Oxfordshire Highways

Cogges Link Road
Botanical Survey Phase II

B0834600/Doc/CLR/15 April 2008

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Document No	:	B0834600/Doc/PA/CLR/15
Revision No	:	01
Date	:	April 2008
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NB This document supersedes Doc No. 0009432/ES/2/13

This document was originally prepared in support of the 2004 Environmental Statement and as such, covers both the Cogges Link Road study area and the Shores Green Slip Roads study area. Only information pertaining to the Cogges Link Road (Map 1) is relevant to this 2007 Environmental Statement.

For avoidance of doubt all references in this document to 'Witney Cogges Link Road' relate to the Cogges Link Road.

Botanical Survey of the Witney Cogges Link Road

For Babtie Group

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June 2003

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1 Methodology

This survey covers an area of approximately 100 hectares directly to the south of Witney, Oxfordshire. For the purposes of the survey the area was divided into two regions as shown on all of the survey maps. The westernmost area will be referred to as the Main survey area and the easternmost as the Additional survey area. These two regions were surveyed for their botanical characteristics and classified in-line with the National Vegetation Classification (NVC) (Rodwell, 1991 onwards). A separate vegetation map and species list has been produced for each region, in line with contract specification.

The site was surveyed over four days in mid-June 2003 by Tom Flynn, (full details including dates of survey are shown in appendix 2). Mid-June was chosen because this is the optimal time of year for recording plant species in lowland Britain, with more species identifiable than at any other time of the year.

Initially, the whole area was traversed by car and foot in order for the surveyor to gain an overview of the site and better plan the detailed survey. Subsequently the western, central and eastern sections of the survey area were covered on 3 separate days. Areas of vegetation were mapped and plant species recorded. Where NVC sub-community was not distinct the vegetation type was mapped as the general community e.g **MG1** rather than **MG1a** or **MG1b**. Quadrats were recorded from the vegetation stands as outlined in British Plant Communities (Rodwell 1991, onwards). In general, 2m x 2m quadrat samples were taken in grassland and open vegetation and 10m x 10m quadrat samples were taken in Woodland and scrub communities. Quadrat sites were not taken at random within vegetation stands that had been identified but were placed over areas of vegetation determined by the surveyor to be representative of that stand. This is standard procedure for NVC survey. In each quadrat, the % cover of each species was estimated by the surveyor and these % values were translated into dominance values for each species using the NVC Domin scale:

% cover	Domin Score
91-100%	10
76-90%	9
51-75%	8
34-50%	7
26-33%	6
11-25%	5
4-10%	4
<4% many individuals	3
<4% several individuals	2
<4% few individuals	1

All parts of the Main survey area and Additional survey area were surveyed with the exception of buildings and gardens. Target notes were recorded for specific features worthy of note.

Maps 1 and 3 are the NVC maps of the two survey areas, with Map 2 being a magnified map of the western section of the Main survey area. Quadrat data, which includes species and Domin scores for each quadrat, are shown in Appendix 4. The location of each quadrat recorded is shown on map 4 (included within Appendix 4). In addition to the quadrat data, species lists were compiled of all plant species recorded within each of the two survey areas. The species lists are given in Appendix 3. Target notes recorded during the survey are listed in Appendix 5 along with map 5 which indicates the points and areas to which the target notes refer. Representative photographs were also taken of all vegetation communities and other general botanical / habitat features , these have been supplied in electronic format as an additional document.

2 Survey Results

The site is predominantly farmland, with some areas of housing and roads. The dominant plant communities on the site are arable land and grassland in almost equal proportions. Arable land is very low in non-crop plant species, although some areas do contain extensive stands of arable weeds. The grassland is generally species poor **MG6** and **MG7**, dominated by agricultural grasses and with a low biomass of broadleaved species and low diversity of broadleaved species, although very large numbers of butterflies, Swallows and Swifts were observed feeding in and above some areas of this habitat.

There are numerous hedges, many of which have overgrown into linear woodland (**W8**) with a range of woody species and some contain mature Oak trees. In addition there are some more extensive areas of woodland: mixed deciduous woodland (**W8**) in the central and eastern regions and mixed Willow woodland (**W6**) in the west. The western region of the Main survey area contains Witney Meadow nature reserve, an area of False Oat-grass (*Arrhenatherum elatius*) grassland with some residual hay-meadow species. The River Windrush and a tributary border this area, which have extensive marginal and aquatic vegetation. At the north of this area, there are extensive areas of tall herb fen dominated by Greater Willowherb (*Epilobium hirsutum*). The A40 road verges largely consist of *Arrhenatherum* grassland communities, and Hawthorn (*Crataegus monogyna*) and Bramble (*Rubus fruticosus*) scrub. The road verges at the northeast of the Additional survey area, bordering Oxford Hill Road, contain a significant diversity of flower species and many butterflies, including the Marbled White (*Melanargia galathea*), were observed utilising these areas.

MAP 1

(See Map1.PDF document supplied with this report.)

MAP 2

(See Map 2.PDF document supplies with this report)

MAP 3

(See Map 3.PDF document supplied with this report)

2.1 Habitat Descriptions

NVC Plant Communities Present In the Main Survey Area

Grasslands

MG1 - *Arrhenatherum elatius* grassland

The grassy banks below hedges and road verges are typically MG1 communities in the Main survey area. This community is characteristic of rich and disturbed soils, abandoned agricultural land and unmanaged grassland. It contains a number of grass species and some broad-leaved species, particularly umbellifers. Some areas are dominated by *Urtica dioica* or *Cirsium arvense*. *Galium aparine* is present in some areas. However, similar such banks, often in the wetter areas, contain abundant or dominant *Epilobium hirsutum*. These latter communities are classified as **OV26** *Epilobium hirsutum* communities (See Open Vegetation section below).

MG1a – *Festuca rubra* sub-community

The majority of non-agricultural grassland in the Main survey area is **MG1a** type. This grassland is dominated by *Arrhenatherum elatius* as **MG1** above, but also contains a large amount of the grass *Festuca rubra*. The two large areas of this grassland in the main survey area are 1) the Witney Meadow nature reserve to the extreme west of the site and 2) a section of a field towards the centre of the survey area. The remainder lies on the north verge of the A40 towards the south east of the area. This latter area contains frequent individual *Crataegus monogyna* bushes.

The grassland within Witney Meadow nature reserve has a higher diversity of herbs than a majority of the other grassland areas in both the Main and Additional survey areas. In particular it contains some *Centaurea nigra* and *Sanguisorba officinalis*, however these herbs are present at low abundance. *Urtica dioica* and the umbellifers *Heracleum sphondylium* and *Anthriscus sylvestris* are much more frequent in the sward.

The **MG1a** field towards the centre of the Main survey area is much poorer in herbs, and contains abundant *Cirsium arvense* in some areas.

MG7 – *Lolium perenne* leys

Generalised **MG7** grassland is present on the site in a number of regularly mown road verges at the north of the site. These contain lawn-weeds such as *Taraxacum officinalis*, *Bellis perennis* and *Sonchus* spp.

MG7d - *Lolium perenne - Alopecurus pratensis* grassland

This community is present in two fields towards the north east of the Main survey area. These are long-grass communities made up of a number of species of agricultural value including *Lolium perenne*, *Alopecurus pratensis*, *Holcus lanatus* and *Dactylis glomerata*. In some areas other grasses are also abundant including *Cynosurus cristatus* and *Hordeum secalinum*. Herbs are generally in very low abundance and include only a few species such as *Ranunculus acris*, *Cerastium fontanum* and *Rumex acetosa*. Large numbers of Meadow Brown butterflies and other insect species, and many tens of swifts and swallows were seen feeding in and above this habitat at the time of the survey.

MG7e – *Lolium perenne – Plantago lanceolata* grassland

This sub-community contains abundant *Plantago lanceolata* and other common weeds such as *Bellis perennis* and *Taraxacum officinale*. It is typical of closely mown verges and lawns and is present here on a mown roadside verge.

MG7f – *Lolium perenne – Poa pratensis* grassland

This community is characteristic of amenity grassland so it is not unexpected that the area of grassland classified as **MG7f** within the survey area is used as a football pitch. This area of grassland is dominated by *Lolium perenne* and *Poa pratensis*.

Open Vegetation

OV24a - *Urtica dioica – Galium aparine* community, Typical sub-community

This community consists principally of a dense growth of *Urtica dioica*. *Symphytum officinale* and *Galium aparine* are present in some areas. The small area of **OV24a** in this survey is located at the north end of the Witney Meadow nature reserve.

