sourced wildflower/grass seed mixes will enhance the botanical interest, which in turn will increase invertebrate biomass and subsequent foraging value to species such as bats and birds already known to use the woodlands, and also provide habitat for reptiles.
46. Ivy is dominant in the ground layer and extends into the shrub and canopy layer. Whilst ivy is considered to provide habitat for wildlife, its current dominance within Long Road Plantation, in particular, lowers this value with other plant species being out-competed and tree vigour potentially compromised. Ivy will be removed in stages throughout the Long Road Plantation during capital works, so that not all of

this habitat will be removed at once. Prior to removal, an ecologist will first survey the area to assess any potential considerations with regard to protected species, namely bats and nesting birds, prior to removal.

47. Prior to any construction works protective chestnut paling fencing will be erected around the plantations within the Built Development. Where works fall within close proximity to the plantations, fencing will be in accordance with BS5837: 2005 Trees in Relation to Construction. Fencing will incorporate appropriate buffers, where required. Signs will inform construction workers of these protected no-go areas. All site storage and compounds will be located at a minimum distance of 30m from protective fencing.
48. Elsewhere, native planting of local provenance will occur across the Built Development, in the form of woodland/shrub blocks and tree belts, incorporating understorey and edge planting, hedgerows and shrub planting to create a mosaic of habitats and provide structural diversity.
49. Bat and bird boxes will be placed in suitable positions within the plantations (see section on 'Species Specific Enhancements' below for details).

Timing of Capital Works

50. Surveys prior to tree felling/ivy removal will be undertaken between May and September and ensuring sufficient time is allowed to mitigate for any impacts as a result of the works. Tree felling and ivy removal will be undertaken between November and February, where possible.
51. Protective fencing around retained and new features will be installed prior to the construction phase.
52. All planting will be undertaken, where possible, at the appropriate time of year (November to February) to maximise success of establishment.

Annual Works

General Management Techniques

53. The plantations will be managed in accordance with multi-disciplinary advice from arboricultural, landscape and ecological specialists to maximise biodiversity and wildlife value. Areas will vary as to their treatment. The overall aim will be to encourage a diverse structural and species mix that provides a wildlife corridor between adjacent habitat patches and provides high quality habitat in its own right.

54. Within the interior of the plantations every effort will be made to secure and enhance the wildlife value of the woodland habitat by ensuring a range of species at various stages of maturity. At the plantation edges there will be an overriding management objective to secure the retention of the trees that are in a safe and healthy condition due to their proximity to the Built Development and areas of recreational space.
55. Deadwood will be retained within the plantations and piled up underneath the main canopy to create invertebrate habitat and shelter for small mammals. Brash will be removed off site as this has a low wildlife value and the excessive piling of cut material could compromise the value of the woodland understory and field layer species.
56. All management involving tree removal and remedial arboricultural works to trees will be carried out to BS5837: 2005 by experienced contractors following an assessment of the trees by a suitably qualified ecological advisor to identify any risks to protected species. Modification of the works to avoid risk to bats, or further bat surveys, may be required for works to continue. Bat surveys will be undertaken at the optimal time of year, which is between May and September.

Remedial Works

57. During remedial works, consideration will be given to maintaining standing and ground based deadwood. Arisings from management will be used to create log piles in sites to suit reptiles, invertebrates and lower plants.
58. For newly planted trees, all poorly established and dead trees will be replaced. Where remedial pruning/general tree works are required, for health and safety reasons, appropriate protected species surveys will be undertaken prior to works.
59. Weed growth may need to be removed on an annual basis. Depending on the type and extent of weed growth, a suitable herbicide will be used or strimming will be undertaken.
60. During years one to five of the ECMP, bat boxes installed on retained trees will be checked annually by a licensed bat surveyor and maintenance/replacement will be undertaken as necessary. Bird boxes will be checked and maintenance/replacement will be undertaken as necessary.

Timing of Management

61. Tree management will be carried out between November and February to avoid the bird breeding season, which is March to August inclusive. Where essential works occur within that timeframe, appropriate assessment by an experienced ecologist will be carried out to ensure no nesting birds are present or would be disturbed by works.
62. Bat surveys of trees prior to management works will be undertaken between May and September and should bats be present, tree works will be undertaken in September to November, following appropriate mitigation.

Monitoring

63. Annual health and safety checks will be undertaken of the plantations. More detailed inspections will be undertaken every five years and will include a survey of the diversity of the shrub and ground layers. These inspections will inform subsequent management.

Amenity Spaces

64. Amenity spaces occur across the Built Development primarily in the form of public open spaces. These spaces comprise primarily amenity grassland with tree and shrub planting.

Management Objectives

65. The management objectives for the new amenity spaces are as follows:
 - To take measures to promote establishment of a diverse sward (e.g. a variety of lengths), where appropriate
 - To maintain a diverse sward which provides visual and biodiversity interest and attractiveness throughout the year
 - To maintain an open character with single specimen trees set within grassland to provide a parkland quality
 - To provide areas for recreation
 - To prevent the encroachment of the shrub and scrub into the grasslands
 - To instigate long term management including suitable cutting regimes and organic approach where possible

Capital Works

Grassland

66. The *amenity grassland* will be sown with DLF PRO070 multi-purpose amenity mix, sown at 35 g/m², and will be patch planted with a variety of native bulbs including snowdrop and grape-hyacinth. Along the fringes of amenity grassland, longer-edge zones will be left, where appropriate.

Tree and Shrub Planting

67. Native planting of local provenance will occur within the amenity spaces, in the form of tree and shrub blocks, to create a mosaic of habitats and provide structural diversity, where appropriate to do so; the overriding aim for amenity spaces is to create and maintain an open character with single specimen trees set within grassland to provide a parkland quality.
68. The planting will comprise standard trees, feathered trees and shrubs, introduced into areas of ameliorated topsoil, using topsoil arising from the excavations on the management site. Best practice horticultural techniques will be used in the planting of these trees and shrubs. When appropriate mulch mats or gravel will be used around the trees and shrubs to maintain a weed free area around each plant within these new woodland areas and tree belts. Only where essential will chemicals be used to suppress weed growth, which will be a Natural England approved glyphosate-based product.

Timing of Capital Works

69. New grassland and tree/shrub habitats will be created following each phase of construction to avoid damage to these new features. Appropriate protective fencing, where required, will protect new and existing features during the construction works.

Annual Works

General Management Techniques - Grassland

70. To protect vegetation and associated fauna, the use of weed killer and other chemicals will be kept to a minimum. Spot removal of weeds and invasive species will be carried out by hand, where possible, if removal is necessary.
71. Within suitable areas of amenity grassland, for example, adjacent to hedgerows and woodland/plantation and tree belts, longer edge zones will be left, where possible, to create varied height and structure to the grass sward.

72. All cuttings will be removed from the grassland areas to prevent smothering of wildflower seedlings and to prevent nutrient build up, which can encourage competitive species. Where possible cuttings will be used to create grass piles elsewhere on site, such as within the buffers adjacent to the hedgerows and woodland/plantation and tree belts, to offer potential nesting sites for grass snake (and habitat for other wildlife).

General Management Techniques – Tree and Shrub Planting

73. Subsequent to the initially intensive maintenance the new trees and shrubs will require the following general management works:
- Maintenance of rabbit guards and other forms of protection
 - Maintenance of good levels of soil fertility
 - Maintenance of adequate levels of soil moisture which may require irrigation during dry periods
 - Maintenance of any stakes and ties
 - Removal of guards, stakes and ties at appropriate times
 - Treatment of pests and diseases
 - Formative pruning to avoid future structure problems and to remedy disease
74. Shrub and tree planting will be managed in accordance with multi-disciplinary advice from arboricultural, landscape and ecological specialists to maximise amenity, biodiversity and wildlife value. Areas will vary as to their treatment. The overall aim will be to encourage a diverse structural and species mix that provides a wildlife corridor between adjacent habitat patches and provides high quality habitat in its own right.
75. Whilst every effort will be made to secure and enhance the wildlife value of tree and shrub planting by ensuring a range of species at various stages of maturity, because of the primary function of green spaces for amenity, there will be an overriding management objective to secure the retention of the trees that are in a safe and healthy condition.
76. All management involving tree removal and remedial arboricultural works to trees will be carried out to BS5837: 2005 by experienced contractors.

Remedial Works - Grassland

77. Following establishment, grassland may require periodic supplementary sowing. This will be undertaken using the same species mixes as used during initial sowings.
78. All management involving tree removal and remedial arboricultural works to trees will be carried out to BS5837: 2005 by experienced contractors.
79. Should herbicide be required for the establishment of new grassland, then these will be restricted to a glyphosate approved by Natural England and the Environment Agency as suitable for use near water bodies. Guidelines for the use of herbicides on weeds in or near to water bodies will be followed (refer to PB2289; MAFF, 1995).

Remedial Works – Tree and Shrub Planting

80. For newly planted trees, all poorly established and dead trees will be replaced. Where remedial pruning/general tree works are required, for health and safety reasons, appropriate bat surveys, as necessary, will be undertaken prior to works.

Timing of Management - Grassland

81. Amenity grassland will be cut regularly as required to maintain a close cropped sward. Longer edge zones will be cut annually in September.

Timing of Management – Tree and Shrub Planting

82. Tree management will be carried out between November and February to avoid the bird breeding season, which is March to August inclusive. Where essential works occur within that timeframe, appropriate assessment by an experienced ecologist will be carried out to ensure no nesting birds are present or would be disturbed by works.
83. Bat surveys of trees prior to management works will be undertaken between May and September and should bats be present, tree works will be undertaken in September to November, following appropriate mitigation.

Monitoring

84. No monitoring is proposed for the amenity grassland areas or amenity tree and shrub planting. Regular inspections of amenity green spaces will be undertaken as part of health and safety and general site maintenance.

Community Garden

85. The Community Garden lies adjacent to Hobson's Brook and Plantation 3 (Trumpington Disused Railway Plantation), connecting these two features. From the

Community Garden there is a crossing point over the brook leading into the Green Corridor. No capital works are proposed for this feature as part of this ECMP, but general management principles have been suggested below, subject to agreement with any Community Garden association/society.

General Management Principles

86. The following broad management measures will be promoted and discussed with any Community garden association/society:
- Organic approach to management restricting/prohibiting the use of chemical pesticides and fertilisers
 - Provision of minimum 10% area of Community Garden for orchard with planting of native fruit trees and hazel
 - Variations in cutting/mowing regime and rotation cuts of grassland to promote structural diversity
 - Consideration to the installation of species specific enhancements, such as bat and bird boxes and refuges for reptiles, amphibians and invertebrates

Tree-lined streets and Other Tree Planting

87. Individual and groups of nursery stock trees will be established within the Management Site. Primarily new tree planting will occur along the main Spine Road through the site (primary route), along secondary and tertiary streets throughout the built development and along the CGB (groups of trees will also be planted within areas of open space, within the Community Garden and Hobson's Brook buffer west of the brook (refer to previous and subsequent sections of this ECMP for further details)).
88. The primary role of the tree planting is to give an immediate sense of maturity and quality to the core of the development and act as a "green foil" to the proposed built forms. Specimen trees or groups of trees will also be used to create focal points, provide enclosure, form features within the landscape and to direct views and vistas.
89. The tree planting will enhance aerial continuity across the site for foraging and commuting bats. It will also encourage bats and birds to fly higher above the roads reducing the likelihood of road kill.
90. Tree planting within the development will also provide shade and shelter for amenity use.

