

LONDON CONSERVATION SERVICES LTD



NATURE CONSERVATION
MANAGEMENT PLAN
for
**THE LOWER WANDLE
LOCAL NATURE
RESERVE**

A REPORT FOR
THE LONDON BOROUGH OF MERTON

April 2001

Written by

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LONDON CONSERVATION SERVICES

London Conservation Services (LCS) is the wholly owned trading company of the London Wildlife Trust (LWT), which is the only charity working through the whole of Greater London to help wildlife. LWT is part of a nation-wide network of Wildlife Trusts and Urban Wildlife Groups, which work to promote wildlife, and is widely regarded as one of the foremost urban nature conservation organisations in the UK. As well as managing over 50 nature reserves in London, the Trust campaigns to save and improve greenspace, gives advice to local communities and schools, and works with Local Authorities and other organisations to make London a better place, not only for wildlife, but for people too.

LCS carries out work in most areas of nature conservation and wildlife management, including: practical habitat management, advice on management of wildlife, ecological surveys, environmental education and landscape design incorporating ecological improvements and safeguards. It is able to call on a wide range of expertise provided by LWT staff and by other ecologists and free-lance professionals in the London Area and beyond.

LCS is managed by Alan Scott Ecological Consultants Limited.

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Introduction

London Conservation Services (LCS) have been commissioned by the London Borough of Merton (LBM) to prepare a management plan for the proposed Lower Wandle Local Nature Reserve. The plan, which is presented in the following report, considers the short and medium-term management works required to conserve and enhance the ecological interest of the Lower Wandle. It also puts forward a number of recommendations for potential longer term enhancements.

The plan is based on a habitat survey of the site carried out in February 2001 and on discussions with Martin Boyle of the London Borough of Merton.

Part 1: General Information

1.1 Name

Lower Wandle Local Nature Reserve.

1.2 Location

The site includes that section of the River Wandle between Plough Lane in the south and Trewint Street in the north (see figure 1). It encompasses the western bank of the river and a narrow adjoining strip of open land, along which the Wandle Trail footpath passes. The eastern bank of the river, which is largely within the London Borough of Wandsworth, and the bed of the river itself, which is managed by the Environment Agency, are not covered by the management plan.

1.3 Area

2.5 hectares (approx.).

1.4 Grid Reference

TQ 258 720 (centre of site).

1.5 Access

The site is open at all times. It is accessible on foot from Plough Lane in the south and from Weir Road and Trewint Street in the north. The Wandle Trail passes through the site. By public transport it is a short walk from either Haydons Road Station in the south or Earlsfield Station in the north.

1.6 Vice County

VC17 Surrey.

1.7 Map Coverage

British Geological Survey 1: 50,000 series Sheet 270 South London.
Ordnance Survey 1: 50,000 series Sheet 176.
Ordnance Survey 1: 25,000 series Sheet TQ27/37.

1.8 Land Tenure

The freehold of the site is owned by the London Borough of Merton (LBM).

1.9 Status

The area has been designated as a Site of Borough Importance for Nature Conservation Grade 1 by the former London Ecology Unit (LEU 1998) and is identified as a Site of Importance for Nature Conservation in the Merton Unitary Development Plan (UDP).

1.10 Public Rights of Way

The Wandle Trail runs along the entire length of the site.

1.11 Planning Authority

London Borough of Merton.

1.12 Sources of Information

London Borough of Merton, The Education, Leisure and Libraries Department, The Civic Centre, London Road, Morden, Surrey. 020 8545 3657.

Part 2: Policy Statement

Merton Borough Council recognises the importance of wildlife and green spaces to people living in Merton and pursues policies to defend sites of interest from development, and manages its open spaces with nature conservation in mind.

The Unitary Development Plan (UDP) highlights ways in which the natural environment can be protected and enhanced. This document directs how Merton's physical environment will alter over the next decade and provides safeguards that the Council can impose to ensure that the Borough's wildlife is protected from injurious development schemes. To further demonstrate its commitment to nature conservation the Council has already designated a number of Local Nature Reserves (LNRs) and intends to declare more in the future. It is proposed that the Lower Wandle will be declared an LNR in the near future, and the production of this management plan is an important part of this process.

Part 3: Description & History

3.1 General Description

The site is situated along the western banks of the River Wandle between Plough Lane, Wimbledon and Trewint Street, Earlsfield. In the south and north the site is very narrow, averaging no more than about 10 metres across. However it broadens out in the central sections, in places reaching circa 40 metres in width. To the west the site is bounded by industrial estates and, at the Plough Lane end, the derelict Wimbledon football ground. The River Wandle forms the eastern boundary, with the borough boundary running down the centre of the river. Factory buildings line the eastern river banks in the south but give way to open space and allotments around Garratt Park in the north.