OV25 – *Urtica dioica – Cirsium arvense* community

This community includes patchy cover of *Urtica dioica* , *Cirsium arvense* and *Cirsium vulgare* along with some coarse grasses. It is present along the southern margin of an arable field where it adjoins the A40 embankment. However, both *Urtica dioica* and *Cirsium arvense* are also common, often in dense stands, throughout the survey area in communities such as **OV24a** and some areas of **MG1a** grassland.

OV25 / W24 - *Urtica dioica - Cirsium arvense* community / *Rubus fruticosus – Holcus lanatus* underscrub

There is a strip of vegetation that runs alongside the track towards the centre of the Main survey area. This vegetation has been classified **OV25/W24** since it contains both abundant *Urtica* and *Cirsium* spp. and also frequent *Rubus fruticosus*. A number of other scrub species are widespread

including *Crataegus monogyna* and *Rosa canina*. Coarse grasses such as *Arrhenatherum* and *Dactylis glomerata* are also frequent.

OV26e *Epilobium hirsutum* Community, *Urtica dioica – Cirsium arvense* sub-community

This tall herb community covers some damper areas close to the river in the west section of the Main survey area. It is dominated by *Epilobium hirsutum*, with *Urtica dioica* and *Cirsium arvense*. In some areas *Galium aparine* is abundant.

OV26d/e *Epilobium hirsutum* community *Urtica dioica – Cirsium arvense / Arrhenatherum elatius – Heracleum sphondylium* sub-community

Some areas along the banks of the smaller channels of the River Windrush are *E. hirsutum* dominated vegetation with abundant *Urtica dioica* and also abundant *Arrhenatherum elatius*. These have been classified as an indistinct community, lying between **OV26d** and **e** sub-communities.

Woodland / Scrub

W6 – *Alnus glutinosa – Urtica dioica* woodland

The wet woodland found in the west section of the Main survey area has been classified as **W6** woodland. It is dominated by *Salix* spp., particularly *Salix fragilis* and *Salix viminalis*. *Salix alba*, *Salix caprea, Alnus glutinosa* and *Fraxinus excelsior* are occasionally present. The ground layer is a dense growth of tall herbs, principally *Urtica dioica*, but also including *Epilobium hirsutum*, *Symphytum officinale* and *Solanum dulcamara*.

W8 - *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland

The majority of the woodland vegetation in this survey area is classified as **W8** woodland. It contains a canopy layer dominated by *Fraxinus excelsior*, *Quercus robur* and *Acer campestre*. The shrub layer includes *Crataegus monogyna* and *Sambucus nigra,* and in some areas *Euonymus europaeus* and *Ligustrum vulgare*. Ground layer flora includes *Geum urbanum*, *Hedera helix* and *Mercurialis perennis* in a few areas. In some areas, particularly for overgrown hedges, the canopy consists almost entirely of *Acer campestre*.

The majority of the overgrown hedges and those containing large trees (although not those containing only occasional mature trees) in the survey area have been classified as **W8** woodland.

Where it has been possible to identify sub-communities of **W8** woodland this has been done, although the vast majority of this habitat is of a more general nature.

W8d –*Hedera helix* sub-community

This sub-community is particularly dense and shaded and as a consequence there is little ground layer except *Hedera helix*. There is a small strip present at the south of the Main survey area.

W8e – *Geranium robertianum* sub-community

In this sub community *Ulmus glabra*, *Acer pseudoplatanus* and *Corylus avellana* are frequent and in particular *Geranium robertianum* is present in the ground layer. This woodland surrounds the Thames Water installation in the central region of the Main survey area.

W21 - *Crataegus monogyna – Hedera helix* scrub

The *Crataegus* scrub category includes most of the non-**W8** hedgerows in the area. These consist of dense *Crataegus monogyna* to approximately 5m, and climbing species such as *Rosa canina* and *Rubus fruticosus* are present in some areas.

Small patches of *Crataegus* scrub, often only individual bushes are present throughout virtually all of the **MG1** road verges on the site, these patches are too small to have been mapped (see **MG1** section above).

W21a - *Hedera helix – Urtica dioica* sub-community

Thin strips of this community occurr along the banks of the River Windrush. In addition to the description given for **W21**, *Hedera helix* is present .

W22 – *Prunus spinosa – Rubus fruticosus* scrub

A small area of scrub adjacent to the A40 is heavily dominated by *Prunus spinosa*.

Planted Trees

Trees have been obviously planted in 5 areas of the Main survey area.

1) A strip along the A40 to the South West of the site (coded 'Plantation' on Map 1) includes planted *Alnus glutinosa*, *Larix decidua* and *Prunus avium* to approx. 9m. *Fraxinus excelsior* and scrub (*Sambucus nigra, Crataegus monogyna*) species have invaded some areas; the ground layer is largely *Urtica dioica*.

2) Street trees including *Acer pseudoplatinus*, and some *Salix alba* and *Quercus robur* are present in the central section of the Main survey area and coded 'Plantation' on Map 1.

3) Small saplings (to 3m) are present around the perimeter of the recreational grassland classified as MG7f, which is towards the centre of the Main survey area. Species include *Betula pendula*, *Quercus robur* and *Carpinus betulus*.

4) There is a further section of roadside planting north of the A40 where it crosses the Main survey area boundary at the east side of the area. Here *Alnus glutinosa, Prunus avium and Eucalyptus gunii* have been planted and are approximately 8m tall.

5) Lines of native saplings have been planted within the grassland to the north of the Main survey area as indicated on map 5.

Aquatic & Swamp Vegetation

A18 - *Ranunculus fluitans* community

All of the rivers towards the West of the Main survey area (the River Windrush and its tributaries) have been classified as an **A18** community since the whole river represents a continuous habitat, and since it was not practical to map individual weed patches The sole dominant, *Ranunculus fluitans,* is present as patches of weed, with some areas of the river clear of weed.

S12a – *Typha latifolia* swamp

A narrow water filled ditch located between the A40 verge and an arable field directly north of the road in the central area of the Main survey area which is heavily dominated by *Typha latifolia* has been classified as **S12a**. In addition, an overgrown pond within the Witney Meadow nature reserve at the west side of the Main survey area contained exclusively *Typha latifolia* and *Agrostis stolonifera* has also been classified as **S12a**. There were no areas of open water in the pond, and a maximum water depth of 15cm was estimated at the time of the survey.

S28- *Phalaris arundinacea* tall-herb fen

Phalaris arundinacea is the dominant component of the vegetation at the margins of the River Windrush and its tributaries. Other species such as *Carex acutiformis*, *Sparganium erectum* and *Mentha aquatica* are present throughout, but none except *Sparganium erectum* is frequent. The *Phalaris arundinacea* occupies areas beyond the immediate river margin, although these areas also contain *Epilobium hirsutum* and grasses such as *Arrhenatherum*. The submerged areas contain much *Sparganium erectum*, and the *Phalaris* is largely located at the margin of the dry and submerged areas. These 3 regions are very narrow and do not form a continuous strips along the riverbanks.

Arable land

Approximately 30% of the land area of the Main survey area consists of arable land. The crops in this area include Wheat (*Triticum aestivum*) and Rapeseed (*Brassica napus*). Arable weeds are abundant in some areas of the crops and in some of the field margins; these include *Alopecurus myosuroides*, *Chenopodium album*, *Bromus sterilis, Avena sativa* and *Avena fatua*.

NVC Plant Communities Present In the Additional Survey Area

Grasslands

MG1a – *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community

This community is present in the Additional survey area largely along the verges of the A40 and along the western section of the Oxford Hill Road. It closely resembles the **MG1a** community of the Main survey area with *Urtica*, *Cirsium arvense* and *Rubus fruticosus* being occasional. *Crataegus* is occasional, particularly in the grassland bordering the A40, where it forms small patches of relatively dense scrub within the grassland.

MG1b - *Urtica dioica* sub-community

The *Urtica dioica* sub-community of **MG1** contains a greater abundance of tall herbs including *Urtica dioica*, *Cirsium arvense, Epilobium hirsutum* and *Rumex obtusifolius*. It is present in one area towards the East of the Additional survey area where the A40 and Oxford Hill roads meet. This small meadow has been planted with saplings.