Management Objectives

91. The management objectives for the new tree planting are as follows:
- To ensure the satisfactory establishment and development of the new trees within the Built Development
 - To ensure the safe and healthy survival of the planted trees by the implementation of sound arboricultural management and maintenance in accordance with Health and Safety and Operational Requirements
 - Ensure that the choice of species enhances the wildlife value of the Built Development

Capital Works

92. The planting of the new trees and tree groups throughout the development will be subject to a high standard of specification during the implementation of the works. Tree planting complies with Local Authority guidance and will include:

- Spine Road (primary route); Single signature species, silver lime
- Secondary Streets; primary species include Oliver's lime, white ash, one-leaved ash and black walnut
- Tertiary Streets; primary species include snake-bark maple, amur maple, striped maple, hupeh rowan and ornamental apple

The Cambridgeshire Landscape Guidelines (Cambridgeshire County Council, no date given) has been considered in the species list selections.

93. The following work will be undertaken during the first three years after planting to ensure the satisfactory establishment and development of the trees:
- Maintenance of adequate levels of soil moisture
 - Maintenance of good levels of soil fertility
 - Provision of rabbit guards, stakes and ties as necessary
 - Maintenance of any stakes and ties
 - Treatment of pests and diseases
 - Formative pruning to avoid future structure problems and to remedy disease
94. Where any new tree plantings fail to establish well, measures will be taken to resolve any underlying problems.

95. Where screening is a particular requirement, spacing will be selected to ensure good screening effect and to facilitate the healthy development of the better higher grade trees. Where screening is not a particular requirement, spacing will be selected to allow sufficient light into plantings in order to enable the development of a good shrub and field layer.
96. Where a screening effect is not required and good establishment has been achieved, the density of trees and shrubs will be reduced to enable a good field layer to develop. Where there is potential for a good field layer, but the flora is poor, pot grown plants (native woodland species of local provenance) will be considered to supplement and enrich the ground flora.
97. Where new tree planting takes place in areas of particular sensitivity to wildlife, such as plantation areas and along hedgerows, the trees will be maintained in order to promote the wildlife interest of the Built Development.

Timing of Capital Works

98. All planting will be undertaken, where possible, at the appropriate time of year (November to February) to maximise success of establishment.

Annual Works

General Management Techniques

99. Subsequent to the initially intensive maintenance the new trees will require the following general management works:
- Maintenance of rabbit guards and other forms of protection
 - Maintenance of good levels of soil fertility
 - Maintenance of adequate levels of soil moisture which may require irrigation during dry periods
 - Maintenance of any stakes and ties
 - Removal of guards, stakes and ties at appropriate times
 - Treatment of pests and diseases
 - Formative pruning to avoid future structure problems and to remedy disease
100. Trees will be managed in accordance with multi-disciplinary advice from arboricultural, landscape and ecological specialists to maximise biodiversity and wildlife value. Areas will vary as to their treatment. The overall aim will be to

encourage a diverse structural and species mix that provides a wildlife corridor between adjacent habitat patches and provides high quality habitat in its own right.

- I01. Whilst every effort will be made to secure and enhance the wildlife value of the trees by ensuring a range of species at various stages of maturity, there will be an overriding management objective to secure the retention of the trees that are in a safe and healthy condition.
- I02. All management involving tree removal and remedial arboricultural works to trees will be carried out to BS5837: 2005 by experienced contractors following an assessment of the trees by a suitably qualified ecological advisor to identify any risks to bats. Modification of the works to avoid risk to bats, or further bat surveys, may be required for works to continue. Bat surveys will be undertaken at the optimal time of year, which is between May and September.

Remedial Works

- I03. Arisings from management will be used to create log piles in sites to suit reptiles, invertebrates and lower plants, to retain the wood biomass on site.
- I04. All poorly established and dead trees will be replaced. Where remedial pruning/general tree works are required, for health and safety reasons, appropriate bat surveys will be undertaken prior to works.

Timing of Management

- I05. Tree management will be carried out between November and February to avoid the bird breeding season, which is March to August inclusive. Where essential works occur within that timeframe, appropriate assessment by an experienced ecologist will be carried out to ensure no nesting birds are present or would be disturbed by works.
- I06. Bat surveys of trees prior to management works will be undertaken between May and September and should bats be present, tree works will be undertaken in September to November, following appropriate mitigation.

Monitoring

- I07. Annual health and safety inspections of all trees within the management site, as deemed appropriate, will be carried out with reactive management as required.

Hedges

108. Existing hedges will be retained and new hedges will be established across the site adjacent to roads, amenity areas, the plantations, and to demarcate property boundaries.

Existing hedges will be protected within 10m wide buffers, where possible.

Management Objectives

109. The management objectives for new and existing hedgerows are as follows:
- To establish and maintain the new hedgerows in a healthy condition
 - To develop the wildlife habitat value of the hedgerows, for example, to enhance connectivity and foraging functions of the hedgerows for commuting bats and reptiles
 - To traditionally manage the hedgerows to develop their structure and integrity and enhance their appearance as landscape features

Capital Works

110. Prior to any construction works protective chestnut paling fencing will be erected around all retained hedgerows and associated buffers on the management site. Where works fall in close proximity to these features, fencing will be in accordance with BS5837: 2005 Trees in Relation to Construction. Signs will inform construction workers of these protected no-go areas. All site storage and compounds will be located at a minimum distance of 30m from the protective fencing.
111. Existing species-poor hedgerows will be augmented to maximise their ecological value and to provide enhanced habitat for bird, bat and invertebrate communities.
112. All planting will use species characteristic of the local area. Species will include a combination of some or all of the following species; hawthorn, blackthorn, elder, holly, guelder-rose, dog-rose, hazel and field maple.

Timing of Capital Works

113. Protective chestnut paling fencing will be erected around all retained hedgerows prior to any works commencing on site and incorporating appropriate buffers, where required.
114. Where possible, augmentation planting will be undertaken prior to or in the early stages of the construction phase, however, this will only occur where there is no risk of damage to new planting from indirect effects, such as dust pollution.

115. All planting will be undertaken, where possible, at the appropriate time of year (November to February) to maximise success of establishment.

Annual Works

General Management Techniques

116. Where practicable, traditional methods of management such as hedge-laying, hand-trimming and coppicing, will be implemented.
117. General hedgerow management practices will aim to benefit hedgerow biodiversity. This will be achieved by using some, and where appropriate, all of the following techniques (adapted from English Nature, 2002):
- Hedgerows will be cut on a rotational basis so that some heavily fruiting structures are always present. Where possible, only a small proportion of the total length of a hedge will be managed at any one time
 - Coppicing and hedge-laying will be used to manage hedgerows that become gappy or lack dense branches at their base
 - If the size of a hedgerow needs to be restricted, one side will be cut, leaving the other side and the top of the hedgerow uncut
 - Flails will be avoided as a cutting technique where possible. Reciprocating bar cutters will be used where there are larger sections of hedgerows, which need to be cut, such as along roadsides
 - Hedges will be trimmed to 'A shaped' or 'topped A shaped', which improves hedge viability and potential for wildlife
 - Hedgerow management will take place at the appropriate time of year in order to take into account the varying interests of wildlife
118. Lengthening the time between hedge cutting can enhance the foraging resource by increasing the production of hard and soft mast. The first growth of a hedge should be laid and then allowed to grow freely so that flowers and fruit are produced and not removed by trimming.
119. Traditional management techniques will be used where possible, and trimming will be kept to a minimum to encourage varied structure, which provides a greater availability of habitats, food and refuge.

120. The use of chemicals near to hedgerows and adjacent areas of vegetation will be avoided where possible to prevent loss of species richness of the hedgerows.

Remedial Works

121. During remedial works, consideration will be given to maintaining standing and ground based deadwood. Arisings from management will be used to create log piles in sites to suit reptiles and a wide range of invertebrates and lower plants.
122. Should herbicide be required for the establishment of new planting, then these will be restricted to a glyphosate approved by Natural England and the Environment Agency as suitable for use near water bodies. Guidelines for the use of herbicides on weeds in or near to water bodies will be followed (refer to PB2289; MAFF, 1995).

Timing of Management

123. Hedge management will be carried out outside of the bird breeding season, which is March to August inclusive. Where essential works occur within that timeframe, an experienced ecologist will carry out a check of vegetation to ensure no nesting birds are present or would be disturbed by works.

Monitoring

124. During the construction phase, inspection of hedgerows will be undertaken four times annually to assess effects of construction and to inform reactive management.
125. Annual monitoring of hedgerows will continue for the term of the Plan (12 years) and will be undertaken in April/May when woodland ground flora is visible.

SUDS

126. SUDS will be used where practicable throughout the Built Development to provide source control, to reintroduce water into the subsoil, to improve water quality, to reduce flood risk and to support biodiversity. Existing ditches to the west of Hobson's Brook will form part of SUDS for the site (refer to the SUDS Drainage Strategy for the site for detailed information).
127. The preferred hierarchy for SUDS is as follows:
- Harvesting using rainwater utilizing water butts
 - Permeable surfacing with infiltration/ storage blankets to driveways, private roads and parking areas. Overflow will be to the piped network
 - Shallow vegetated swales to be used as a conveyance and storage mechanism where space is adequate such as verges and open spaces

- Existing ditches as flood protection and water quality facility
- Dry detention basins/wet ponds as final flood protection and water quality facility

128. The latter point refers to the attenuation ponds (water bodies 1-4), which form part of the Green Corridor. Management of these features for biodiversity is dealt with in subsequent sections below.

Management Objectives

129. The overriding aim of management of the vegetated swales/ditches within the Built Development will be to ensure their continued function as part of SUDS for the site. However, these features provide opportunity for biodiversity enhancements. The primary management objective for these features with respect to biodiversity is:

- To develop the wildlife habitat value of the ditches/swales without impeding their function as SUDS

Capital Works

130. The new swales will be designed, where practicable, following Cambridge City Council's *SUDS Draft design guide – Biodiversity*, incorporating where possible the following features:

- Soft profiling
- Vegetated channel with planting to follow guidance in Cambridge City Council's *SUDS Draft design guide – Biodiversity* document, with emergent plants, such as yellow iris (*Iris pseudacorus*), floating sweet-grass (*Glyceria fluitans*), water-plantain (*Alisma plantago-aquatica*) and common club-rush (*Schoenoplectus lacustris*). Natural generation of aquatic plants will be favoured, but plug planting in groups of 5-10, to create stands may be required

Timing of Capital Works

131. The timing of the creation of new swales will be dependent in part on the drainage requirements of the Built Development as each plot is sold off for development. Where possible, the water bodies will be created prior to or in the early phases of construction of the Built Development to ensure maintenance of the existing drainage pattern.

Annual Works

General Management Techniques

132. No introductions of fish, crayfish or plants into the ditches/swales will be permitted, as any non-native species could pose a risk to ecology.
133. To protect marginal vegetation, the use of weed killer and other chemicals will be avoided where possible with spot removal of weeds and invasive species carried out by hand, where practicable to do so.
134. Where possible rotational management will be carried out. Every third year sections of the ditches/swales will be cleared, where necessary, and by hand (or by mechanical means) and vegetation will be left to re-grow naturally to promote species diversity. Prior to clearance operations an ecological survey of the ditches/swales will be undertaken to ensure protection and mitigation, as appropriate, can be put in place prior to works commencing.
135. All maintenance operations will comply with health and safety legislation, and all necessary risk assessments will be undertaken prior to any works.
136. Key management operations will include (taken from Cambridge City Council's *SUDS Draft design guide – Biodiversity*):
- Litter and debris removal - Litter and rubbish will be removed from the ditches/swales as part of on-going management of the site, as necessary
 - Cleaning of inlets and outlets to prevent blockages
 - Management of marginal vegetation and aquatic vegetation –

The spread of any invasive, exotic species will be monitored and controlled by hand to ensure the growth of other species is not suppressed
 - Regular monitoring of sediments, together with removal and disposal if required: Silt/debris accumulation will be removed on a minimum three-year rotational basis by either mechanical or manual means. All debris will be removed to appropriate licensed tips
137. Prior to any major works, Cambridge City Council, Cambridge County Council and the Environment Agency will be consulted to ensure correct methods are used and any relevant licences obtained.