3.2 History

The present course of the River Wandle is largely artificial, the original course lying further to the east by Summerstown and Riverside Road. However the present course was largely established by the time of the earliest maps in the mid-18th century (LEU 1998). Numerous attempts to straighten and divert the river were made over the centuries to feed the many water mills that had developed in the Wandle valley. Increasing urbanisation in the 20th century led to further straightening and the deepening of the river to prevent flooding.

Three mills were at one time situated along this section of the Wandle. In the south, at Copper Mill Lane, was Garratt Mill. This was a copper mill in the 17th century but from 1890 to 1960 operated as Chuter's Chamois Leather Works (LEU 1998). Another mill, the Garratt Print Works, was located further north on a bend of river close to Riverside Road. By Trewint Street in the north was Strong Mill, which later became the Garratt Paper Mill. Despite the presence of the mills and other industries, until the nineteenth century much of the land on the western side of the Wandle north of Plough Lane remained under arable cultivation or was managed as floodplain meadow and pasture.

In the late 19th century the Wimbledon Sewage Works was developed on the land to the west of the river. This continued to operate until the middle of the 20th century, after which the site was redeveloped as the Weir Road Industrial Estate.

3.3 Geology and Topography

The natural surface geology of the area consists of recent river alluvium, with London Clay immediately to the west. However much of the site is made ground and is likely to consist of a miscellaneous mix of materials, giving rise to disturbed and fairly nutrient rich soils.

The site is several metres above the normal level of the River Wandle. There is some variation in topography within the site, with mounded areas rising about two metres above the general level in the central sections. The river banks are generally steep sided and for the most part lined by either sheet steel piling or by a concrete footing below earth banks.

The site is free draining for the most part although there is a damp, seasonally flooded area straddling the path in the northern section (see figure 2a). A culverted stream crosses the site from the west and joins the Wandle about half a kilometer north of Plough Lane.

3.3 Past Management

Previous management of the site has been limited to pollarding and other tree surgery works on some of the larger trees, mowing of path margins and planting of small lengths of native hedge. There have also been attempts to control giant hogweed *Heracleum mantegazzianum*, a noxious plant which occurs in the central part of the site.

Part 4: The Habitats, Flora and Fauna

A habitat survey of Lower Wandle was carried out as part of the background research for the preparation of the management plan. The survey was carried out on the 22nd February 2001. The timing was considered adequate to characterise the habitats present on the site. However, because the survey was undertaken outside of the growing season, it was not possible to compile comprehensive species lists for the site. It is therefore recommended that further survey work be carried out in late Spring/early summer. Other information on the flora and fauna of the site has been obtained from the London Ecology Unit handbook on Merton (LEU 1998).

4.1 Habitats

The site supports a complex mosaic of vegetation, incorporating areas of scrub, tall herb and grassland, as well as significant numbers of mature trees. Riparian habitats occur along the Wandle itself. These habitats are described in turn below and shown on figures 2a & b.

4.1.1 The River Wandle

The channel of the River Wandle is managed by the Environment Agency and is not covered by the present management plan. However, because the river is such a significant feature and exerts a strong influence on the ecology of the site proper, its habitats are described briefly here.

The Wandle is noted for its comparatively rich aquatic flora, including species such as water starwort *Callitriche spp.*, arrowhead *Sagittaria sagittifolia*, water crowfoot *Ranunculus spp.*, fennel-leaved pondweed *Potamogeton pectinatus*, broadleaved pondweed *P. natans* and Nuttall's pondweed *Elodea nutallii*, amongst others. Particularly prominent in this section of the Lower Wandle is unbranched bur-reed *Sparganium emersum*, whose grass-like leaves form extensive underwater meadows.

For the most part, the banks in this section are lined with a concrete toe-wall or by sheet steel piling and are not conducive to the development emergent and marginal vegetation. Occasional muddy shoals can be found on the margins where trees have encouraged deposition. Higher up, the banks are generally covered with bramble *Rubus fruticosus* scrub or tall herb vegetation dominated by species such as stinging nettle *Urtica dioica*. Ivy *Hedera helix* often dominates the areas under trees (see below). Pellitory-of-the-wall *Parietaria judaica* grows on the concrete river wall towards the northern end of the site.

A tributary stream joins the Wandle from the west, about half a kilometer north of Plough Lane. The channel is lined with a corrugated material and is devoid of vegetation. Water quality in the channel appears poor and was flowing black at the time of survey.