MG1e- *Centaurea nigra* sub-community

The verges of the Eastern section of Oxford Hill road are Dominated by *Arrhenatherum* and *Dactylis glomerata*, but are quite herb rich, certainly in some areas where *Lotus corniculatus*, *Vicia* spp., *Achillea millefolium*, *Hypericum perforatum*, and *Prunella vulgaris* are abundant. *Centaurea nigra* is also conspicuously frequent in some areas. *Heracleum sphondylium* and *Anthriscus sylvestris* were locally abundant in this habitat. The floral diversity of this community is much higher than that of the Other **MG1** sub-communities mentioned in this report. Much insect activity was observed in this habitat, including the sighting of a number of Marbled White butterflies (*Melanargia galathea*).

MG6a- *Lolium perenne – Cynosurus cristatus*, Typical sub-community

This grassland community is dominated by *Lolium perenne* with *Cynosurus cristatus* present. It is present in the Additional survey area in two fields north of Oxford Hill Road, and two fields at the extreme east of the area. Some areas of this community contain a greater diversity of grass and herb species than others. The easternmost field to the north of Oxford Hill Road contained

abundant *Ranunculus acris & repens, Trifolium* spp. and occasional *Centaurea nigra*, while the westernmost field was heavily grazed and species poor. The fields to the east of the site contained much *Hordeum secalinum* and some *Deschampsia cespitosa* and *Cirsium arvense*, but in general were relatively species poor.

MG7a - *Lolium perenne – Trifolium repens* leys

This grassland is present in two large fields and a smaller one in the Additional survey area. These have a species poor composition with few herbs. *Lolium perenne*, *Dactylis glomerata*, *Holcus lanatus* and *Poa pratensis* make up the vast majority of the sward. The few herbs present include *Ranunculus repens* and *Cerastium fontanum*. Numerous Meadow brown butterflies (*Maniola jurtina*) were observed in one *Ranunculus* spp. rich area at the south west of the largest field of this type.

MG7d - *Lolium perenne – Alopecurus pratensis* grassland

This grassland is present in two areas at the western edge of the Additional survey area. This grassland is continuous with and of a similar composition to the **MG7d** found in the Main survey area.

Open Vegetation

OV26 – *Epilobium hirsutum* tall-herb community

A very small area of **OV26** is present in the Additional survey area. It covers a ditch beside a road at the extreme east of the area, and contains almost exclusively *Epilobium hirsutum*.

Woodland / Scrub

W8 – *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland

Areas of **W8** woodland are present on both north and south verges of the A40, and also on the traffic island in the northeast of the area. This woodland is dominated by *Fraxinus excelsior* and *Acer campestre* with some *Quercus robur*. The under storey is dominated by *Crataegus monogyna* and *Prunus spinosa*. Some areas that have been classified as **W8** woodland are relatively young e.g. some roadside **W8** probably results from roadside planting of broadleaved tree species. These areas differ markedly from other areas of plantings, the letter being much more artificial, principally due to clumped planting of single species stands and also the planting of exotics.

W8d – *Hedera helix* sub community

A network of hedges in the centre has been classified as **W8d**. They consist of abundant *Acer campestre*, some *Fraxinus excelsior*, *Ulmus glabra* and *Quercus robur*, and an under storey of *Crataegus monogyna* and *Sambucus nigra*. *Hedera helix* is often abundant within the hedge.

W21 – *Crataegus monogyna – Hedera helix* scrub

Dense *Crataegus monogyna* scrub is present around the A40 and the traffic Island in the north east of the Additional area. *Prunus spinosa*, *Rosa canina* and *Rubus fruticosus* are locally frequent.

W21a – *Hedera helix – Urtica dioica* sub-community

In some areas the *Crataegus monogyna* scrub contains an under storey of *Urtica dioica*, with occasional *Cirsium arvense*, *Arctium minor* and *Anthriscus sylvestris*.

W24 – *Rubus fruticosus – Holcus lanatus* scrub

Rubus fruticosus scrub is present in the Additional survey area on the traffic island in the north east and one notable patch on the south side of the A40. *Rubus fruticosus* is also often a component of other plant communities such as **W8** and **W21**, and small quantities of it are frequently present in **MG1** roadside verges.

W24b – *Arrhenatherum elatius – Heracleum sphondylium* sub-community

One area of *Rubus fruticosus* scrub replaced a Crataegus monogyna hedge with a much lower and more open vegetation bank dominated by *Rubus fruticosus* and *Arrhenatherum elatius* with abundant *Urtica dioica*. This has bee classified as **W24b**

Arable Land

The two arable fields North of the A40 contained Field Beans (*Vicia faba*) at the time of the survey. Many areas contained a dense growth of arable field weeds including *Alopecurus myosuroides, Chenopodium album, Viola arvensis*. The Two fields to the south of the A40 contained Wheat (*Triticum aestivum*) and Rapeseed (*Brassica napus*) and also contained many weeds including *Geranium dissectum*, *Matricaria inoderatum* and *Chenopodium album*.

2.2 Protected and Notable Species

No species included on European and Schedule 8 protected species lists were recorded as part of the NVC survey carried out in June 2003. Also no UK national Biodiversity Action Plan priority species were recorded as part of the survey.

The Oxfordshire Local Biodiversity Action Plan includes the following species of vascular plants:
Sorbus torminalis
Orchis morio
Juniperus communis
(Source: www.ukbap.org.uk)

None of these species were recorded as part of the botanical survey. However, veteran trees occurring in hedgerows do feature as an element of the Oxfordshire Habitat Action Plan for Wood Pasture, Parkland and Veteran Trees. Several veteran *Quercus robur* occur throughout the site, indicated in Appendix 5, and so should be considered a feature of the Local BAP.

Additionally, low frequencies of *Sanguisorba officinalis* were recorded from an area of rough grassland. Though this plant is not included as a local species in the LBAP, reference is made to it in the Oxfordshire Habitat Action Plan for Neutral grasslands as an indicative character species which is in decline.

No account has been taken of any historical records and so any data available from the Oxfordshire Local Records Centre may be useful in supporting this botanical survey carried out in June 2003.

3 Mitigation Recommendations

3.1 Grasslands and tall herb communities

These are represented by the **MG** and **OV** communities described in section 2.1. All the sub-communities of **MG1** can be considered analogous to the rough grasslands described within the Habitat Action Plan (HAP) for Grazing Marsh and Neutral Grasslands as part of the Oxfordshire Local Biodiversity Action Plan (LBAP). These grasslands are on the whole fairly species poor although they are of significant biodiversity interest as havens for small mammals and invertebrates and potentially as a breeding site for birds. The same can be said of the tall herb communities, which tend to be dominated by either by either Great Willowherb (*Epilobium hirsutum*) or Nettles (*Urtica dioica*). A significant area of rough grassland and tall herb habitat lies directly on the line of the proposed route within the Main survey area and will therefore be destroyed as part of this development.

Given the inherent biodiversity value of this resource, efforts should be made to minimise the area destroyed by the development. The initial removal of the habitat should take place over the winter months (October – March) when small mammal and invertebrate activity is at a minimum and it is outside of the bird breeding season. Any adjacent areas of rough grassland should be left to allow a source for re-colonisation of any habitats re-created as part of any rehabilitation programme. Habitat removal in the spring or summer will run the risk of disturbing ground nesting birds and other fauna. If spring/summer removal cannot be avoided the area should first be checked for breeding birds and the grass should be cut and left lying for a period of several days to allow invertebrates to escape and seek refuge in adjacent habitat before the habitat is ultimately removed.

Various sub-communities of **MG6** and **MG7** grassland are the most abundant grassland habitat type covering both survey areas. Both these grassland types are agriculturally improved grasslands and are of low botanical interest. However, Skylarks (*Alauda arvensis*) may potentially breed in these areas so as with other areas of grassland, removal should take place outside of the bird breeding season or the areas checked for ground nesting birds prior to removal.

3.2 Woodlands and Hedgerows

Throughout the Main and Additional survey areas there is a fairly continuous network of small woodlands and hedgerows. The biodiversity of these habitats are included in the Oxfordshire BAP under four separate habitat action plans:

- HAP for Wet Woodland
- HAP for Lowland Broadleaved Woodland
- HAP for Wood Pasture, Parkland and Veteran Trees
- HAP for Hedgerows

All of these habitats are present in some form within the two survey areas, though the HAP for Wood Pasture, Parkland and Veteran Trees is represented by a number of veteran trees within the hedgerow network, which may also be considered as a feature of the hedgerows.