New Species Specific Enhancements

138. New species specific enhancements will be provided across the Built Development, including the provision of bat roosting features, bird nesting habitat, refugia/hibernacula for reptiles/amphibians and deadwood habitats for invertebrates.

Management Objectives

139. Management will aim to ensure that features continually offer a habitat resource for the target species. These specific provisions in combination with the new and existing habitats aim to boost species populations, particularly those susceptible to disturbance (reptiles, bats, birds and amphibians), to a stable and sustainable level.
- To ensure the continuity of habitat features for target species
 - To enhance the existing population of target species/species groups, for example, bats, birds and reptiles
 - To contribute towards maintaining viable populations of target species, such as reptiles, and to prevent isolation of species through habitat fragmentation which would result in increased likelihood of local extinction
 - To contribute to local and national biodiversity targets

Capital Works

140. Bird ledges and bird and bat boxes will be provided throughout the Built Development within the plantations, Community Garden and new builds. This will consist of 20 bird boxes and 20 bat boxes within each plantation (Long Road Plantation and Plantations 1-3) and five bat boxes and five bird boxes within the Community Garden (subject to agreement with any association/society). Bird nesting and bat roosting features will be installed on one in every 30 buildings (houses, garages and other buildings). These features will be designed for use by a range of species.
141. Reptile and amphibian hibernacula will be provided in the form of log piles in the plantation understorey (four will be provided within each plantation) and along existing retained hedges (two will be provided within each hedge).
142. A plan of the location of species-specific enhancements, along with details of design specifications, will be provided once these features have been installed, along with a 'conditions checklist', to assist future monitoring.

Timing of Capital Works

143. Habitat creation will be phased in accordance with the construction works. Deadwood will be created in undisturbed areas away from the works, and bat and bird boxes will be installed as early on in the construction as possible without exposing new habitats to disturbance. Other features will be installed within new builds and will not be available until completion of the works.

Annual Works*Monitoring*

144. During the construction phase, inspection of habitats supporting the new species specific features will be undertaken annually to assess effects of construction and to inform reactive management.
145. For years one to five of the term of the plan, annual checks will be made of the bat boxes to determine their use by bats. Regular inspections of the roost sites will be undertaken. It is anticipated that the annual long-term monitoring of the bat boxes will be assigned to a local bat conservation group in conjunction with the Community Garden Association.
146. Annual checks will be carried out of bird nest boxes prior to the nesting season and any damaged boxes will be replaced.
147. Reptile hibernacula will be monitored annually for years one to five of the plan to ensure their condition remains favourable. Should the refuges show signs of water logging, these will be carefully dismantled during the summer months and re-created in suitable locations elsewhere. Habitat piles will be removed if there is a risk of fire through vandalism.

HOBSON'S BROOK AND ASSOCIATED FEATURES

148. The brook forms a significant landscape feature through the site and offers habitat for a range of wildlife including reptiles, invertebrates, bats and birds. The brook is a City Wildlife Site, Cambridgeshire Biodiversity Action Plan habitat and an important wildlife corridor. The brook forms the boundary between the Built Development to the west and the Green Corridor and Bird Mitigation Area to the east. On the western side, between the Built Development and the brook, will be a minimum 20m wide buffer where no built development will occur. Landscape features and management will be prescribed to ensure the continued primary function of this strip of land as a buffer to protect the brook from the direct and indirect effects of

the development. Management and maintenance of the brook will continue to be the responsibility of Hobson's Brook Trustees.

General Management Objectives for Hobson's Brook

149. Objectives for management include:

- To minimise risk of elevated levels of disturbance associated with the Built Development
- To adhere to the Environment Agency's Pollution Prevention Guidelines 'Works in, near or liable to affect watercourses' and to undertake managing and monitoring of the brook throughout the construction period

Hobson's Brook

Capital Works

150. Prior to works commencing, protective fencing will be erected to protect the brook from disturbance during construction. This fencing will be positioned along the outer edge of the buffer adjacent to the Built Development (i.e. 20m from the left bank). The fencing will be accompanied by appropriate signage. Site storage and compounds will be located at a minimum distance of 30m from the brook.

151. Prior to works directly affecting the channel and banks, for example, the new crossing points across the brook, a water vole survey will be undertaken of the brook (refer to section on 'Crossing Points' below for further information).

Timing of Capital Works

152. Protective fencing will be erected along the outer edge of the buffer prior to works commencing on site to ensure a no-go area is maintained for the duration of the works.

Annual Works

Monitoring

153. During the construction phase, an inspection of Hobson's Brook will be undertaken four times annually to assess effects of construction and to inform reactive management.

Buffer

154. The buffer forms a linear strip of land between the brook and the Built Development. In the north of the site (north of the crossing point of Trumpington Dismantled Railway), the buffer consists of plantation (Plantation I). To the south,

the buffer will consist of a mosaic of grassland, scrub and trees, to offer habitat to wildlife as well as amenity function and a visual screen to the development.

Management Objectives

155. Management objectives for the buffer are:

- To ensure maintenance of the protective function of the brook to reduce the effects of the Built Development
- To provide a wildlife habitat in its own right
- To minimise disturbance to habitats within the buffer as a result of low key recreational activities
- To instigate long-term management, including suitable cutting regimes and an organic approach
- To incorporate all management objectives detailed in this ECMP for proposed new component habitats (trees, scrub and grassland) and existing component habitats (grassland and plantations)

Capital Works

156. Prior to construction works, protective fencing will be erected along the edge of the buffer to demarcate a no-go area for site workers and machinery. This fencing will be positioned along the outer edge of the buffer adjacent to the Built Development (i.e. 20m from the left bank). The fencing will be accompanied by appropriate signage. Site storage and compounds will be located at a minimum distance of 30m from the brook.

157. The buffer will consist of a gradation of vegetation from grass at the top of the banks (except adjacent to crossing points where scrub will be planted), to scrub and trees towards the outer edge of the buffer. Native planting of local provenance will occur within the buffer to the south of the crossing point of the Trumpington Dismantled Railway, in the form of tree and shrub/scrub blocks, to create a mosaic of habitats and provide structural diversity. Trees will comprise native willows (crack-willow (*Salix fragilis*) and goat willow (*Salix caprea*) and alder. Shrub planting will be consistent with understorey shrub planting within the plantations, for example, holly, guelder-rose, hazel, rowan, field maple and hawthorn will be used. Scrub/shrub planting will be carried out immediately adjacent to existing and new crossing points over the brook (refer to section on 'Crossing Points' below for further details). The scrub planting will enhance the value of the buffer as a foraging habitat for bats and

birds as well as Badger, providing a mosaic of open and closed vegetation. Scrub will provide a gradation of vegetation from mature trees to shrubs/scrub and grass sward.

158. A more formal treatment to the Hobson's Brook buffer south of the CGB crossing point may be established, which would incorporate occasional groups of native shrubs to allow glimpses into the Green Corridor from the built development frontage. Occasional formal groups of quaking aspen (*Populus tremula*) may be established along this section of the buffer.
159. Best practice horticultural techniques will be used in the planting of trees and shrubs. When appropriate mulch mats or gravel will be used around the trees and shrubs to maintain a weed free area around each plant within these new woodland areas and tree belts.
160. Patches of wildflower grassland will be created across the buffer. New grassland will provide species and structural diversity above that currently present and offer habitat and feeding opportunities for local wildlife, such as invertebrates, foraging mammals, reptiles and amphibians. This will consist of wet and neutral grasslands.
161. Grassland species mix adjacent to the banks of the brook and within 2m of the top of the banks will be of a mix to benefit water vole by including foodplants, such as sedges, reed canary-grass (*Phalaris arundinacea*) and bur-reeds (*Sparganium* species).
162. Log piles, sourced using material from the management site (for example, from tree management works), will be created within the buffer to provide refuge and hibernacula for reptiles, amphibians and invertebrates.

Timing of Capital Works

163. Habitats within the buffer will be created during the early stages of the development. Appropriate protective fencing will protect new and existing features during the construction works.

Annual Works

General Management Techniques - Grassland

164. To protect vegetation and associated fauna, the use of weed killer and other chemicals will be prohibited within the buffer. Spot removal of weeds and invasive species will be carried out by hand where removal is necessary.

165. Once the sward has established, the grassland within the buffer will be cut once a year in late autumn. The grass cuttings will be used to create grass piles away from the banks of the brook to offer suitable nesting site for reptiles.
166. The grassland will be edged with a mown strip (approximately 45cm wide) where it abuts formal hard areas or paths (for example cycle paths) and unpaved informal pathways to create a neat visual transition from formal to more naturalistic areas and to reinforce the message to residents that these areas are being managed and are not unmanaged 'wasteland'.

General Management Techniques – Tree and Shrub Planting

167. Subsequent to the initially intensive maintenance the new trees and shrubs will require the following general management works:
- Maintenance of rabbit guards and other forms of protection
 - Maintenance of good levels of soil fertility
 - Maintenance of adequate levels of soil moisture which may require irrigation during dry periods
 - Maintenance of any stakes and ties
 - Removal of guards, stakes and ties at appropriate times
 - Organic treatment of pests and diseases
 - Formative pruning to avoid future structure problems and to remedy disease
168. Shrub and tree planting will be managed in accordance with multi-disciplinary advice from arboricultural, landscape and ecological specialists to maximise amenity, biodiversity and wildlife value. Areas will vary as to their treatment. The overall aim will be to encourage a diverse structural and species mix that provides a wildlife corridor between adjacent habitat patches and provides high quality habitat in its own right.
169. Whilst every effort will be made to secure and enhance the wildlife value of tree and shrub planting by ensuring a range of species at various stages of maturity, permissive access may be provided into the buffer for low key recreational activities, therefore, there will be an overriding management objective to secure the retention of the trees that are in a safe and healthy condition.
170. All management involving tree removal and remedial arboricultural works to trees will be carried out to BS5837: 2005 by experienced contractors.

Remedial Works - Grassland

171. Following establishment, grassland may require periodic supplementary sowing. This will be undertaken using the same species mixes as used during initial sowings.
172. Should herbicide be required for the establishment of new grassland, then these will be restricted to a glyphosate approved by Natural England and the Environment Agency as suitable for use near water bodies. Guidelines for the use of herbicides on weeds in or near to water bodies will be followed (refer to PB2289; MAFF, 1995).

Remedial Works – Tree and Shrub Planting

173. All poorly established and dead trees will be replaced. Where remedial pruning/general tree works are required, for health and safety reasons, assessment by an ecologist prior to works will be undertaken.

Timing of Management - Grassland

174. The cutting regime for areas of grassland will involve strimming the grassland in late autumn (November) with cuttings used to create grass piles away from the banks of the brook. Cutting the grassland in late autumn will allow the sward to become tall and will enable flowering plants to set seed. It will also avoid the risk of injury to amphibians and reptiles, which could occur if cutting took place during their active season (April to September).
175. The shorter edges to the grassland will be mown approximately every two weeks between April to September but this is dependent on weather and the growing conditions.