4.1.2 Riverside trees & woodland

Mature trees line the banks of the Wandle throughout much of the site. These include a number of large crack willows *Salix fragilis*. Some of these have been pollarded, whilst others are beginning to collapse and split. Large hybrid black poplar *Populus x canadensis* trees are also frequent, especially in the central section opposite Garratt Park and allotments. Sycamore *Acer pseudoplatanus* is occasional and groups of these trees are particularly common in the south. In places the trees are sufficiently dense as to form a narrow strip of secondary woodland, with a sparse understorey of elder *Sambucus nigra*.

The main ground cover in these areas consists of bramble, stinging nettle, cow parsley *Anthriscus sylvestris*, cleavers *Galium aparine* and ground ivy *Glechoma hederacea*, with ivy

common in the shadier parts. Rarer species include garlic mustard *Alliaria petiolata*, stinking iris *Iris foetidissima* and lesser celandine *Ranunculus ficaria*.

4.1.3 Scrub & hedgerow

Areas of scrub are frequent, especially along the western margins of the site. Elder is the most abundant shrub species but hawthorn *Crataegus monogyna*, buddleia *Buddleja davidii*, grey sallow *Salix cinerea* and goat willow *S. caprea* are also frequent, as are saplings of sycamore and ash *Fraxinus excelsior*. Laburnum *Laburnum anagyroides* occurs in one area in the central portion of the site. Bramble is also a common scrub component, both amongst shrubs and also forming dense patches on its own. The field layer of the scrub areas generally consists of stinging nettle and cow parsley but in places it features species such as Spanish bluebell *Hyacinthoides hispanica*, green alkanet *Pentaglottis sempervirens* and garlic mustard. Carpets of the mosses *Brachythecium rutabulum* and *Eurhynchium praelongum* are common under the more mature areas. Russian vine *Fallopia baldschuanica* occurs as a scrambling climber in some areas.

Sections of native hedgerow have been planted in places to help screen boundary fences and factory walls. Typical species include hawthorn, hazel *Corylus avellana*, dogwood *Cornus sanguinea*, silver birch *Betula pendula* and English oak *Quercus robur*.

4.1.4 Tall herb

As noted above, stinging nettle and cow parsley are abundant in the woodland and scrub areas of the site. They are also widespread in the more open sections, forming the main tall herb cover on the banks of the Wandle and elsewhere. A variety of other tall herbs also occur, including hemlock *Conium maculatum*, hogweed *Heracleum sphondylium*, teasel *Dipsacus fullonum*, lesser burdock *Arctium minus* and great willowherb *Epilobium hirsutum*, amongst others. Hemp agrimony *Eupatorium cannabinum*, an uncommon plant in Greater London, is present in small quantity in damper areas, together with reed canary grass *Phalaris arundinacea* and, in one location, pendulous sedge *Carex pendula*. Of particular concern is the presence of giant hogweed *Heracleum mantegazzianum*, an introduced plant that can reach a height of 5.5 metres and which contains a toxic sap which can cause dermatitis in the presence of sunlight. It is fairly frequent in the central part of the site (see figure 2a). Another exotic species of concern is Japanese knotweed *Fallopia japonica*, which forms dense monoclonal stands and can spread at the expense of other vegetation. This species occurs in a few scattered patches in the southern part of the site and is abundant on the eastern (Wandsworth) bank of the Wandle.

4.1.5 Grassland

There are several small areas of semi-improved neutral grassland associated with the margins of the footpath. These are generally fairly disturbed and have been kept short by rabbit grazing and regular mowing during the growing season. Typical species include ryegrass *Lolium perenne*, annual meadow grass *Poa annua*, cut-leaved cranesbill *Geranium dissectum*, ribwort plantain *Plantago lanceolata*, yarrow *Achillea millefolium* and creeping cinquefoil *Potentilla reptans*. Where rabbit grazing has been less intense and mowing has not been so frequent this grades into ranker grassland dominated by false oat grass *Arrhenatherum elatius*, with herbs such as perforate St. John's-wort *Hypericum perforatum*, ragwort *Senecio jacobea* and Michaelmas daisy *Aster sp.*

4.2 Fauna

The fauna of the site has not been surveyed in any detail, although casual records are available from the recent habitat survey. It would be worthwhile carrying out systematic surveys of the fauna in the future, in particular breeding bird and invertebrate surveys.

4.2.1 Mammals

There is a healthy rabbit *Oryctolagus cuniculus* population within the reserve, mainly concentrated in the more open areas towards the centre of the site. A fox *Vulpes vulpes* earth was noted on a steep embankment in the southern part of the site. Small mammals are present in the grassland and scrub areas – an old vole nest was found under a discarded panel. Bats may be attracted to forage along the river and some of the older trees with cavities offer potential roosting sites.