The proposed route of the link road dissects an area of wet woodland (**W6**) at the western end of the Main survey area that borders the channels of the River Windrush. The proposed route also cuts through several hedgerows along the length of the development. Mitigation of the effects of this will need to involve re-planting of hedgerows and woodlands with locally sourced native species, see section 4. Removal of woodland and hedgerow should occur outside of the bird breeding season as both these habitats are likely to be extensively used by birds for nest sites. Any final route for the link road should avoid removal of any veteran trees present in the hedgerows or woodland pockets. Veteran trees are important for a range of species from insects to birds and mammals and due to their very nature the loss of these features cannot be compensated for.

3.3 Wetlands

There are few areas of wetland across both survey areas, though the River Windrush does flow through the western end of the main survey area. River Water–crowfoot (*Ranunculus fluitans*) is the sole dominant of the patches of channel vegetation and the main channel is bordered by a fringe of marginal vegetation dominated by Reed Canary-grass (*Phalaris arundinacea*). The only other areas of wetland are an overgrown pond, again in the western most section of the main survey area, and a ditch bordering the north side of the A40, both of which are dominated by Bulrushes or Reedmace (*Typha latifolia*). As such, there is not any significant biodiversity interest in the flora of these wetlands. However, Rivers and Ditches and Ponds are the subject of separate HAP's in the Oxfordshire LBAP. These habitats can be important for a range of species including birds, mammals, amphibians, invertebrates and fish. Therefore it is important to avoid any decline in the quality of these habitats as a result of the proposed developemnt. Also, together with the rough grassland and patches of wet woodland in the area, the floodplain of the River Windrush is likely to provide quite an important local wildlife refuge.

The proposed route of the link road passes directly through this area and crosses the River Windrush. During construction efforts should be made to reduce the amount of silt/material run-off getting into the water course. Of potential importance is ensuring the continued presence of a

wildlife corridor along the banks of the rivers. Any bridges required will therefore need to be constructed in such a manner as to allow for the movement of animals under the bridges and along the watercourse without being impeded. This is espcially true if species such as Otter (*Lutra lutra*) are present in the area or the if the area is considered to have potential for re-colonisation by Otters. Presence or otherwise of Water Vole (*Avricola terrestris*) in this area would also need to be confirmed prior to the start of the development.

3.4 Arable

The main biodiversity interest of the arable fields are the weedy margins which support a range of plants and can also provide a valuable habitat for many bird species and animals such as Brown Hares (*Lepus europaeus*) and bats. As with the other habitats discussed in the previous sections removal of this habitat will be best carried out in the winter months away from the breeding season of much of the wildlife that utilises these areas. If it is discovered that many bird species are utilising these areas through the winter months as a feeding site then an alternative food source in the form of provided seed would help to mitigate against the loss of this habitat during the initial winter the habitat was removed.

4 Enhancement recommendations

4.1 Grasslands and tall herb communities

The key area of rough grassland to be impacted by the proposed route of the link road is an area of **MG1a** grassland west of the main channel of the River Windrush. This area is part of the Witney Meadow nature reserve and is thought to be owned by Witney Town Council and is potentially included within the Upper Thames Tributaries Environmentally Sensitive Area (UTTESA). This area of grassland is slightly more species rich than other areas containing low frequencies of both Great Burnet (*Sanguisorba officinalis*) and Common Knapweed (*Centaurea nigra*), possibly indicating previous treatment as a hay meadow with potentially some seasonal flooding. Great Burnet is recorded within the Oxfordshire Flora (Killick et al. 1998) as decreasing due to the loss of unimproved grassland. Any loss of this habitat should be compensated for through the re-creation of lowland meadow. Specifically this would mean the creation of an area of **MG4**, *Alopecurus pratensis – Sanguisorba officinalis* or **MG5** *Cynosurus cristatus – Centaurea nigra* grassland. Both these habitat types are included as priority habitats in the Oxfordshire LBAP. A suitable area adjacent to the River Windrush will need to be identified for such a grassland creation project, the site having a bearing on the type of grassland to create. As maintenance of both these types of grassland requires specific management (mowing and/or grazing) then the site would need to be carefully

selected to ensure continued management. The presence of both the Witney Meadow nature reserve and the UTTESA suggest that continued management of such a site would be feasible.

Other areas of rough grassland and tall herb communities to be impacted by the proposed development include several existing road verges. Along with the hedgerows the road verges form a network of wildlife corridors that allow a range of fauna to travel between islands of habitat and also use the road verges as resources in themselves. Disruption of this network may cause further isolation of biodiversity-important areas so efforts should be made to re-instate this network once work has been completed. An increase in the number of neutral grassland roadside verges is an objective within the Oxfordshire LBAP and so re-creation of such verges would be a valuable project contributing to the local biodiversity effort. Creation of grassland should be done by way of introducing seed onto a previously prepared seed bed. Species to sow should include the following suitable for neutral grassland: *Agrostis capillaris, Alopecurus pratensis, Anthoxanthum odoratum, Cynosurus cristatus, Achillea millefolium, Centaurea nigra, Plantago lanceolata and Prunella vulgaris*. This is by no means an exhaustive list and further species would also be suitable. *Arrenhatherum elatius* has not been included on this list as it is likely to colonise these areas as they mature and are managed as standard road verges. Consideration should be given to planting Dark mullein (*Verbascum nigrum*) on the created road verges as this is the principal larval food plant of the Striped Lychnis moth (*Cucullia lychnitis*), a UK BAP priority species. This propsal is included within the Oxfordshire LBAP.

Creation and re-creation of grassland should follow guidelines set out in The Lowland Grassland Management Handbook (Crofts and Jefferson, 1999) and advice published by Flora Locale (www.floralocale.org) with specific reference to native sources of seed.

4.2 Woodlands and Hedgerows

Wet Woodland is a valuable and scattered resource in Oxfordshire and efforts should be made to compensate for the loss of any such habitat as part of the road development. The main area of wet woodland to be impacted by the development is the Willow (*Salix* spp.) dominated woodland that fringes the channels of the River Windrush. A suitable site for the re-planting of a wet woodland community will need to be located, ideally within the Windrush valley. An area of gravel pits occurs to the south of Witney, along the Windrush valley, which may form a suitable site for wet woodland creation and would also contribute to the Oxfordshire LBAP objective of creating 20ha of wet woodland in worked-out gravel pits. Alternatively, a site may be considered in association with the Witney Meadow nature reserve which is adjacent to the area of wet woodland that may be destroyed. The aim of a compensatory project should be create an area of wet woodland with a

canopy dominated by Willows (*Salix* spp.) and/or Alder (*Ulnus glutinosa*) at least equal to the area lost through the devlopment. Ideally, the area to be created should complement existing areas of woodland, such as any remnants of wet woodland left intact after the development , as opposed to creating an isolated small area of woodland of marginal biodiversity value.

The other areas of woodland, hedgerows and scrub on the site forms a reasonable network of wildlife corridor habitat around the site. The woodland pockets and hedgerows are almost undoubtedly relatively recent (that is, not ancient), though some of the hedgerows, specifically those identified as NVC community **W8** (or a sub-community of W8), can be considered as species-rich hedgerows, a UK BAP priority habitat. However, the Oxfordhsire HAP for Hedgerows specifies that objectives for conservation of this habitat in the county applies to all hedges, irrespective of species richness, in order to maintain the hedge network. The maintenace or re-instatement of the hedge network should therefore be the objective of a habitat compensatory project. Species used to plant the hedge should all be native and preferably of local origin and a diversity of species should be planted as opposed to a monoculture of Hawthorn (*Crataegus monogyna*) or Beech (*Fagus sylvatica*) for example. The exact species to plant should be in keeping with the local character.

Any areas of lowland broadleaved woodland removed as part of the development should also be compensated for in the same manner as the hedgerows so that the network of woody habitats is maintained across the site.

4.3 Wetlands

Based on the proposals for the route of the link road it appears that the overgrown pond in the eastern section of the Main survey area will be destroyed and one of the channels of the River Windrush will be diverted. The banks of the diverted stretch of the river should be engineered to avoid steep sloping banks. Vegetation should be replanted along the edge of the diverted stretch in keeping with the local character, in this case Crack Willow (*Salix fragilis*), or be replanted to attract riparian species.

Though the existing pond was overgrown, consideration should be given to a pond creation scheme as this would add significant interest to the local biodiversity. There is a wealth of information available on ponds and pond creation such as from the Pond Conservation Trust which can be consulted if such a scheme were to go ahead.