Timing of Management – Tree and Shrub Planting

176. Tree management will be carried out between November and February to avoid the bird breeding season, which is March to August inclusive. Where essential works occur within that timeframe, appropriate assessment by an experienced ecologist will be carried out to ensure no nesting birds are present or would be disturbed by works.
177. Bat surveys of trees prior to management works will be undertaken between May and September and should bats be present, tree works will be undertaken in September to November, following appropriate mitigation.

Monitoring

178. During the construction phase, monitoring of the buffer and component habitats will be undertaken four times annually to assess effects of construction and to inform reactive management. Annual monitoring will continue for the term of the Plan (12 years) and will be undertaken in June/July.

Connecting Ditch

179. In order to improve drainage and develop the wildlife habitat, one ditch, which feeds into Hobson's Brook from the east, will be enhanced. This ditch flows east to west from the active railway line along the eastern boundary of the management site (i.e. east of the Green Corridor), through the Green Corridor in the northern half, before flowing into the brook.

Management Objectives

180. Objectives for management include:
- To maintain, and where possible, enhance the ditch
 - To develop the wildlife habitat value of the ditch
 - To adhere to the Environment Agency's Pollution Prevention Guidelines 'Works in, near or liable to affect watercourses' and to undertake managing and monitoring of the ditch throughout the construction period
 - To provide appropriate, organic and long-term management of the ditch

Capital Works

181. Prior to works commencing within the Green Corridor (for example, pond creation and planting), the ditch will be protected with appropriate fencing and signage, incorporating a 5m wide buffer either side of the ditch.
182. The ditch will be re-profiled to enhance drainage function, improve connectivity for wildlife and create diversity in channel flow, thus providing additional opportunities for wildlife. Prior to any works commencing on the ditch, a survey for water voles will be undertaken. In the unlikely event that water voles are discovered to be using this ditch, ecological advice will be sought before the commencement of works with regard to appropriate courses of action for maintaining the population.
183. The profile of the ditch will be made to vary and will be of suitable depth to prevent marginal aquatic vegetation from drying out too quickly as a result of sediment or litter build up. Marginal planting will be undertaken, where appropriate, along 30m

section of the banks within every 100m, with the remaining sections of banks left to colonise naturally. Planting will include the following species (following Cambridge City Council's *SUDS Draft design guide – Biodiversity*); branched bur-reed (*Sparganium erectum*), lesser bulrush, common club-rush (*Schoenoplectus lacustris*), yellow iris, floating sweet-grass, lesser pond-sedge (*Carex acutiformis*), water-plantain, reed sweet-grass (*Glyceria maxima*) and marsh speedwell (*Veronica scutellata*) as plugs in groups of 5-10 to create stands.

184. Log piles, sourced using material within the management site (for example, from tree management works within the plantations), will be created along the ditch to provide refuge and hibernacula for reptiles, amphibians and invertebrates.

Timing of Capital Works

185. Prior to re-profiling works commencing, a water vole survey will be undertaken of the ditch. This will be carried out between April and October leaving suitable time to mitigate for any impacts should this species (and other species, such as reptiles) be recorded. Re-profiling of the ditch will be undertaken in the winter months.
186. Appropriate protective fencing around the ditch will be in place prior to habitat creation works within the Green Corridor commencing.

Crossing Points

187. Within the site boundary, there are two existing crossing points over Hobson's Brook and three new crossing points.

Management Objectives

188. Objectives for management include:
- To ensure maintenance of connectivity along the brook
 - To ensure minimal disturbance to the brook at crossing points

Capital Works

189. Where practicable, crossing points will be designed to span the brook, so that the brook and 1m of the bank either side is retained to allow wildlife access beneath. Either side of the brook, the crossing points will allow for headroom of 600mm.
190. Prior to the construction of the crossing points a survey of the brook will be undertaken, primarily to survey for signs of water voles. Should water vole burrows be found in the vicinity of the proposed crossing points, then ecological advice will

be sought before the commencement of works with regard to appropriate courses of action.

191. To minimise disturbance to wildlife at the locations of the crossing points, prickly shrub species, such as bramble, hawthorn and blackthorn, will be planted up to 5m either side of the crossing points, along both banks and extending to 2m from the top of the banks, subject to maintenance access not being impeded and subject to agreement with the Hobson's Brook Trustees. This planting will aim to provide dense cover for wildlife whilst deterring domestic animals from the banks of the brook. This will assist in maintaining the value of the brook as a corridor and foraging resource for wildlife.

Timing of Capital Works

192. The survey of the brook for water voles (and other fauna) will be carried out between April and October and allowing suitable time to mitigate for any impacts should water voles be recorded.
193. Planting either side of the crossing points will be undertaken, where possible, between November and February.

Annual Works

General Management and Remedial Works

194. Inspections and maintenance of the crossing points will be undertaken alongside general highway and public access maintenance.
195. Passage for wildlife beneath the crossing points will be kept clear at all times to maintain connectivity along the brook during any works.
196. Scrub planting will be monitored to ensure spread along the banks is restricted to within 5m either side of the crossing points to maintain the generally open character of the channel.

Timing of Management

197. Unless health and safety precludes it, general management and remedial works will be undertaken at a time of year when disturbance to the brook and associated features and species is minimised (i.e. during the winter months).

Monitoring

198. During the construction phase, monitoring of the crossing points will be undertaken four times annually in conjunction with monitoring of the brook. Annual monitoring

of the crossing points will continue for the term of the Plan (12 years) in conjunction with monitoring of the brook.

Species-specific Enhancements

199. Enhancement features tailored to the specific requirements of target species will be created within the buffer. This linear feature through the management site, in combination with the brook, will have important functions as temporary habitat during migration and as permanent habitat. Enhancement features will add to the value of existing and new habitats further promoting use of this feature by wildlife.

Management Objectives

200. The management objectives for the new species specific enhancements are to ensure that features continually offer a habitat resource for the target species. These specific provisions, in combination with the new and existing habitats, aim to boost species populations, particularly those susceptible to disturbance, to a stable and sustainable level.
201. The principal species-specific management objectives are:
- To ensure the continuity of habitat features for target species
 - To maintain and enhance, where appropriate, existing populations of target species/species groups e.g. aquatic invertebrates, reptiles, amphibians, bats, birds and water vole
 - To retain a viable population of target species and to prevent isolation of species through habitat fragmentation which would result in increased likelihood of local extinctions
 - To contribute to local and national biodiversity targets

Capital Works

202. Reptile and amphibian hibernacula and refuges will be provided in the form of log and rubble piles, sourced using material from the management site (for example, from tree management works), within the 20m buffer adjacent and to the west of the brook. Two hibernacula/refuges will be provided for every 100m length of the buffer.
203. Crossing points will be designed to allow wildlife passage beneath, for example, badgers, and other species that may colonise the brook in the future, for example, otters (not recorded along the brook but known to be present in the wider area;

refer to section on 'Crossing Points' above for further details on the specification of the crossing points). Adjacent to these crossing points, dense scrub planting will deter access to the brook at these points, aiming to minimums disturbance to sensitive in-channel and bank habitats, whilst providing additional cover for wildlife adjacent to the brook.

204. Bat and bird boxes will be provided on existing trees along the brook corridor, for example, along the eastern edge of plantation I.
205. A plan of the location of species-specific enhancements, along with details of design specifications, will be provided once these features have been installed, along with a 'conditions checklist', to assist future monitoring.

Timing of Capital Works

206. New species specific enhancements will be undertaken along the brook and buffer prior to construction works commencing. This will aim to provide higher quality habitat above that which currently exists to ensure sufficient habitat is available for any displaced species from the Built Development.

Annual Works

General Management Techniques

207. General management for species specific enhancements will follow a minimal intervention approach.
208. It is not envisaged that in-channel planting will be undertaken, but should monitoring of the brook deem this appropriate, Cambridge City Council's *SUDS Draft design guide – Biodiversity*, will be used to guide planting lists.

Monitoring

209. During the construction phase, inspection of habitats supporting the new species specific features will be undertaken four times annually to assess effects of construction and to inform reactive management.
210. Reptile and amphibian hibernacula will be monitored annually during years one to five of the 12-year management term, to ensure their condition remains favourable. Should the refuges show signs of water logging, these will be carefully dismantled during the summer months and re-created in suitable locations elsewhere within the buffers. Habitat piles will be removed if there is a risk of fire through vandalism.

211. Bat boxes will be monitored annually for years one to five of the 12-year management term to assess use by bats and to make repairs, as appropriate. Bird boxes will be checked annually in winter.

THE GREEN CORRIDOR

212. The Green Corridor occupies around 43ha of land. It incorporates the Bird Mitigation Area and Hobson's Brook, which, for the purpose of this ECMP, have been considered separately (refer to 'Hobson's Brook' section above and 'Bird Mitigation Area' section below). The overall aim of the Green Corridor in relation to ecological conservation is:

- To recognise sensitive features, namely Hobson's Brook, with appropriate buffer zones
- To provide ecological connections to the countryside beyond
- To provide various SUDS for ecological enhancements
- To provide a range of ecological habitats to be incorporated and managed to promote biodiversity

Grassland

213. Grassland forms the majority of the Green Corridor, consisting of amenity grassland (playing fields primarily in the northern half of the Corridor) and species-rich grassland (occurring in the southern half and adjacent to water bodies 1 and 3 (water body 1 forms part of the Bird Mitigation Area; refer to section below)). Species-rich grassland is considered in this ECMP.

Management Objectives

214. The management objectives for species-rich grassland within the Green Corridor are as follows:
- To maximise the diversity of the grassland flora and value for associated fauna, namely birds
 - To control undesirable herbaceous species
 - To prevent the encroachment of woodland and scrub into the grassland
 - To instigate long-term management, including suitable cutting regimes and an organic approach

- To ensure visual attractiveness and recreational benefit whilst minimising disturbance to grassland habitat

Capital Works

215. Species-rich grassland will be created across the Green Corridor, primarily to the east of the Bird Mitigation Area. This will comprise smaller areas of higher quality habitat than is currently provided by the dominant arable habitat on site. New grassland will provide species and structural diversity above that currently present and offer habitat and feeding opportunities for local wildlife, namely birds, invertebrates, foraging mammals, reptiles and amphibians. Patch sowing of species will include (refer to Cambridge City Council's *SUDS Draft design guide – Biodiversity* for recommended percentage cover of species); red fescue (*Festuca rubra*), sweet vernal-grass (*Anthoxanthum odoratum*), crested dog's-tail (*Cynosurus cristatus*), quaking-grass (*Briza media*), tufted hair-grass (*Deschampsia cespitosa*), selfheal (*Prunella vulgaris*), yellow-rattle (*Rhinanthus minor*), meadowsweet (*Filipendula ulmaria*), meadow vetch (*Lathyrus pratensis*), common bird's-foot-trefoil (*Lotus corniculatus*), hairy sedge (*Carex hirta*), black knapweed (*Centaurea nigra*), ribwort plantain (*Plantago lanceolata*), silverweed (*Potentilla anserina*) and common sorrel (*Rumex acetosa*).
216. Planting in the damp zone (up to 250mm above anticipated normal water level) around water body 3 will comprise inundation-tolerant species as plugs (as opposed to seed) in groups of 5-10. Referring to Cambridge City Council's *SUDS Draft design guide – Biodiversity*, species will include marsh-marigold (*Caltha palustris*), reed canary-grass (*Phalaris arundinacea*), brooklime (*Veronica beccabunga*), wild angelica (*Angelica sylvestris*), purple loose-strife (*Lythrum salicaria*), gypsywort (*Lycopus europaeus*), water forget-me-not (*Myosotis scorpioides*), fool's-water-cress (*Apium nodiflorum*), ragged-robin (*Lychnis flos-cuculi*), water dock (*Rumex hydrolapathum*), water mint (*Mentha aquatica*), cuckooflower (*Cardamine pratensis*), lesser spearwort (*Ranunculus flammula*), jointed rush (*Juncus articulatus*), cyperus sedge (*Carex pseudocyperus*), marsh woundwort (*Stachys palustris*) and water figwort (*Scrophularia auriculata*).