4.2.2 Birds

A range of common birds were recorded during the habitat survey, including dunnock *Prunella modularis*, robin *Erithacus rubecula*, blackbird *Turdus merula*, wren *Troglodytes troglodytes*, great tit *Parus major*, chaffinch *Fringilla coelebs*, starling *Sturnus vulgaris*, magpie *Pica pica* and carrion crow *Corvus corone*. Mallard *Anas platyrhynchos*, moorhen *Gallinula chloropus* and grey wagtail *Motacilla cinerea* were noted along the river. LEU (1998) state that grey wagtail and moorhen breed beside the river, whilst pied wagtail *Motacilla alba*, blackcap *Sylvia atricapilla*, reed bunting *Emberiza schoeniclus*, goldfinch *Carduelis carduelis* and linnet *Acanthis cannabina* breed nearby. Grey heron *Ardea cinerea* and kingfisher *Alcedo atthis* have been recorded foraging along the river.

4.2.3 Invertebrates

No comprehensive invertebrate survey has been carried out. LEU (1998) note that the site supports numerous bees, grasshoppers and butterflies, whilst damselflies are associated with the river.

Part 5: Evaluation

5.1 Nature Conservation

This section of the Lower Wandle has been designated as part of a Site of Borough Importance Grade 1 by the London Ecology Unit (1998).

Although highly modified and constrained by engineered banks, the river supports a reasonably diverse aquatic flora, including several species which are uncommon in Greater London (see table 1 below). It also attracts species such as kingfisher and grey wagtail which are scarce in London, and grey heron, a London Biodiversity Action Plan priority species.

The terrestrial habitats complement the river and add considerably to the habitat diversity. No rare species are associated with the terrestrial habitats, although hemp agrimony is relatively uncommon in Greater London. It is also unusual to find a thriving rabbit population this far into central London.

As a linear feature which is continuous with similar habitats along the River Wandle and its tributaries, the site is a critical link in a wildlife corridor of considerable importance. Such corridors facilitate the movement and dispersal of plants and animals and are thought to help reduce the vulnerability to chance extinctions that may occur when habitats are isolated and fragmented.

Table 1: Uncommon plant species

Plants	Habitat	(% of Greater London tetrads ¹)
Unbranched bur-reed <i>Sparganium emersum</i>	River	4.75
Nuttall's pondweed <i>Elodea nutallii</i>	River	1.5 ²
Arrowhead <i>Sagittaria sagittifolia</i>	River	3.75
Fennel-leaved pondweed <i>Potamogeton pectinatus</i>	River	10
Stream water crowfoot <i>Ranunculus pencillatus</i>	River	7
Hemp agrimony <i>Eupatorium cannabinum</i>	Tall herb, river (?)	9.5

¹ as calculated by the London Ecology Unit from the Flora of the London Area (Burton 1983)

² rare at the time of the Flora, this species has expanded considerably in recent years

5.2 UDP Policies

The UDP defines policies relating to ecology and nature conservation and is available for inspection at Merton Civic Centre and most local libraries. The London Ecology Unit handbook "Nature Conservation in Merton" (LEU 1994) identifies the Lower Wandle as a Site of Local Importance for Nature Conservation. This designation ensures that the site is covered by Policy EN.4 of the UDP, which seeks to protect Sites of Importance to Nature Conservation in the Borough. The production of this management plan is in line with Policy EN.16 – Management of Green Spaces – Conservation Plans. The site is additionally designated as a Green Corridor in the UDP.

5.3 General Amenity/Recreation

A public footpath, the Wandle Trail, runs the entire length of the site. The footpath is open to the public at all times.

The River Wandle is used (unofficially) for angling.

5.4 Education

The site has potential for educational use, but this is severely constrained by health and safety considerations such as the occurrence of giant hogweed and by steep banks alongside the River Wandle. Safer opportunities for environmental education are available nearby at the Wandle Meadow Nature Park.

For the time being, schools should not be actively encouraged to utilise the site, although the situation should be reviewed in due course.

5.5 Management Objectives

The general long-term aims are to conserve and enhance the existing nature conservation interest of the site and to provide local people with an accessible place in which to enjoy nature.