5 Sources of information

Crofts A and Jefferson RG (eds.), 1999. The Lowland Grassland Management Handbook. 2nd edition. English Nature/Wildlife Trusts

Killick J, Perry R, Woodell S, 1998. The Flora of Oxfordshire. Pisces

Oxford LBAP: http://www.oncf.org.uk

Rodwell J.S. (ed) 1991 onwards. British Plant Communities. Volumes 1,3,4,5. Cambridge University Press

UK national BAP: http://www.ukbap.org.uk

Upper Thames Tributaries ESA:
http://www.defra.gov.uk/erdp/schemes/esas/stage4/upper.htm

Appendix 1 – Name(s) and contact details of surveyor(s)

Surveyor Name: Tom Flynn

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Appendix 2 – Details of site visits

Date of visit	Duration	Purpose
04/06/2003	9:30 – 16:00	Site & vegetation overview
10/06/2003	9:00 – 16:30	Plant survey – western area
12/06/2003	9:00 – 17:00	Plant survey – central area
17/06/2003	9:00 – 16:00	Plant survey – eastern area

Appendix 3 – Species Lists

List 1: Plant species found within the Main survey area

The DAFOR abundance score is shown for all species (D=dominant, A=abundant, F=frequent, O=Occasional, R = rare).

Acer campestre	A
Acer pseudoplatinus	F
Achillea millefolium	A
Aesculus hippocastanum	R
Agrostis capillaris	O
Agrostis stolonifera	O
Alliaria petiolata	O
Alnus glutinosa	O
Alopecurus myosuroides	A
Alopercurus pratensis	A
Anthoxanthum oderatum	O
Anthriscus silvestris	F
Arctium minor	O
Arrhenatherum elatius	D
Artemesia vulgaris	F
Avena fatua	O
Avena sativa	O
Betula pendula	O
Bromus hordaceus	A
Bromus sterilis	F
Calystegia alba	O
Capsella bursa-pastoris	R
Carex acutiformis	R
Carpinus betula	R
Centaurea nigra	O
Cerastium fontanum	A
Chenopodium album	A
Cirsium arvense	A
Cirsium vulgare	A
Conium maculatum	O
Convolvulus arvensis	O
Cornus sanguinea	R
Corylus avellana	O
Crataegus monogyna	D
Crepis capillaris	O
Cynosurus cristatus	F

Dactylis glomerata	D
Deschampsia cespitosa	O
Dipsacus fullonum	O
Elytrigia repens	O
Epilobium hirsutum	D
Equisetum arvense	O
Eucalyptus gunii	O
Euphorbia lathyris	R
Festuca arundinacea	O
Festuca rubra	D
Filipendula ulmaria	R
Fraxinus excelsior	D
Galium aparine	A
Galium molugo	O
Geranium dissectum	F
Geum urbanum	O
Glechoma hedrecea	F
Glyceria maxima	O
Hedrea helix	O
Heracleum sphondylium	A
Holcus lanatus	A
Hordeum murinum	O
Hordeum secalinum	A
Humulus lupus	O
Juglans regia	R
Juncus effusus	O
Larix decidua	O
Lathyrus pratensis	O
Leucanthemum vulgare	O
Ligustrum domestica	O
Linaria vulgaris	R
Lolium perenne	D
Matricaria discoidea	O
Medicago lupulina	F
Mentha aquatica	O
Papavar rhoeas	O
Persicaria aquatica	R
Persicaria aveculare	O
Phalaris arundinacea	D
Phleum pratense	D
Picris echioides	O

Plantago lanceolata	F
Plantago major	F
Poa pratensis	A
Poa trivialis	A
Populus tremula	O
Potentilla reptans	F
Prunella vulgaris	O
Prunus avium	F
Prunus spinosa	F
Quercus robur	F
Ranunculus acris	O
Ranunculus fluitans	A
Ranunculus repens	A
Ranunculus sceleratus	R
Reseda lutea	R
Rosa canina	F
Rubus fruticosis	D
Rumex acetosa	O
Rumex hydrolapanthum	O
Rumex obtusifolius	O
Salix alba	O
Salix caprea	O
Salix fragilis	F
Salix viminalis	F
Sambucus nigra	F
Sanguisorba officinalis	R
Senecio jacobea	O
Senecio vulgaris	R
Silene vulgaris	O
Sisymbrium officinale	O
Solanum dulcamara	O
Sonchus arvensis	O
Sonchus asper	R
Sonchus oleraceus	O
Sorbus aucuparia	R
Sparganium erectum	A
Stachys sylvatica	F
Symphytum officinale	F
Taraxacum officinalis	F
Tragopogon pratensis	O
Trifolium dubium	F

Trifolium pratense	F
Trifolium repens	D
Tripleurospermum inodorum	O
Triticum aestivum	D
Typha latifolia	A
Ulmus glabra	F
Urtica dioica	D
Veronica persica	O
Viburnum lantana	R
Viburnum opulus	O
Vicia faba	D
Vicia sativa	F
Vicia tetrasperma	O
Viola arvensis	A

List 2: Plant species found within the Additional survey area

The DAFOR abundance score is shown for all species (D=dominant, A=abundant, F=frequent, O=Occasional, R = rare).

Acer campestre	A
Acer pseudoplatinus	O
Achillea millefolium	A
Aesculus hippocastanum	R
Agrostis capillaris	O
Agrostis stolonifera	A
Alliaria petiolata	O
Alopercurus myosuroides	A
Alopercurus pratensis	A
Anthoxanthum oderatum	R
Anthriscus sylvestris	A
Arctium minor	R
Arrhenatherum elatius	D
Artemesia vulgaris	O
Avena fatua	R
Betula pendula	O
Bromus hordaceus	A
Bromus sterilis	O
Calystegia sepium	F
Capsella bursa-pastoris	R
Centaurea nigra	O
Cerastium fontanum	A
Chenopodium album	A
Cirsium arvense	A
Cirsium vulgare	F
Conium maculatum	R
Convolvulus arvensis	F
Corylus avellana	O
Crataegus monogyna	D
Crepis capillaris	R
Cynosurus cristatus	A
Dactylis glomerata	A
Deschampsia cespitosa	O
Dipsacus fullonum	O
Elytrigia repens	O
Epilobium hirsutum	D
Equisetum arvense	O
Eucalyptus gunii	R

Euonymus europaeus	R
Festuca arundinacea	O
Festuca rubra	A
Fraxinus excelsior	D
Galium aparine	A
Galium molugo	O
Galium verum	R
Geranium dissectum	O
Glechoma hedrecea	F
Hedrea helix	O
Heracleum sphondylium	A
Hordeum secalinum	F
Holcus lanatus	F
Hordeum murinum	O
Hypericum perforatum	O
Juncus effusus	R
Juncus inflexus	R
Lamium albm	R
Larix decidua	O
Lathyrus nissolIa	R
Lathyrus pratensis	O
Leucanthemum vulgare	R
Ligustrum domestica	R
Lolium perenne	D
Lotus corniculatus	O
Malus domestica	R
Malva sylvestris	O
Matricaria discoidea	O
Medicago lupulina	F
Myotis arvensis	F
Papavar rhoeas	R
Persicaria aveculare	O
Phalaris arundinacea	D
Phleum pratense	O
Picea abies	R
Picris echioides	O
Pinus sylvestris	O
Plantago lanceolata	O
Plantago major	O
Poa pratensis	O
Poa trivialis	O

Potentilla anserina	O
Potentilla reptans	F
Primula veris	R
Prunella vulgaris	O
Prunus avium	F
Prunus spinosa	O
Quercus robur	F
Ranunculus acris	R
Ranunculus repens	A
Rosa canina	A
Rubus fruticosis	D
Rumex acetosa	R
Rumex obtusifolius	O
Salix alba	R
Sambucus nigra	O
Sedum acre	O
Senecio jacobea	F
Senecio vulgaris	R
Silene latifolia	O
Silene vulgaris	R
Sisymbrium officinale	O
Solanum dulcamara	O
Sonchus arvensis	O
Sonchus oleraceus	O
Sorbus aucuparia	R
Stachys sylvatica	O
Symphytum officinale	O
Taraxacum officinalis	F
Tilia sp.	R
Tragopogon pratensis	O
Trifolium dubium	O
Trifolium pratense	O
Trifolium repens	A
Tripleurospermum inodorum	O
Triticum aestivum	R
Tussilago farfara	O
Ulmus glabra	O
Urtica dioica	D
Veronica chamaedrys	O
Veronica persica	O
Viburnum lantana	R

Viburnum opulus	O
Vicia cracca	R
Vicia faba	D
Vicia sativa	F
Vicia tetrasperma	O
Viola arvensis	F

Appendix 4 – Quadrat data

Quadrat locations are shown on Map 4, Page 38.