Timing of Capital Works

217. New grassland will be created during the course of the construction period.

Annual Works

General Management Techniques

218. To protect vegetation and associated fauna, the use of weed killer and other chemicals will not be used within areas of species-rich grassland. Spot removal of weeds and invasive species will be carried out by hand where removal is necessary.
219. General management will aim to maintain a mosaic of different structures within the sward. Where practicable, the grassland will primarily be maintained as medium height sward (20cm to 40cm), with patches of bare ground (covering less than 10% of the total grassland area) and tussocks of taller grass (up to 20% cover of total grassland area) and longer edge zones adjacent to the boundaries of the grassland and around patches of scrub and tree/woodland planting.
220. All cuttings will be removed from the grassland areas to prevent smothering of wildflower seedlings and to prevent nutrient build up, which can encourage competitive species. Cuttings will be used to create grass piles elsewhere within the Green Corridor, such as within hedges, woodland and scrub, to offer potential nesting sites for grass snake (and habitat for other wildlife).

Remedial Works

221. Following establishment, grassland may require periodic supplementary sowing. This will be undertaken using the same species mixes as used during initial sowings.
222. Should herbicide be required for the establishment of new grassland, then these will be restricted to a glyphosate approved by Natural England and the Environment Agency as suitable for use near water bodies. Guidelines for the use of herbicides on weeds in or near to water bodies will be followed (refer to PB2289; MAFF, 1995).

Timing of Management

223. Species-rich grassland will be cut once annually in September.

Monitoring

224. During the construction phase, inspection of grassland habitats will be undertaken four times annually.
225. Annual monitoring of grassland habitats and assessment of diversity will continue for the term of the Plan (12 years). This will be undertaken in June/July prior to cutting and when the majority of grasses and forbs are flowering.

Water Bodies

226. The Green Corridor will support the drainage strategy (SUDS) for the Built Development. This comprises four water bodies (1-4; refer to Figure 1. The 'Bird Mitigation Area' section below includes water body 1).

Management Objectives

227. The management objectives for the water bodies (2-4) and associated features within the Green Corridor are as follows:
- To develop the wildlife habitat value of the water bodies
 - To establish reedbeds, which are a Cambridgeshire Biodiversity Action Plan habitat, contributing towards targets to increase the extent of this habitat in the County
 - To adhere to the Environment Agency's Pollution Prevention Guidelines 'Works in, near or liable to affect watercourses' and to undertake managing and monitoring of the water bodies throughout the construction period
 - To provide appropriate, organic and long-term management of water bodies

Capital Works

228. Water bodies 2-4 will be designed following Cambridge City Council's *SUDS Draft design guide – Biodiversity*, where practical to do so, incorporating some, and where possible, all of the following features:
- Soft profiling and sinuous outline
 - Maintenance of dry, damp and wet zones
 - Length to width ratio of between 3:1 and 5:1
 - Water depths should not exceed 2m with average depth of 1.2m
 - Wedge-shaped layout to ponds to aid flow and sedimentation
 - Natural regeneration will be favoured but where planting is required, planting schemes will use locally sourced seed/plants characteristic of the local area (following species lists provided in Cambridge City Council's *SUDS Draft design guide – Biodiversity*). Invasive aquatic and emergent species (for example, water lily *Nymphaea* species, common reed *Phragmites australis* and bulrush *Typha latifolia*) will not be used

229. Reedbed habitat will be created along the margins of water bodies 2 and 3, with lesser bulrush as the dominant constituent. Not more than one-third of the water's edge will comprise reedbed habitat, allowing other emergent plants, such as yellow iris, floating sweet-grass, water-plantain and common club-rush, to become established. Natural generation of aquatic plants will be favoured, but plug planting in groups of 5-10, to create stands may be required.
230. A minimum of four hibernacula/refugia per water body (for example log piles) will be created around the water bodies to provide refuge and hibernacula for reptiles, amphibians and invertebrates.
231. A plan of the location of species-specific enhancements (in this case the hibernacula/refuges), along with details of design specifications will be provided once these features have been installed, along with a 'conditions checklist' to assist future monitoring.

Timing of Capital Works

232. The timing of the creation of new water bodies (SUDS) will be dependent in part on the drainage requirements of the Built Development. Where possible, the water bodies will be created prior to or in the early phases of construction of the Built Development.

Annual Works

General Management Techniques

233. No introductions of fish, crayfish or plants into the water bodies will be permitted, as any non-native species could pose a risk to ecology. No feeding of any waterfowl will be permitted, including ducks and Canada geese.
234. To protect marginal vegetation, the use of weed killer and other chemicals will not be used. Spot removal of weeds and invasive species will be carried out by hand where removal is necessary.
235. The management of the water bodies will be carried out in rotation. Every third year sections of the water bodies will be cleared, where necessary, and by hand (or by mechanical means) and vegetation will be left to re-grow naturally to promote species diversity. Prior to clearance operations a survey for water vole will be undertaken, to ensure appropriate protection and mitigation, as appropriate, can be put in place prior to works commencing.

236. All maintenance operations will comply with health and safety legislation, and all necessary risk assessments will be undertaken prior to any works.
237. Deadwood and other organic material naturally occurring within the water bodies will be allowed to accumulate unless they pose a risk to the primary function of the water bodies as SUDS for the development. The only regular management will be the removal of any litter and rubbish.
238. Key management operations will include (taken from Cambridge City Council's *SUDS Draft design guide – Biodiversity*):

- Litter and debris removal - Litter and rubbish will be removed from the ponds as part of on-going management of the site, as necessary
- Cleaning of pond inlets and outlets to prevent blockages
- Management of marginal vegetation and aquatic pond vegetation, and associated bankside planting –

Maintenance of open and shaded sections of the ponds: In ponds with a permanent water area a minimum of one-third open water will be maintained. Periodic maintenance will ensure the ponds do not become choked with accumulating plant debris and emergent vegetation. No more than one third of the permanent water area of each pond will be cleared during a single operation and management will be undertaken on a rotational basis

Success of aquatic plant colonisation: Once established, a healthy, diverse and vigorous growth of aquatic and bankside vegetation will be maintained. Should planting be required to augment natural colonisation of the ponds, native locally sourced species will be used. The spread of any invasive, exotic species will be monitored and controlled by hand to ensure the growth of other species is not suppressed

- Regular monitoring of pond sediments, together with removal and disposal if required: Silt/debris accumulation will be removed on a minimum three-year rotational basis by either mechanical or manual means. All debris will be removed and where appropriate used to create habitat piles close to the water bodies. Where this is not possible, arisings will be removed to appropriate licensed tips

239. Prior to any silt removal, statutory bodies (for example, the Environment Agency) will be consulted to ensure correct methods are used and any relevant licences obtained.

Remedial Works

240. Marginal and aquatic vegetation will not be allowed to cover more than two thirds of the surface of the water bodies (no more than one-third will be reedbed). Vegetation removed from the water bodies will be left on the banks for a period of 48 hours, to allow any aquatic fauna present to return to the pond. The vegetation will then be removed from the site. A survey of the water bodies will be undertaken prior to any remedial works, to assess whether protected species require protection and mitigation.
241. Should herbicide be required for the establishment of new planting, then these will be restricted to a glyphosate approved by Natural England and the Environment Agency as suitable for use near water bodies. Guidelines for the use of herbicides on weeds in or near to water bodies will be followed (refer to PB2289; MAFF, 1995).
242. It is possible that algal blooms may occur under certain weather conditions. Some algal blooms are severely toxic to animals (such as dogs) and humans. Different types of algal bloom require different methods of control. For example, filamentous algae can be removed by raking and leaving the algae to rest on the bank for 24 hours to allow invertebrates to escape back into the water before removal off site. Advice should be sought from experienced contractors. No chemical treatments will be used.

Timing of Management

243. General maintenance and remedial works will be undertaken in the winter months following surveys of the affected water bodies for protected species. Surveys will be undertaken between April and October.

Monitoring

244. During the construction phase, inspection of water bodies will be undertaken four times annually to assess the effects of construction and to inform reactive management.

245. The water bodies within the Green Corridor will be monitored annually for the duration of the Plan (12 years) to assess their condition. Monitoring will consider the following:
- Success of aquatic plant colonisation
 - Maintenance of open and shaded sections of the water bodies
 - Water quality
 - Water vole and aquatic invertebrate presence
246. Aquatic flora will aid the assessment, where appropriate, based on the tolerance/preference of certain species for enriched or clean water.

Woodland and Trees

247. Patches of woodland and individual trees will feature across the Green Corridor. Primarily these will occur adjacent to the boundaries, for example, alongside the active railway line forming the eastern boundary of the Corridor, adjacent to sections of Trumpington Dismantled Railway, adjacent to Hobson's Brook along the western boundary and the new water bodies, and adjacent to the CGB (the latter is not dealt with in this ECMP).

Management Objectives

248. The management objectives for woodlands and trees within the Green Corridor are as follows:
- To protect and enhance existing tree and woodland habitat
 - To ensure satisfactory establishment and development of the new woodland and trees
 - To maintain the screening value of the woodland and trees
 - To protect and enhance the habitat value of the woodland and trees
 - To promote deadwood habitat
 - To ensure that the choice of new species enhances the wildlife value of the management site and is consistent with the surrounding habitats

Capital Works

249. Prior to any construction works within the Green Corridor, protective chestnut paling fencing will be erected around all retained woodland and trees. Tree protection will be in accordance with BS5837: 2005 Trees in Relation to

- Construction, where works fall in close proximity to trees. Signs will inform construction workers of these protected no-go areas. All site storage and compounds will be located at a minimum distance of 30m from protective fencing.
250. Native planting of local provenance will occur across the Green Corridor, in the form of woodland and trees, incorporating understorey and edge planting, hedgerows and shrub planting to create a mosaic of habitats and provide structural diversity.
251. The woodland and tree planting will comprise standard trees, feathered trees, forest transplants and whips and shrubs, introduced into areas of ameliorated topsoil, using topsoil arising from the excavations within the Built Development and Green Corridor. Best practice horticultural techniques will be used in the planting of these trees and shrubs. When appropriate mulch mats or gravel will be used around the trees and shrubs to maintain a weed free area around each plant within these new woodland areas and tree belts. Only where essential will chemicals be used to suppress weed growth, which will be a Natural England approved glyphosate-based product.
252. The woodland planting will contain oak and ash with holly, guelder-rose, hazel, rowan, field maple and hawthorn forming the shrub layer. The scattered 3m spacing of small groups (3 to 5) of the same species will eventually provide a natural looking stand.
253. Where the tree belts are in close proximity to the water bodies, 2.5m to 3m high alder, downy birch, and ash standards will be planted with varying spacing of 2.5m to 4m in groups of ten to 20. In addition to the standard trees, feathered trees 1.75m to 2.50m high of downy birch and aspen with 2m spacing in groups of ten to 20. Understorey planting will consist of field maple, dogwood, hazel, blackthorn, guelder-rose, grey willow (*Salix cinerea*) and goat willow from 0.4m to 0.8m high with 0.5m to 2m spacing in groups of 25 to 75. The various sizes of trees and shrubs in proximity to water bodies will be distributed evenly.
254. The following work will be undertaken during the first three years after planting to ensure the satisfactory establishment and development of the trees and shrubs:
- Maintenance of adequate levels of soil moisture
 - Maintenance of good levels of soil fertility
 - Provision of rabbit guards, stakes and ties as necessary

- Maintenance of any stakes and ties
 - Organic treatment of pests and diseases
 - Formative pruning to avoid future structure problems and to remedy disease
255. Where any new tree plantings fail to establish well, measures will be taken to resolve any underlying problems.
256. Where screening is a particular requirement, spacing will be selected to ensure good screening effect and to facilitate the healthy development of the better higher grade trees. Where screening is not a particular requirement, spacing will be selected to allow sufficient light into plantings in order to enable the development of a good shrub and field layer.
257. Where a screening effect is not required and good establishment has been achieved, the density of trees and shrubs will be reduced to enable a good field layer to develop. Where there is potential for a good field layer, but the flora is poor, pot grown plants (native woodland species of local provenance) will be planted to supplement and enrich the ground flora.
258. Where new tree planting takes place in areas of particular sensitivity to wildlife, such as within the species-rich grassland areas, adjacent to the water bodies and along Trumpington Dismantled Railway, the trees will be maintained in order to promote the wildlife interest of the Green Corridor.