These aims incorporate the following ideal management objectives:

1. To maintain and enhance the existing ecological value of terrestrial habitats, including grassland, tall herb, scrub, trees and woodland.
2. To work in partnership with the Environment Agency with a view to enhancing riparian habitats alongside the River Wandle
3. To control noxious and invasive plant species
4. To facilitate greater public use and enjoyment of the area
5. To collect further ecological information on the site and to monitor the effectiveness of management

5.6 Bibliography

London Ecology Unit 1998 *Nature Conservation in Merton*, London Ecology Unit, London.

Part 6: Management

6.1 General principles

6.1.1 General safety

Public safety must be a priority at all times since there is unrestricted public access to the site. Regular safety inspections should be carried out. Any hazards should be promptly reported and any necessary remedial action organised. Particular attention should be paid to the access points and footpath, to the river banks and bridges, to fences and to trees which overhang boundaries and footpaths.

6.1.2 Litter

Litter and fly-tipping is a problem throughout the site but is particularly apparent in the northern section near the Trewint Street and Weir Road entrances. An abandoned car occurs in this vicinity. As well as being an eyesore, litter and fly-tipping can also present safety hazards, both to people and wildlife.

Litter should be collected and cleared on a regular basis and fly tipping and abandoned vehicles promptly removed. Visitors should be encouraged to take their litter home. Litter bins should not be installed within the reserve since they tend to encourage more littering, require regular emptying and are a focus for vandalism.

6.1.3 Use of herbicides

There will be a general presumption against the use of herbicides, however it will be necessary to use limited amounts for specific tasks (e.g. control of giant hogweed and Japanese knotweed). Herbicides should only be used by suitably qualified operatives and must accord with all relevant Health & Safety and COSHH guidelines. The Environment Agency should be consulted regarding any proposed herbicide use adjacent to the Wandle and its tributaries.

6.1.4 Survey and monitoring

Survey and monitoring should be an integral component of site management. Survey work adds to the site knowledge base and helps to refine conservation priorities. Monitoring provides essential feedback, enabling management actions to be evaluated and fine-tuned.

A habitat survey was carried out in February 2001 but the timing was not adequate to provide a comprehensive picture of the flora of the site. Further botanical survey work in the spring and summer of 2001 is therefore recommended. To date no detailed fauna surveys of the site have been undertaken. Invertebrate and breeding bird surveys would be particularly worthwhile and should be carried out at the earliest opportunity.

As a minimum requirement, photographic monitoring should be implemented. A series of fixed photographic points should be established and photographs repeated at two year intervals to provide a photographic record of site management and development.

Records of species found on site should be made available to the London Wildlife Trust Biological Recording Project and London Natural History Society.

6.1.5 Review of management plan

This management plan is written to cover the next 5 years and should be thoroughly reviewed at the end of this period. The implementation of the plan should be subject to a

brief review at the end of each year, to ensure that the specified works are being carried out and that they are having the desired effect.

6.1.6 Planting and other introductions

Only limited further introduction of plants to the site is anticipated (e.g. to extend hedges along the site boundary and to provide long-term replacements for some of the riverside trees). All plant introductions to the site should be of native species, preferably material of local provenance. This will ensure maximum benefit to wildlife and help to promote local distinctiveness. All plant introductions should be recorded.

There should be a general presumption against the introduction of animal species.

6.1.7 Dead wood

Dead wood is an essential habitat for many species, especially invertebrates, bryophytes and fungi. The removal of dead wood and the excessive 'tidying-up' which often takes place in parks and gardens leads to relatively sterile conditions and takes away an essential part of the ecosystem. It is therefore desirable to retain as much dead wood as possible within scrub and tree planting areas. Standing dead trees should be allowed to stand wherever possible, as this provides a habitat for a different range of fauna, for example feeding and nesting opportunities for woodpeckers and other birds. However, standing dead trees can be a safety hazard and this consideration must always take precedence in areas of high public use. Consequently any trees which are in a demonstrably unsafe condition and are situated near paths, boundaries or other regularly used areas must be made safe.