MG1 *Arrhenatherum elatius* grassland

MG1	MG1-1	MG1-2	MG1-3	MG1a-1	MG1a-2	MG1a-3	MG1a-4	MG1a-5	MG1a-6	MG1a-7	MG1e-1	Mean
Arrhenatherum elatius	5	5	6	5	7	6	6	7	5	5	7	6
Holcus lanatus	0	0	4	7	5	3	5	5	0	4	0	3
Dactylis glomerata	2	0	0	1	4	5	3	5	4	5	2	3
Trifolium pratense	0	0	4	0	0	6	5	10	0	4	0	3
Lolium perenne	3	0	4	2	2	4	4	0	4	3	0	2
Festuca rubra	0	0	0	6	3	2	6	4	3	0	2	2
Ranunculus acris	0	0	0	2	4	4	5	5	0	0	0	2
Trifolium dubium	0	0	0	2	3	4	5	0	2	0	2	2
Heracluem sphondylium	2	0	0	4	0	4	0	0	3	0	3	1
Achillea millefolium	3	0	0	0	0	5	1	0	3	0	3	1
Rumex acetosa	0	0	0	5	1	0	4	0	0	0	0	1
Geranium dissectum	0	0	0	1	1	3	0	4	0	0	0	1
Agrostis stolonifera	0	4	0	0	1	1	0	2	0	0	0	1
Trifolium repens	0	0	0	0	5	0	0	0	0	3	0	1
Plantago lanceolata	0	0	0	0	0	7	0	0	0	0	1	1
Cerastium fontanum	0	0	0	0	0	2	2	0	0	2	0	1
Ranunclus repens	0	0	0	4	0	0	1	0	0	0	0	0
Bromus mollis	0	0	0	0	3	0	0	0	0	0	2	0
Rumex obtusifolia	0	0	0	0	0	0	0	5	0	0	0	0
Taraxacum officinalis	0	0	0	3	1	0	0	0	0	0	0	0
Poa pratensis	0	0	0	0	0	0	0	4	0	0	0	0
Prunella vulgaris	0	0	0	0	0	0	0	0	0	2	1	0
Cirsium arvense	0	2	0	0	0	0	0	0	0	0	0	0
Vicia tetrasperma	0	0	0	0	0	0	0	0	0	0	2	0
Hordeum secalinum	0	0	0	0	0	0	0	1	0	0	0	0
Anthriscus sylvestris	0	0	0	0	0	0	0	1	0	0	0	0
Dipsacus fulnosum	0	0	0	0	0	0	0	0	1	0	0	0
Mysotis arvensis	0	0	0	0	0	0	0	0	1	0	0	0
Epilobium hirsutum	0	0	0	0	0	0	0	0	0	0	0	0

MG6 *Lolium perenne – Cynosurus cristatus* grassland

MG6	MG6-1	MG6-2	Mean
Lolium perenne	6	6	6
Hordeum secalinum	6	4	5
Cynosurus cristatus	3	4	4
Trifolium repens	2	3	3
Poa pratensis	4	0	2
Ranunculus acris	3	0	2
Cirsium arvense	1	0	1
Cerastium fontanum	0	1	1
Alopecurus pratensis	0	1	1

MG7 *Lolium perenne* leys

MG7	MG7-1	Mg7-2	MG7-3	MG7d-1	MG7d-2	MG7d-3	MG7d-4	MG7d-5	MG7d-6	MG7d-7	MG7d-8	MG7a-1	MG7a-2	MG7a-3	MG7a-4	Mean
Lolium perenne	6	6	7	7	6	5	5	4	6	7	4	6	6	6	6	6
Holcus lanatus	5	6	8	4	6	4	0	5	6	7	5	5	6	8	0	5
Poa trivialis	0	0	0	6	4	1	5	6	0	5	4	0	0	0	0	2
Poa pratensis	7	4	5	0	0	0	0	0	0	0	0	7	4	5	0	2
Phleum pratensis	0	0	0	5	0	7	7	5	0	0	0	0	0	0	0	2
Alopecurus pratensis	1	4	1	5	0	2	2	2	2	0	2	2	5	1	0	2
Dactylis glomerata	4	2	2	0	0	0	2	0	0	0	3	4	3	2	4	2
Hordeum secalinum	0	0	0	0	2	3	3	0	5	0	0	0	0	0	0	1
Cirsium arvense	0	0	0	1	0	4	2	0	0	2	0	0	0	0	0	1
Ranunculus repens	0	0	1	3	2	0	0	0	0	0	0	0	0	0	0	1
Phleum pratense	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Agrostis stolonifera	0	0	0	0	1	0	0	0	0	0	5	0	0	0	0	0
Ranunculus acris	2	0	0	0	0	0	0	0	1	1	0	3	0	0	0	0
Festuca rubra	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
Bromus hordaceous	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
Ranunculus acris	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Trifolium repens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Anthoxanthum odoratum	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Deschampsia cespitosa	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Cynosurus cristatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

W6 *Alnus glutinosa – Urtica Dioica* woodland

W6	W6-1
Rumex obtusifolius	9
Salix viminalis	8
Salix fragilis	4
Urtica dioica	3
Epilobium hirsutum	3

W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland

W8	W8-1	W8-2	W8d-1	W8-3	W8-4	Mean
Fraxinus excelsior	7	4	8	7	6	6
Urtica dioica	0	5	8	5	4	4
Crataegus monogyna	0	5	6	4	0	3
Prunus spinosa	0	6	3	4	0	3
Alnus glutinosa	0	6	6	0	0	2
Hedrea helix	0	0	5	2	3	2
Quercus robur	0	0	5	4	0	2
Alliaria petiolata	0	4	4	1	0	2
Galium aparine	0	0	7	0	2	2
Acer pseudoplatanus	0	0	5	3	0	2
Anthriscus silvestris	0	4	4	0	0	2
Corylus avellana	0	0	5	3	0	2
Dactylis glomerata	0	4	4	0	0	2
Acer campestre	0	0	0	8	0	2
Poa pratensis	0	3	4	0	0	1
Eucalyptus gunneii	0	5	0	0	0	1
Bromus ramosa	0	0	4	0	0	1
Geum urbanum	0	0	4	0	0	1
Larix decidua	0	0	4	0	0	1
Euonymus europaeus	0	0	0	0	2	0
Ligustrum vulgare	0	0	0	0	1	0
Tilia sp.	0	0	0	0	0	0

W21 *Crataegus monogyna – Hedera helix* scrub

W21	W21-1	W21-2	W21-3	Mean
Crataegus monogyna	8	10	8	9
Acer campsetre	6	0	6	4
Rubus fruticosis	4	3	2	3
Urtica dioica	5	0	0	2
Ulmus glabra	4	0	0	1
Quercus robur	0	0	0	0
Rosa canina	0	1	0	0

W24 *Rubus fruticosus – Holcus lanatus* scrub

W24	W24
Rubus fruticosus	7
Urtica dioica	6
Rosa canina	3
Crataegus monogyna	3

OV26 *Epilobium hirsutum* community

OV26	OV25 -1	OV25-2	Mean
Epilobium hirsutum	9	9	9
Urtica dioica	3	0	2
Galium aparine	2	0	1

A18 *Ranunculus fluitans* community

A18	A18-1	A182
Ranunculus fluitans	5	6

S12 *Typha latifolia* swamp

S12	S12-1
Typha latifolia	8
Agrostis stolonifera	5

S28 *Phalaris arundinacea* tall-herb fen

S28	S28-1	S28-2	Mean
Phalaris arundinacea	5	6	5
Urtica dioica	2	5	3
Sparganium erectum	0	5	2
Arrhenatherum elatius	4	0	2
Mentha aquatica	0	2	1