Timing of Capital Works

259. Protective chestnut paling fencing will be erected around all retained woodland and trees prior to any works commencing within the Green Corridor and incorporating appropriate buffers, where required. Where possible, planting will be undertaken prior to or in the early stages of construction of the Built Development, however, this will only occur where there is no risk of damage to new planting from indirect effects, such as dust pollution.
260. All planting will be undertaken, where possible, at the appropriate time of year (November to February) to maximise success of establishment.

Annual Works

General Management Techniques

261. Subsequent to the initially intensive maintenance new woodland and trees will require the following general management works:

- Maintenance of rabbit guards and other forms of protection
 - Maintenance of good levels of soil fertility
 - Maintenance of adequate levels of soil moisture which may require irrigation during dry periods
 - Maintenance of any stakes and ties
 - Removal of guards, stakes and ties at appropriate times
 - Organic treatment of pests and diseases
 - Formative pruning to avoid future structure problems and to remedy disease
262. The woodland and trees will be managed in accordance with multi-disciplinary advice from arboricultural, landscape and ecological specialists to maximise biodiversity and wildlife value. Areas will vary as to their treatment. The overall aim will be to encourage a diverse structural and species mix that provides a wildlife corridor between adjacent habitat patches and provides high quality habitat in its own right.
263. Deadwood arising from tree management works will be retained within the woodland areas and piled up underneath the main canopy to create invertebrate habitat and shelter for small mammals. Brash will be removed off site as this has a low wildlife value and the excessive piling of cut material could compromise the value of the woodland understory and field layer species. Arboreal ivy will not be removed from a tree unless it threatens the growth and life of the tree.
264. All management involving tree removal and remedial arboricultural works to trees will be carried out to BS5837: 2005 by experienced contractors following an assessment of the trees by a suitably qualified ecological advisor to identify any risks to protected species, namely bats. Modification of the works to avoid risk to bats, or further bat surveys, may be required for works to continue. Bat surveys will be undertaken at the optimal time of year, which is between May and September.

Remedial Works

265. During remedial works, consideration will be given to maintaining standing and ground based deadwood. Arisings from management will be used to create log piles in sites to suit reptiles, invertebrates and lower plants.
266. For newly planted trees, all poorly established and dead trees will be replaced. Where remedial pruning/general tree works are required, for health and safety reasons, appropriate bat surveys will be undertaken prior to works.

Timing of Management

267. Tree management will be carried out between November and February to avoid the bird breeding season, which is March to August inclusive. Where essential works occur within that timeframe, appropriate assessment by an experienced ecologist will be carried out to ensure no nesting birds are present or would be disturbed by works.
268. Bat surveys of trees prior to management works will be undertaken between May and September and should bats be present, tree works will be undertaken in September to November, following appropriate mitigation.

Monitoring

269. During the construction phase, inspection of woodland and trees will be undertaken four times annually to assess establishment and any effects of construction and to inform reactive management.
270. Annual monitoring of woodland and trees will continue for the term of the Plan (12 years) and will be undertaken in April/May when woodland ground flora is visible.

Hedges and Scrub

271. The Green Corridor will support approximately 1.5km of new hedges and patches of scattered scrub associated with the hedges, woodland and trees. Primarily the hedges will function to delineate the boundaries of amenity areas in the north of the Green Corridor, and the allotments.

Management Objectives

272. The management objectives for hedges and scrub within the Green Corridor are as follows:
- To traditionally manage the hedges to develop their structure and integrity
 - To develop the wildlife habitat value of the hedges
 - To develop the wildlife habitat of scrub
 - To contribute to the overall 'green link' or 'corridor' function of the Green Corridor

Capital Works

273. All planting will use species characteristic of the local area. Hedges will consist of some or all of the following species; hawthorn, blackthorn, hazel, elder, dogwood, spindle, dog-rose and bramble. All hedgerow plants will be fitted with transparent

spiral guards and biodegradable mulch mats and mulched to a minimum depth of 75mm.

274. Scrub will be planted in patches across the grassland, adjacent to new woodland and along the fringes of the Green Corridor. Scrub will comprise hawthorn, blackthorn and bramble.

Timing of Capital Works

275. All planting will be undertaken, where possible, at the appropriate time of year (November to February) to maximise success of establishment.

Annual Works

General Management Techniques

276. Where practicable, traditional methods of management such as hedge-laying, hand-trimming and coppicing, will be implemented.
277. General hedgerow management practices will aim to benefit hedgerow biodiversity. This will be achieved by using some, and where appropriate, all of the following techniques (adapted from English Nature, 2002):
- Hedgerows will be trimmed at three yearly intervals at most and maintained at a height of at least 2m, except where road safety and access precludes it
 - Hedgerows will be cut on a rotational basis so that some heavily fruiting structures are always present. Where possible, only a small proportion of the total length of a hedge will be managed at any one time
 - A proportion of the hedgerows throughout the management site will be left to grow for at least seven to ten years
 - Coppicing and hedge-laying will be used to manage hedgerows that become gappy or lack dense branches at their base
 - If the size of a hedgerow needs to be restricted, one side will be cut, leaving the other side and the top of the hedgerow uncut
 - Flails will be avoided as a cutting technique where possible. Reciprocating bar cutters will be used where there are larger sections of hedgerows, which need to be cut, such as along roadsides
 - Hedges will be trimmed to 'A shaped' or 'topped A shaped', which improves hedge viability and potential for wildlife

- Hedgerow management will take place at the appropriate time of year in order to take into account the varying interests of wildlife
278. Lengthening the time between hedge cutting can enhance the foraging resource by increasing the production of hard and soft mast. The first growth of a hedge should be laid and then allowed to grow freely so that flowers and fruit are produced and not removed by trimming.
279. Traditional management techniques will be used where possible, and trimming will be kept to a minimum to encourage varied structure, which provides a greater availability of habitats, food and refuge.
280. The use of chemicals near to hedgerows and adjacent areas of vegetation will be avoided where possible to prevent loss of species richness of the hedgerows.

Remedial Works

281. During remedial works, consideration will be given to maintaining standing and ground based deadwood. Arisings from management will be used to create log piles in sites to suit reptiles and a wide range of invertebrates and lower plants.
282. Patches of scrub within the grassland will not be allowed to exceed 5% cover (approximately). Should 5% scrub cover be reached this will trigger management of scrub clearance, to prevent encroachment and subsequent loss of grassland.
283. Should herbicide be required for the establishment of new planting, then these will be restricted to a glyphosate approved by Natural England and the Environment Agency as suitable for use near water bodies. Guidelines for the use of herbicides on weeds in or near to water bodies will be followed (refer to PB2289; MAFF, 1995).

Timing of Management

284. Hedge management will be carried out outside of the bird breeding season, which is March to August inclusive. Where essential works occur within that timeframe, an experienced ecologist will carry out a check of vegetation to ensure no nesting birds are present or would be disturbed by works.

Allotments

285. The Allotments site lies immediately to the north of the Bird Mitigation Area within the Green Corridor. No capital works are proposed for this feature as part of this ECMP, but general management principles are suggested below, subject to agreement with any allotment society.

General Management Principles

286. The following broad management measures will be applied to the Allotment site (subject to agreement with the local allotment society):
- Organic approach to management restricting/prohibiting the use of chemical pesticides and fertilisers
 - Retention and maintenance of a minimum wide long grassy verge around the perimeter of the Allotment site
 - Variations in cutting/mowing regime and rotation cuts of grassland to promote structural diversity
 - Consideration to the installation of species specific enhancements, such as bat and bird boxes and refuges for reptiles, amphibians and invertebrates

BIRD MITIGATION AREA

287. The Bird Mitigation Area forms part of the Green Corridor, covering 5ha of land. It has been designed specifically with the target bird species in mind, namely golden plover and lapwing, to compensate for the loss of winter farmland habitat. The Bird Mitigation Area will consist of an area of permanent open water (water body I) and a series of shallow scrapes and wet grassland.
288. Of fundamental importance in maximising potential use of the Bird Mitigation Area by these birds, is to ensure minimal visual and noise disturbance from low key recreational activities and from the adjacent Built Development.

Management Objectives for the Bird Mitigation Area

289. The overall aim of management of the Bird Mitigation Area is:
- To provide a smaller area of high quality habitats for the target bird species (lapwing and golden plover), including habitats that can be exploited by these birds at different times of the year
 - To provide habitat for other bird species, such as ducks, coots, moorhen, wagtails and sedge warblers
 - To enhance the heterogeneity of the landscape by providing seasonal/permanent wetland combined with the surrounding arable landscape

- To contribute to Cambridgeshire Biodiversity Action Plan targets (migratory and wintering wildfowl and wading birds are recognised as a group requiring action in the Arable Land Local Habitat Action Plan)
- To consider the sensitive bird species present with all management works undertaken following specialist advice from an ornithologist

Water Bodies

290. An area of permanent open water (water body 1) will be maintained. This will be around 1.9ha in size. The volume of the water body will be 18,000 m³. Shallow scrapes and hollows will be created within the upper limits of the area of inundation, to provide temporary pools.

Management Objectives

291. The management objectives for the water body and shallow scrapes and hollows:
- To offer permanent and temporary aquatic habitat to birds and their invertebrate prey (as well as other species)
 - To maintain and develop the wildlife habitat value of the water bodies
 - To adhere to the Environment Agency's Pollution Prevention Guidelines 'Works in, near or liable to affect watercourses' and to undertake managing and monitoring of the water bodies throughout the construction period
 - To provide appropriate, organic and long-term management of water bodies

Capital Works

292. Water body 1 will be designed primarily with the target bird species in mind, but will also follow Cambridge City Council's *SUDS Draft design guide – Biodiversity*, incorporating the following features:
- Soft profiling and sinuous outline
 - Maintenance of dry, damp and wet zones
 - Length to width ratio of between 3:1 and 5:1
293. Additional features include:
- Creation of reedbed habitat
 - Creation of floating islands
 - Wet grassland

- Roosting areas (floating islands and wet grassland)
294. Features for recreational and amenity value include:
- Footpaths, boardwalks and bird hides
 - Strategically positioned shrub-covered bunds
295. The permanent area of water (water body 1) lies adjacent to Hobson's Brook, but will be separated from it by a planted bund (for screening). This will slow natural colonisation of the water body; therefore to aid establishment and maturation of the water body, and to aid oxygenation, submerged and floating vegetation will be planted as individual plants (with weights), to include (referring to Cambridge City Council's *SUDS Draft design guide – Biodiversity*); fennel pondweed (*Potamogeton pectinatus*), broad-leaved pondweed (*Potamogeton natans*), shining pondweed (*Potamogeton lucens*), spiked water-milfoil (*Myriophyllum spicatum*), rigid hornwort (*Ceratophyllum demersum*), unbranched bur-reed (*Sparganium emersum*) and fan-leaved water-crowfoot (*Ranunculus circinatus*).