6.1.8 Species control & management

Noxious and invasive plant species

Giant hogweed is well established in the central part of the site, growing amongst other tall herbs on damp ground on either side of the footpath (see figure 2a). Originally from the Caucasus, giant hogweed was introduced to gardens in the late nineteenth century and has since become widely naturalised, especially along watercourses. Although a spectacular plant - growing to a height of up to 5.5 metres and with leaves approaching a metre in width - giant hogweed is a problem due to its invasive nature and toxic sap, which can cause blistering of the skin in the presence of sunlight (giant hogweed dermatitis). Efforts have been made to control the plant in the Lower Wandle Nature Reserve (M. Boyle, pers. comm.) and these should be continued. A variety of methods have been devised for the control of this species, including severing the roots, de-heading before the plant sets seed, grazing and herbicide treatment. Of these the most practical and effective has been found to be herbicide control using glyphosate. The herbicide should be applied at a rate of 7.2 g/litre in April/early May, when the plants are readily recognisable but before they grow too tall. The whole plant should be sprayed, taking care to avoid spray drift onto non-target vegetation. After five to six weeks any surviving plants should be cut down to ground level and any re-growth treated with herbicide a week or so later. The plant regenerates from seed and is likely to re-appear for several years until the seed bank is exhausted. An on-going and consistent control programme is therefore needed. Operatives should take care at all times to avoid skin contact with the plant. Although non-persistent, glyphosate is a broad spectrum herbicide so it should be applied carefully so as to avoid damage to other plants. The Environment Agency must be consulted regarding any herbicide use alongside or close to the River Wandle.

Japanese knotweed *Fallopia japonica* also occurs within the reserve, although it is of rather more restricted occurrence than giant hogweed (however it is very abundant on the Wandsworth side of the river). Japanese knotweed was also introduced as a garden plant in the nineteenth century and subsequently became widely naturalised. It forms dense,

persistent clumps, which gradually spread by means of underground rhizomes, at the expense of surrounding vegetation. The plant should ideally be eradicated before it can spread further. This can be achieved by a combination of cutting and herbicide application (Cooke 1988, Child & Wade 2000). The plant should be treated with glyphosate herbicide at the rate of 5 litres (1.8 kg) per hectare during the spring when the leaves have fully expanded. Surviving stems should then be cut down in mid-summer and any subsequent re-growth repeat treated with herbicide at the end of the summer (August). Repeat treatments will be required for several years in order to achieve complete eradication. Liaison should be established with the Environment Agency, the London Borough of Wandsworth and other landowners/land managers with a view to developing a co-ordinated control programme for this and other sections of the River Wandle.

Michaelmas daisy, a naturalised ornamental plant, is present in the grassland areas and this species can be invasive in some situations. However the plant does provide a valuable nectar source for insects, including butterflies, and should in general be tolerated. The abundance of the plant should be monitored and if it continues to spread at the expense of other vegetation it should be controlled by hand-pulling or by weedwiping with glyphosate herbicide.

Sycamore, an introduced but long established tree, is often regarded as an invasive species and is disliked by some conservationists on account of its perceived low ecological value. However it does provide a valuable nectar source for bees and other insects, and supports a large biomass of aphids which in turn attract insectivorous birds. It is also very tolerant of pollution and is well adapted to urban habitats. Sycamore is common in the south of the site, where it forms small areas of secondary woodland, and occurs sporadically elsewhere. It is not considered a problem species in the context of the reserve and no control measures are proposed, although this may be reviewed if it is found to be spreading at the expense of other vegetation.

Ivy

Ivy is a valuable late nectar source for insects, is one of the larval food plants of the holly blue butterfly *Celastrina argiolus*, provides abundant fruit for birds and other animals and affords excellent cover for nesting birds and over-wintering insects. Despite its ecological value, ivy is still all too often perceived as a threat to trees. It is not parasitic on trees nor does it compete with them for light. Ivy will therefore be left to grow undisturbed within the Lower Wandle Nature Reserve.

Animal pest species

Norway or brown rats *Rattus norvegicus* may occur within the site. Norway rats are a significant health hazard, being responsible amongst other things for the spread of diseases such as Weil's disease. In order not to encourage rats, it is important to control and prevent littering and flytipping within the site. If rat populations become abundant control measures may be required. Such measures should be carefully evaluated and implemented to ensure that there is no harm to other wildlife populations.

Magpies and carrion crows are sometimes perceived as problem species due to their habit of preying upon the nestlings of songbirds. Such predation is a natural phenomenon and there is no evidence that it has been responsible for the decline in songbird numbers which has been observed in recent decades. No control of these species is therefore proposed.

6.1.9 Dogs

Visitors utilising the reserve and the Wandle Trail should be encouraged to keep their dogs on a leash to minimise disturbance to wildlife. Fouling by dogs presents a problem and

visitors should be requested not to allow their animals to defecate within the site and to clear up after them if they do. Dog toilets and bins are inappropriate in a nature reserve.

6.1.10 Angling

The banks of the Wandle are used unofficially by anglers. This results in a certain amount of trampling of vegetation and damage to riverside trees etc., as well as littering. Resolution of these conflicts is beyond the scope of the present management plan. However it is recommended that a dialogue be established with anglers with a view to formalising their activities. The establishment of permanent fishing stations and the regulation of angling activities through an angling club might be one way to resolve the existing conflicts. It could also help to enlist the support of anglers in caring for the reserve and the river.