MAP 4

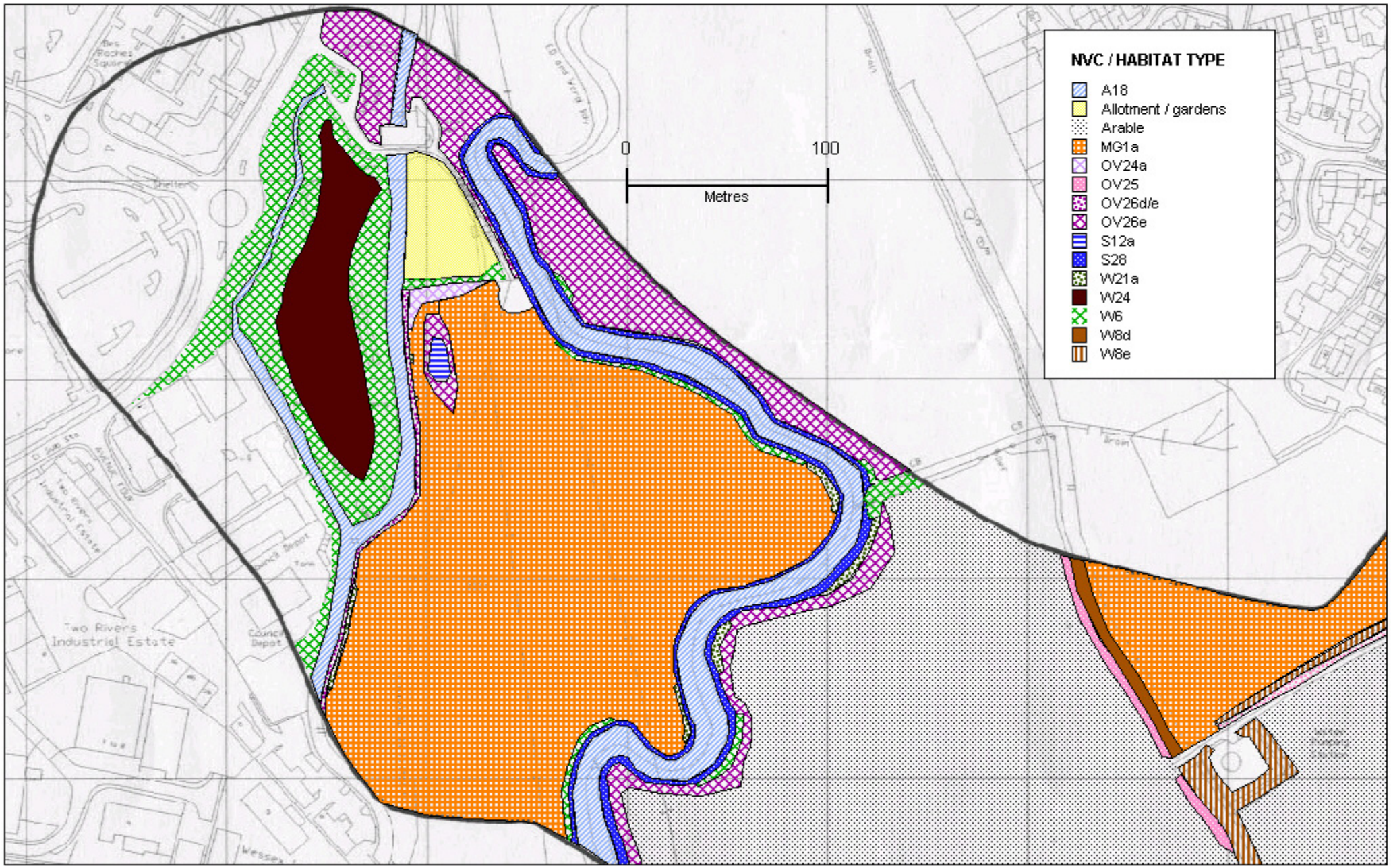
(See Map 4.PDF document supplied with this report.)

Appendix 5 - Target Notes

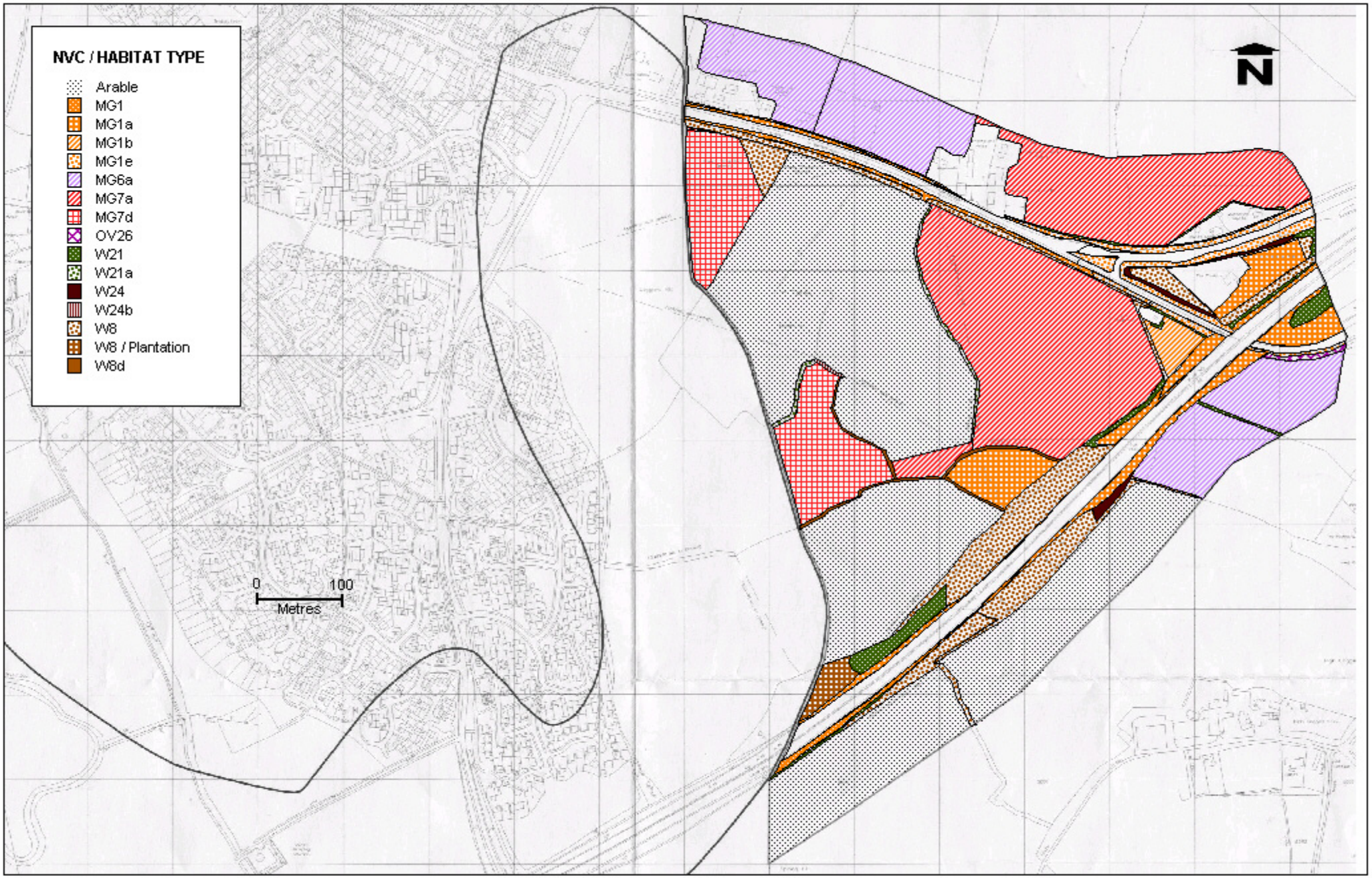
Locations of points and areas referred to in these notes are shown on map 5, page 40.

1	Overgrown pond. Estimated maximum water depth 15cm. Little open water.
2	Area of weed-rich arable field. Weed species present include *Alopercurus myosuroides, Bromus sterilis, Chenopodium album.*
3	Planted trees to 8m: *Larix decidua, Prunus avium, Alnus glutinosa.*
4	Planted exotic trees: *Acer pseudoplatinus*.
5	Planted native trees to 3.5m: *Fraxinus excelcior, Betula pendula, Populus tremula, Quercus robur, Prunus avium*.
6	Planted trees to 8m: *Alnus glutinosa, Eucalyptus gunnii, Larix dicidua*
7	Planted *Acer pseudoplatinus* to 7m
8	Large *Salix alba* and *Quercus robur* along roadside.
9	Exotic street trees: *Robinia pseudoacacia.*
10	Planted native trees to 3m: *Quercus robur, Fraxinus excelsior, Crataegus monogyna, Vibernum opulus*
11	Planted native trees to 3.5m *Prunus avium, Viburnum opulus, Fraxinus excelsior* and some non-native *Picea abies*
12	Native trees to 2m: *Acer campestere, Fraxinus excelsior, Viburnum opulus, Crataegus monogyns, Betula pendula.*
13	*Pinus sylvestris* to 8m on A40 embankment.
14	*Pinus sylvestris* to 8m on A40 embankment.
15	Planted *Prunus avium* to 4m on traffic island
16	Planted *Quercus robur* to 2m on edge of scrub
17	Road verges with high floral diversity. Marbled white butterfly abundant.