Timing of Capital Works

296. The water bodies within the Bird Mitigation Area will be created in the early phases of construction of the Built Development.

Annual Works

General Management Techniques

297. No introductions of fish, crayfish or plants into the water bodies will be permitted, as any non-native species could pose a risk to ecology. No feeding of any waterfowl will be permitted, including ducks and Canada geese. There will be no access to the water's edge except via two boardwalks, which lead to the bird hides and interpretation boards will inform visitors to the Bird Mitigation Area of permitted activities.
298. To protect marginal vegetation, the use of weed killer and other chemicals will be prohibited within the Bird Mitigation Area. Spot removal of weeds and invasive species will be carried out by hand where removal is necessary.
299. The management of the water bodies will be carried out in rotation. Every third year sections of the water bodies will be cleared, where necessary, and by hand (or by mechanical means) and vegetation will be left to re-grow naturally to promote species diversity.

300. All maintenance operations will comply with health and safety legislation, and all necessary risk assessments will be undertaken prior to any works.
301. Deadwood and other organic material naturally occurring within the main water body (water body 1) will be allowed to accumulate unless they pose a risk to the primary function of the water body as SUDS for the development. The only regular management will be the removal of any litter and rubbish.
302. Key management operations will include (taken from Cambridge City Council's *SUDS Draft design guide – Biodiversity*):
- Litter and debris removal - Litter and rubbish will be removed from the water bodies as part of on-going management of the site, as necessary
 - Cleaning of water inlets and outlets to prevent blockages
 - Management of marginal vegetation and aquatic pond vegetation, and associated bankside planting –
- Maintenance of open and shaded sections of the water body: A minimum of two-thirds of the permanent open water area will be maintained. Periodic maintenance will ensure the water body does not become choked with accumulating plant debris and emergent vegetation. No more than one third of the surface area of the permanent water area will be cleared during a single operation and management will be undertaken on a rotational basis
- Success of aquatic plant colonisation: Once established, a healthy, diverse and vigorous growth of aquatic and bankside vegetation will be maintained. Should further planting be required to augment natural colonisation, native locally sourced species will be used. The spread of any invasive, exotic species will be monitored and controlled by hand to ensure the growth of other species is not suppressed
- Regular monitoring of sediments, together with removal and disposal if required: Silt/debris accumulation will be removed on a minimum three-year rotational basis by either mechanical or manual means. All debris will be removed and used to create habitat piles close to the water body. Where this is not possible, arisings will be removed to appropriate licensed tips
303. Prior to any silt removal, statutory bodies (for example, the Environment Agency) will be consulted to ensure correct methods are used and relevant licences obtained.

Remedial Works

304. Marginal and aquatic vegetation will not be allowed to cover more than one-third of the water's surface. Vegetation removed from the ponds will be left on the banks for a period of 48 hours, to allow any aquatic fauna present to return to the water. The vegetation will then be removed from the site. The shallow scrapes and hollows will be kept free of vegetation. Aquatic plants (reeds and rushes, for example) will be removed from the shallow scrapes and hollows on a regular basis (as required).
305. Should herbicide be required for the establishment of new planting, then these will be restricted to a glyphosate approved by Natural England and the Environment Agency as suitable for use near water bodies. Guidelines for the use of herbicides on weeds in or near to water bodies will be followed (refer to PB2289; MAFF, 1995).
306. It is possible that algal blooms may occur under certain weather conditions. Some algal blooms are severely toxic to animals (such as dogs) and humans. Different types of algal bloom require different methods of control. For example, filamentous algae can be removed by raking and leaving the algae to rest on the bank for 24 hours to allow invertebrates to escape back into the water before removal off site. Advice should be sought from experienced contractors. No chemical treatments will be used.

Timing of Management

307. General maintenance and remedial works will be undertaken in the winter to avoid disturbance to nesting birds.

Monitoring

308. During the construction phase, inspection of the water bodies (water body I and scrapes and hollows), will be undertaken four times annually to assess effects of construction and development of aquatic habitats, and to inform reactive management.
309. The water bodies within the management site will be monitored annually for the duration of the Plan (12 years) to assess their condition and function as wildlife (specifically bird) habitat. Monitoring will consider the following:
- Success of aquatic planting and natural colonisation
 - Maintenance of wet, damp and dry zones
 - Water quality

- Presence of target species; lapwing and golden plover
- Diversity and abundance of other birds species and invertebrates

Floating Islands

Capital Works

310. Floating islands will be created within the permanent area of open water (water body 1) to provide undisturbed nesting habitat for birds, such as terns and gulls. The islands will have a covering of bare shingle (15-25mm), small shelters to give shade for chicks and protection from predators and an access ramp for chicks that fall overboard. The islands will measure approximately 3m x 3m and be constructed principally from timber. Firm anchorage is essential and the islands should be placed at least 10m from the bank. The islands must also be able to move with fluctuating water levels.

Annual Works

311. The islands will be inspected annually and any vegetation will be removed by hand. The islands will be checked to ensure that they remain securely fastened in place.
312. Visual inspections of the islands with the use of binoculars will be undertaken regularly from the water's edge during maintenance and monitoring checks. Litter will be removed from the islands on a regular basis as required, as this poses a risk to bird safety. However, during the nesting season consideration will be given to the presence of nesting birds to ensure any nests are not disturbed.

Reedbeds

Capital Works

313. Reedbed habitat will be created along the western margin of the water body and adjacent to the boardwalks. Primarily, the function of the reedbeds will be to screen access to the bird hides along the boardwalks, to reduce visual disturbance to birds. The reedbeds will also provide visitors with close views of small birds and invertebrates. The reedbeds will provide cover for warblers such as reed and sedge warblers and also for reed bunting, and provide a source of invertebrate prey. Lesser bulrush will be the dominant constituent, with other emergents such as yellow iris, branched bur-reed, lesser pond-sedge, common club-rush, water-plantain, reed sweet-grass and marsh speedwell. Natural generation of aquatic plants will be favoured, but plug planting in groups of 5-10, to create stands may be required. The

eastern edge of the water body will remain free of marginal vegetation, leaving muddy edges in the damp zone for dabbling birds.

314. Once established, the reedbeds could provide roosts for swallows and house martins prior to migration, and also starlings.

Annual Works

315. Reedbeds will require some management to prevent their spread along the water's edge. The eastern edge should be kept free of reeds, which would otherwise deter waders from feeding. Reeds and other marginal vegetation should be removed by hand during the winter months, when no nests will be disturbed. Along the western edge, and adjacent to the boardwalks and bird hides, the spread of reeds should be naturally controlled because the central depth of water will be more than 1m.

Roosting Areas

316. The floating islands and wet grassland provide roosting areas for waders, whilst the reedbeds provide winter roosts for starlings and also for swallows and martins prior to migration. Refer to 'Water Bodies', 'Floating Islands' and 'Reedbeds' sections above and 'Wet Grassland' section below for details of management.

Footpaths, Boardwalks and Bird Hides

Capital Works

317. Footpaths will guide visitors around the periphery of the Bird Mitigation Area (except along the western edge). These will be flanked by bunds planted with trees, shrubs and hedges to minimise visual disturbance. Entry into the wetland area will be via two paths, leading to the boardwalks and bird hides.
318. Two bird hides will be positioned along the southern and northern edges of the water body. The hides will allow enjoyment of the Bird Mitigation Area whilst keeping visual and noise disturbance to birds to a minimum. The hides will be positioned so they have views over the eastern edge of the water body towards the scrapes and hollows. They will be vandal and fire resistant. The entrances to the hides will be screened by shrubs, with the access paths (boardwalks) screened by reedbeds.

Annual Works

319. A management regime should be agreed to monitor the footpaths, boardwalks and bird hides.

Wet GrasslandCapital Works

320. Grassland will dominate around the scrapes and hollows, and within the limit of inundation. This habitat will provide a valuable feeding area for waders.

Annual Works

321. The grassland will be kept short for most of the year with mowing in late May and again in late September. Mowing in late May will need to consider the presence of nesting birds, such as lapwing. A walkover of the area will be undertaken prior to mowing and should no active nests be recorded, then mowing will proceed. Should nests be present, then mowing will be postponed until all nests are empty (expert advice will be sought prior to mowing).
322. Encroaching scrub, shrubs and trees from the adjacent bunds, will be controlled by hand so that the grassland remains free of taller vegetation.

Shrub-covered BundsCapital Works

323. Bunds created around the entire wetland area will screen the wetland from surrounding habitats, reducing visual (including light) and noise disturbance from the footpaths and the adjacent Built Development. The bunds will vary in height but will be up to 2m high. The bunds will be planted with native shrubs to provide foraging and cover, and nesting sites as the shrubs mature. Species will include a range of berry-producing species, such as hawthorn and bramble with dogwood and goat willow; the latter providing a valuable source of food for invertebrates early in the year. Thistles and wild teasel will be allowed to grow at the base of the bunds to provide food for birds, such as finches.
324. The shrub planting of the bunds will allow views through to the wetland from the footpath. These views will be limited as visual disturbance could deter birds from the wetland.

Annual Works

325. Annual works will focus on ensuring shrubs do not encroach into the wet grassland area, and also will ensure the shrubs on top of the bunds do not become too tall, as these will not be tolerated by waders in the vicinity of their feeding areas.

RESPONSIBILITIES

326. Implementation of the ECMP is the responsibility of Countryside Properties, or their successors in title, through a management company and will be undertaken by suitably qualified approved contractors and site staff. Works will be implemented by site staff, suitably qualified contractors and ecologists. The review of the ECMP will be undertaken annually following monitoring in consultation with Cambridge City Council. Countryside Properties, or their successors in title, will be responsible for the management of all management areas, except Hobson's Brook (which will continue to be managed and maintained by Hobson's Brook Trustees), until adoption of responsibility by Cambridge City Council (anticipated to be take place one year after practical completion).

Contractor Responsibilities

327. All materials, workmanship, quality and operations will be in accordance with current British Standards, Codes of Practice and legislation.

328. An Ecological Clerk of Works/Ecologist will be appointed by the contractor during the following capital works:

- Arboricultural removal or maintenance procedure to monitor for nesting birds and bats, and to advise as appropriate
- Hedgerow removal or maintenance procedure to monitor for nesting birds and other wildlife, and to advise as appropriate
- Ditch re-profiling and mitigation (subject to species surveys)
- Grassland disturbance/destruction

Monitoring ResponsibilitiesConstruction Phase (up to a 10 year period)

329. An Ecological Clerk of Works/Ecologist will be appointed to carry out monitoring during the construction phase including:

- Quarterly checks of component habitats and features to ensure maintenance of favourable condition during the construction phase
- Quarterly checks of protective measures around retained and new features (new planting, grassland, hedgerows, plantations and water bodies (including Hobson's Brook))

330. An Ecologist will be appointed to undertake the following tasks:

- Specific species surveys prior to works commencing (bat and water vole surveys for example)
- Annual monitoring of species populations during the construction phase
- Annual monitoring of vegetation communities, including grassland and marginal plants to monitor management and ensure favourable status of habitats during the construction phase
- Annual monitoring of species specific enhancements (refuges/hibernacula and bat boxes) for years one to five of the plan

331. Annual reports of monitoring will be provided by the ecologist and subsequent reviews of the ECMP will be undertaken following annual monitoring and surveys. The ECMP will be revised accordingly in consultation with involved parties.