6.1.11 Bye-laws

The declaration of the site as a statutory Local Nature Reserve will enable the formulation of bye-laws. These could be used to address issues such as preservation of wildlife, litter, angling, motorcycling, use of firearms and control of dogs, amongst others.

6.1.12 Interpretation

It is important to provide visitors to the site with information about the wildlife that occurs there and the management that is being carried out to conserve it. This can be achieved in a variety of ways, for example through information leaflets, guided walks, articles in the local press etc. The site already features in Walk 2: The River Wandle, one of a series of five self-guided walk leaflets produced by the London Borough of Merton and distributed with the London Ecology Unit Handbook 'Nature Conservation in Merton' (LEU 1998).

The provision of interpretation boards is a simple and direct way of informing people about the site. Interpretation boards can make people feel more welcome and positive about their visit and, by providing information about what is to be seen, can increase the level of enjoyment. Information boards giving detailed information about the site's ecology and management should be installed by the Plough Lane entrance in the south and near the Weir Road entrance in the north. All boards should be kept clean and in good repair.

6.2 *Habitat Management*

6.2.1 Riparian habitats along the banks of the Wandle

As noted above (section 4.1.1), there is currently very little emergent and marginal vegetation along the edge of the River Wandle. Such vegetation would greatly enhance the habitat value of the river, providing for cover for breeding birds, fish and dragonflies, as well as helping to buffer the effects of poor quality run-off entering the river. Opportunities for the establishment of such vegetation are limited by the hard, engineered edges of the river, consisting variously of steel piling and concrete toe walls.

Liaison should be established with the Environment Agency with a view to exploring ways in which emergent vegetation could be established along the edge of the river. These might include for example:

- Removal of engineered walls in places, with the creation of more gently sloping natural banks.
- The creation of vegetated ledges below existing or pulled back river walls
- Planting in fabric pockets hung over vertical banks

Enhancement of the tributary stream that joins the Wandle c. 0.4 km north of Plough Lane should also be investigated. This is lined by corrugated metal and its ecological value is extremely limited in its present state.

Opportunities for riverbank enhancements such as these should be actively pursued as part of redevelopment schemes affecting the area (e.g. the forthcoming redevelopment of the former Wimbledon football ground).

6.2.2 Riverside trees

Mature crack willow and hybrid black poplars line the riverbank for much of its length. Some of these trees have started to split and collapse under their own weight, whilst others have been damaged by storms. To conserve these characteristic trees it is proposed that a selective pollarding and coppicing programme be implemented. As well as making the trees safe and prolonging their life, new microhabitats will be created by this management. Several trees have in fact already been treated in this way and are successfully regenerating.

The trees should be inspected annually by the Borough tree officer and specimens which require or which would benefit from pollarding/coppicing should be selected. Selected trees should be cut in the following winter, with the aim of re-pollarding/coppicing on a 10-15 year cycle. Crack willows can be either pollarded or coppiced, depending on the particular situation and existing trunk characteristics (a variety of specimens of both should ideally be created). Poplars should in general be pollarded.

Larger items of cut wood should be placed in suitable locations to provide dead wood habitat and staked down if necessary to prevent it being rolled into the river. Brash should be chipped and spread on nearby path surfaces. Existing dead or fallen trees should be left in situ to provide dead wood habitat wherever safety considerations allow.

To provide for the long-term replacement of riverside trees, limited new planting should be carried out. This could include the planting of a small number of native black *poplars* *Populus nigra* var. *betulifolia*, a rare but characteristic riverside tree. Other suitable species include crack willow, white willow *Salix alba* and alder *Alnus glutinosa*. This planting should be concentrated in existing tree and scrub lined sections, wherever suitable canopy gaps exist (i.e. in the vicinity of dead or dying trees, around pollarded/coppiced specimens etc.). No new planting should be carried out on existing open sections of riverbank. Trees should be planted as whips or light standards, each protected by a tree shelter or rabbit guard. A c.5 cm layer of wood chip mulch should be spread around the base of each tree to suppress competing weed growth.

6.2.3 Other trees/woodland

Other tree and woodland areas will be treated as minimal intervention areas. An annual tree safety inspection should be carried out by the Borough tree officer and any necessary safety works carried out. Small scale felling/coppicing will be carried out to create graded woodland edge in some locations and some pruning back of obstructing branches may be required to maintain access along the footpath.