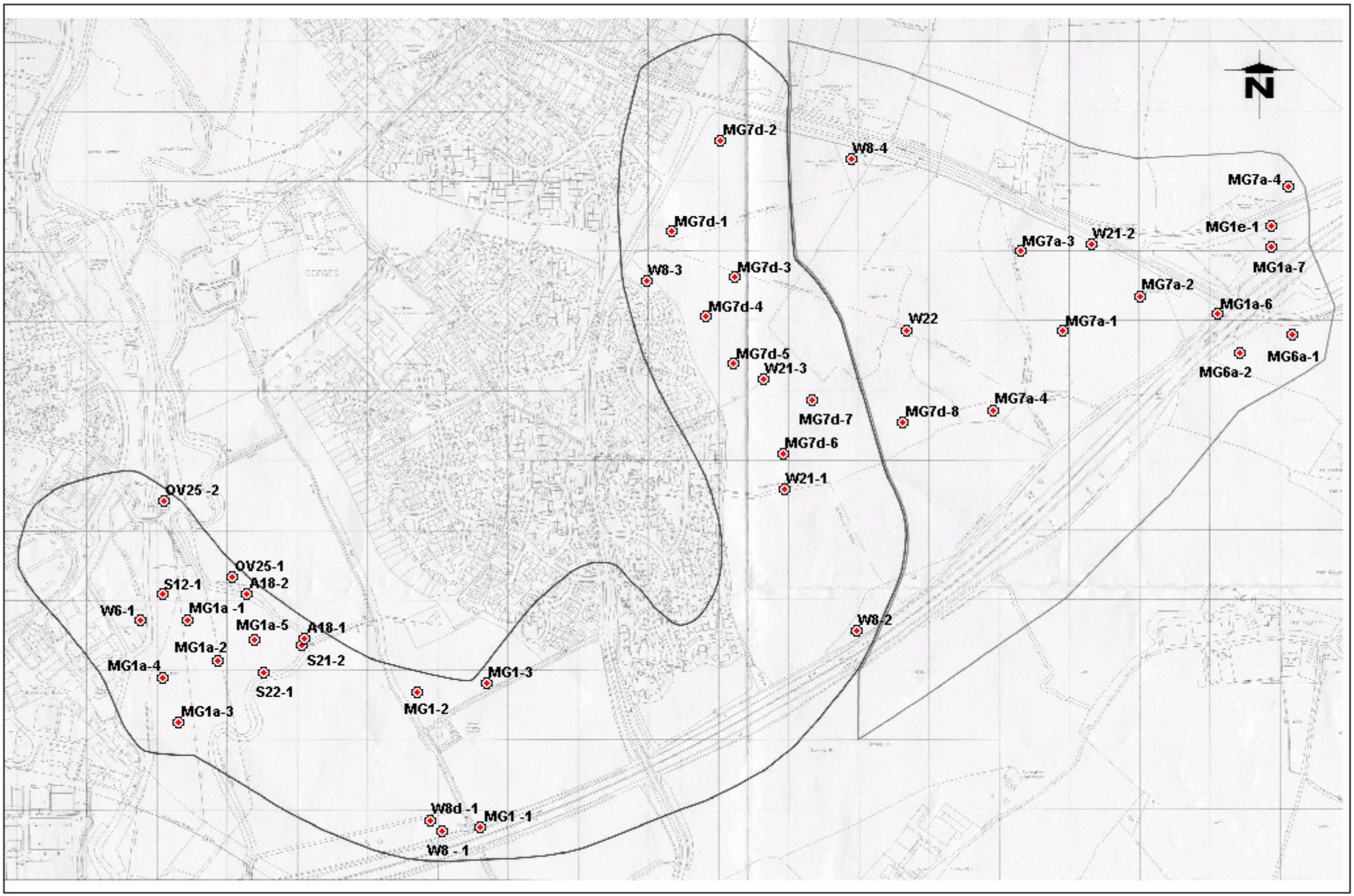
Map 1. Habitat map of main survey area: Witney Cogges Link Road



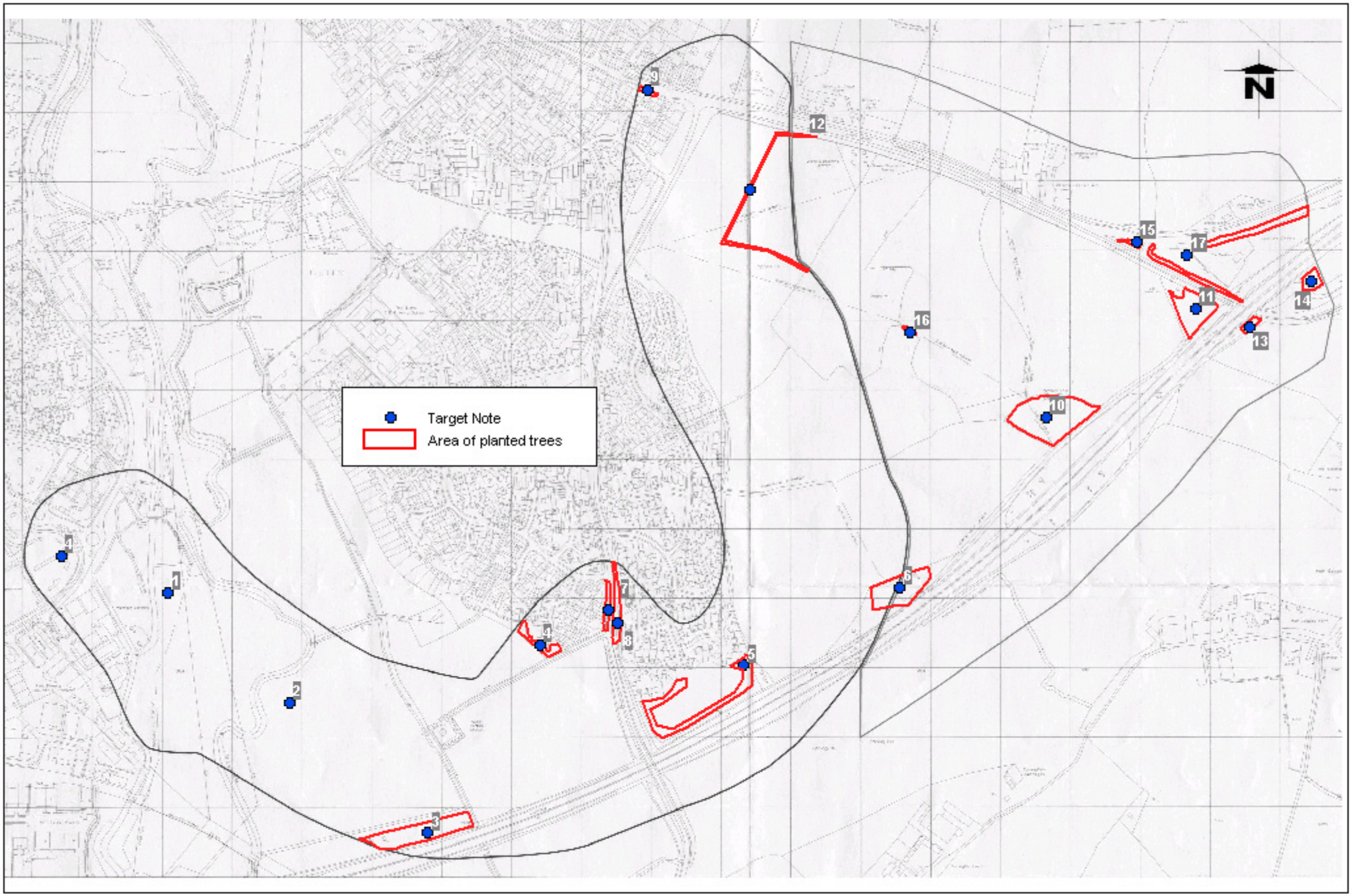
Map 2. Enlarged habitat map of eastern section of main survey area: Witney Cogges Link Road



Map 3. Habitat map of additional survey area: Witney Cogges Link Road



Map 4. Map showing location of quadrats.



Map 5. Map showing location of target notes and areas of planted trees