Operational Phase

332. An Ecologist will be appointed to undertake the following tasks:

- Annual monitoring of species populations (or the habitats that support them) for the remaining term of the Plan, including badgers, water voles, birds, bats, reptiles and invertebrates
- Annual monitoring of vegetation communities, including woodland, grassland and marginal plants to monitor management and ensure favourable status of habitats for the term of the Plan

333. Annual reviews of the ECMP will be undertaken during its term following annual monitoring and surveys. The ECMP will be revised accordingly in consultation with involved parties.

SPECIES SPECIFIC CONSIDERATIONS

334. Species specific considerations given throughout this ECMP are summarised in Table 2, below.

Table 2: Species Specific Considerations within the Management Site

Species	Work Stage	Action	Recommended Timing	Reason
Birds	Pre-construction	Destruction of arable habitat	November to February	Timed to avoid disturbance to ground-nesting birds. If unavoidable during the nesting season, an Ecological Clerk of Works will survey for nesting birds
	Pre-construction	Destruction/removal of trees and hedges	November to February	Timed to avoid disturbance to nesting birds. If unavoidable during the nesting season, an Ecological Clerk of Works will survey for nesting birds
	Pre-construction	Protective fencing around all retained habitats (plantations, hedgerows and Hobson's Brook)	Unrestricted	To minimise disturbance and protect bird nesting habitat
	Pre-construction	Create 5ha wetland area (Bird Mitigation Area) within Green Corridor	Unrestricted	To compensate for loss of arable habitat for winter birds
	Pre-construction and construction	Increase vegetative areas on management site in the form of woodland, trees, shrubs and hedges	November to February (for planting)	To provide enhanced nesting and foraging opportunities

	Construction and post-construction	Monitoring of Bird Mitigation Area	Annually (winter)	To assess establishment and maturation of habitats, quality of habitats, and their use by birds, and to inform management
	Post-construction	New builds and associated features	Unrestricted	Provision of additional roosting and nesting opportunities for birds, including purpose-built features (nest boxes/ledges)
Water vole	Pre-construction	Survey prior to any works commencing which will affect potential habitat (Hobson's Brook and connecting ditch)	April to September	To ensure due consideration is given to water voles during any works which may affect their habitat
	Pre-construction	Protective fencing adjacent to brook (incorporating minimum 20m adjacent to the built development) throughout works	Unrestricted	To ensure protection of habitat throughout construction phase and minimal disturbance to water voles
	Pre-construction	Enhancements to existing ditch within Green Corridor	November to February	To extend areas of suitable habitat and link with other water bodies in the wider area, for example, within the Cambridge Biomedical Campus to the east
	Pre-construction	Creation of new aquatic habitats (water bodies 1-4)	Unrestricted	Provision of additional habitats to provide shelter and food resources

	Construction phase and post-construction	Annual monitoring of habitats	April – October	Monitor habitat quality throughout works and in longer-term to inform management
Badger	Pre-construction	Monitoring of existing setts and survey for new setts	Unrestricted (spring optimal time)	To ensure due consideration is given to badgers during any works which may affect their habitat
	Pre-construction	Protective fencing around plantations	Unrestricted	To ensure protection of habitat throughout construction phase and minimal disturbance to badgers
	Pre-construction	Enhancements to plantations and woodland/shrub/tree / scrub planting within Green Corridor	November to February	Provision of additional habitats to provide shelter and food resources
	Pre-construction	Wildlife-friendly design, where possible, of crossing points over Hobson's Brook	Unrestricted (but installation subject to results of water voles survey)	Maintain connectivity and provide safe access across the management site
	Construction and post-construction	Annual monitoring of setts and activity	Unrestricted (spring optimal)	Monitor habitat quality and stability of population throughout works and in longer-term to inform management

Bats	Pre-construction	Survey of trees to be felled/ivy to be removed for suitability as bat roosts	May to September	To ensure due consideration is given to bats during any works which may affect their habitat
	Pre-construction	Removal of trees for Spine Road/other development areas	November to February (following survey)	To minimise disturbance to bats (and nesting birds)
	Pre-construction	Enhancement of existing habitat and creation of new habitat	Unrestricted	Increased connectivity, foraging and roosting habitat
	Construction phase	Creation of new roosting opportunities in the form of new builds and specific features for bats	Unrestricted	Increased roosting opportunities
	Construction	Appropriate lighting strategy	Unrestricted	To maximise foraging opportunities and minimise light pollution on adjacent sensitive habitats (Hobson's Brook and Green Corridor)
	Construction and post-construction	Annual monitoring (as appropriate)	May to September (years 1-5 of plan)	Monitor habitat quality throughout works and in longer-term to inform management

Amphibians and Reptiles	Pre-construction	Presence of Ecological Clerk of Works during destruction of small existing areas of habitat (grassland, hedgerows and plantations edges)	May to September	To ensure no reptiles/amphibians are injured or harmed during the works
	Pre-construction	Enhancement of habitats, including buffer along Hobson's Brook and creation of specific habitats (hibernacula/refuges) across management site	Unrestricted	To enhance habitat and provide additional protection from disturbance
	Pre-construction	Creation of aquatic habitats (water bodies 1-4)	Unrestricted	To provide optimal foraging opportunities and places of shelter in undisturbed habitats to boost numbers
	Post-construction	Annual monitoring of new features	April to September (years 1-5 of the plan)	To ensure new features remain in favourable condition for species
Invertebrates	Pre-construction	Survey prior to any works commencing which will affect habitat (Hobson's Brook)	May to September	To ensure due consideration is given to invertebrates during any works which may affect their habitat
	Pre-construction	Creation of a range of habitats including	Unrestricted	To provide a range of habitats to support species

		water bodies, grasslands, shrub/scrub/tree and woodland planting		at all stages of their lifecycles To enhance foraging resources for species, including bats, birds, reptiles and amphibians
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RECOMMENDED WORKS SCHEDULES

335. The following tables (Tables 3 and 4) provide guidance on the work tasks to be undertaken throughout the management site (capital works; Table 3 and annual works; Table 4) and the recommended timings of these works.

Table 3: Guidance for Work Programme – Capital Works – Entire Management Site

	Capital Works	Initial Responsibility (in accordance with paragraph 326)	Recommended Time of Year to Undertake Works (shown in grey)											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Survey of water bodies (prior to any works on these features)	Suitably qualified ecological consultant												
2	Mitigation prior to works to water bodies (if protected species present)	Suitably qualified ecological consultant and site contractor												
3	Works to water bodies (e.g. habitat creation, re-profiling)	Suitably qualified ecological consultant and site contractor												

	Capital Works	Initial Responsibility (in accordance with paragraph 326)	Recommended Time of Year to Undertake Works (shown in grey)											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4	Protected species assessment/survey of trees prior to felling/ivy removal	Suitably qualified ecological consultant												
5	Mitigation prior to tree removal (if bats present)	Suitably qualified ecological consultant												
6	Tree felling/ivy removal (following 4 above and no constraints)													
7	Tree felling (following 4/5 above and bats present)	Site contractor and Ecological Clerk of Works/ecologist												
8	Protection of retained habitats	Site												

	Capital Works	Initial Responsibility (in accordance with paragraph 326)	Recommended Time of Year to Undertake Works (shown in grey)											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		contractor and Ecological Clerk of Works												
9	Vegetation removal (if works not carried out during this period, then Ecological Clerk of Works present to oversee)	Site contractor												
10	New planting/sowing (woodland, shrub, scrub and hedges)	Site contractor												
11	Grassland creation/sowing	Site contractor												
12	Creation of bat roosts/bird nesting opportunities within new builds (species-specific enhancements)	Site contractor and Ecological Clerk of Works												

	Capital Works	Initial Responsibility (in accordance with paragraph 326)	Recommended Time of Year to Undertake Works (shown in grey)											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
13	Installation of bat and bird boxes on retained features (species-specific enhancements)	Ecologist/Ecological Clerk of Works												
14	Creation of refuges/hibernacula (species-specific enhancements)	Ecological Clerk of Works												
15	Protection of new planting and refuges/hibernacula	Site contractor and Ecological Clerk of Works												

Table 4: Guidance for Work Programme – Annual Works – Entire Management Site

	Annual Works	Responsibility (following appointment)	Recommended Time of Year to Undertake Works (shown in grey)												
			Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	Cutting of species-rich grassland (Green Corridor) and longer edge zones (Built Development)	Management company													
2	Cutting of amenity grassland (as required) retaining longer edges (see 1 above)	Management company													
3	Cutting of grassland within Hobson’s Brook buffer	Management Company													
4	Cutting of wet grassland (Bird Mitigation Area)	Management Company (in consultation with suitably qualified ecologist)													
5	Scrub management (Green Corridor and Bird Mitigation Area)	Management Company (in consultation)													

	Annual Works	Responsibility (following appointment)	Recommended Time of Year to Undertake Works (shown in grey)											
			Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		with suitably qualified ecologist)												
6	Hedgerow management	Management company												
7	Health and safety checks of trees	Suitably qualified arboriculturalist												
8	Detailed tree inspections (once every five years for 25 years)	Suitably qualified arboriculturalist												
9	Bat assessment/survey prior to remedial tree works	Suitably qualified ecological consultant												
10	Remedial tree works (no	Arboricultural												

	Annual Works	Responsibility (following appointment)	Recommended Time of Year to Undertake Works (shown in grey)											
			Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	constraints)	contractor/m anagement company												
11	Remedial tree works (bats present)	Suitably qualified ecological consultant/arb oricultural contractor												
12	Bat box checks (condition and replacement as necessary for years 1-5 of the management term)	Suitably qualified ecological consultant/Lic ensed bat worker												
13	Bird box checks (condition and replacement as necessary)	Management company												
14	Reptile hibernacula/refuge checks	Suitably												

	Annual Works	Responsibility (following appointment)	Recommended Time of Year to Undertake Works (shown in grey)											
			Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	(for years 1-5 of the management term)	qualified ecological consultant												
15	Survey of water bodies (for protected species, namely water vole and aquatic invertebrates)	Suitably qualified ecological consultant												
16	Management/maintenance of water bodies (vegetation clearance by hand, de-silting works; following 15 above)	Management company/suitably qualified ecological consultant												
17	Removal of litter	Management company												
18	Treatment of algal blooms	Management company with specialist advice												

	Annual Works	Responsibility (following appointment)	Recommended Time of Year to Undertake Works (shown in grey)												
			Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
19	Management of woodland/tree belts	Management company													
20	Establishment monitoring/maintenance of new trees and hedges	Management company													
21	Quarterly inspections of working areas and protective fencing	Ecological Clerk of Works													
22	Quarterly inspections of all habitats/features	Ecological Clerk of Works													
23	Annual badger survey	Suitably qualified ecological consultant													
24	Annual winter bird survey (Bird Mitigation Area)	Suitably qualified ecological													

	Annual Works	Responsibility (following appointment)	Recommended Time of Year to Undertake Works (shown in grey)											
			Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		consultant												
25	Annual hedgerows and woodland/plantation surveys	Suitably qualified ecological consultant												
26	Annual grassland survey	Suitably qualified ecological consultant												
27	Invasive species monitoring	Management company with specialist advice												
28	Annual review of Plan	Management company and other interested parties												

	Annual Works	Responsibility (following appointment)	Recommended Time of Year to Undertake Works (shown in grey)											
			Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	Nov	Dec
29	Revision of Plan, as necessary	Management company and other interested parties												

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