6.2.4 Scrub and hedges

Scrub habitats provide valuable cover for nesting birds and for mammals such as rabbits and foxes. They can also be an important invertebrate habitat, whilst old elder bushes often support epiphytic bryophyte and lichen communities. Small scale coppicing will be carried out on a piecemeal basis in order to maintain structural diversity in scrub areas, but much of the scrub habitat will be left undisturbed.

Unattractive fences and bare walls occur along the western site boundary. Attempts have been made to screen these with new hedge planting in places, but some sections remain open and visually intrusive. Additional hedge planting will therefore be carried out along the western boundary in selected locations (see figure 3a). Hawthorn, hazel, dog rose *Rosa canina* and field maple *Acer campestre* whips will be planted in a double staggered row at 30 cm centres. A c. 5 cm layer of wood chip mulch should be spread below the trees to suppress the growth of competing vegetation. Existing sections of planted hedge do not require any management at the present time, apart from some limited gapping-up.

The boundary along the edge of the former Wimbledon football ground is particularly unattractive. The site is very narrow in this section and the path runs directly alongside the corrugated metal fencing that surrounds the football ground. Opportunities for the enhancement of this section should be actively pursued as part of the forthcoming redevelopment of the football ground. Beneficial enhancements would include the setting back of the boundary fence by several metres to increase the width of the reserve at this point, and the screening of the boundary with a new hedgerow or a planted strip of native trees and shrubs. Enhancements to the riverbank are also desirable (see section 6.2.1).

6.2.5 Tall herb

Tall herb vegetation dominated by stinging nettle, cow parsley and other species is widespread within the reserve. As well as providing cover for wildlife, many of the species are important invertebrate foodplants or nectar sources. Most of the existing tall herb vegetation will therefore be retained, although regular mowing can be expected to lead to limited conversion to grassland along path margins (see 6.2.6 below).

Tall herb vegetation requires little in the way of regular management, although occasional cutting can help to control scrub and tree colonisation and also promotes structural variety in the habitat. A programme of rotational strimming will therefore be carried out in areas dominated by tall herbs. Each area will be divided into thirds, one third to be cut each year over a three year rotation. Cutting should be carried out at the end of the summer (August/September). Cut material should be raked up and placed under nearby scrub to compost.

An area of damp ground located about 200 metres south of the Weir Street entrance, which supports pendulous sedge, reed canary grass and other wetland plants, should be left uncut. However piecemeal cutting may be required from time to time to prevent invasion by scrub.

Control of giant hogweed and Japanese knotweed will be carried out in accordance with the procedures detailed in section 6.1.8.

6.2.6 Grassland

Although of only limited extent, grassland is nevertheless an important component of the overall habitat mosaic and supports a variety of common wildflowers as well as butterflies and other grassland invertebrates. Regular mowing has been carried out along the path margins and in some other areas to maintain access and, in conjunction with rabbit grazing, has had the effect of creating a short grassland habitat. In other areas where management has been less intensive a taller sward has developed, supporting a different suite of species.

Management will be carried out to maintain and enhance the diversity of grassland habitats and to prevent encroachment by scrub and tall herbs.

Regular mowing will be continued along the path margins, in a zone extending 1 metre either side of the path. The mowing will be carried out on a monthly basis throughout the growing season (April-September). Cutting height should be set to 5 cm. Arisings will be left in situ.

In short grassland areas away from the path the mowing regime will be relaxed. These areas will be cut on an annual basis, in late summer (August/September). Cutting height should be set to 5 cm. Arisings will be raked up and placed under nearby scrub to compost.

Areas of taller rank grassland will be managed by rotational cutting. Each area will be divided into two roughly equal parts, with one half cut each year over a two year rotation. This will ensure that some tall grass habitat remains for over-wintering insects etc., whilst preventing scrub or tall herb invasion. Cutting will be carried out in late summer (August/September), with the cutting height set to 10 cm. The arisings should be raked up and placed in nearby scrub areas to compost.

6.3 Management by Compartments

To facilitate implementation of the management plan the site has been divided into a number of compartments on the basis of habitats or other physical features. Each compartment is described below, together with an outline of the management required. Compartment boundaries and management requirements are shown in figures 3a & b.

6.3.1 Compartment 1

Description

This compartment is dominated by mature crack willow and hybrid black poplars growing along the Wandle riverbank. Elder and other shrubs occur amongst the trees and merge to form denser scrub areas along the margins. Ivy carpets the ground in the shadier parts, with bramble, cow parsley and stinging nettle in the more open areas.

Objectives

To conserve mature riverside trees

To provide for the long term replacement of riverside trees

To maintain a graded edge along the landward (path) side

To control fly-tipping and litter

Prescription

- Maintain riverside trees by pollarding/coppicing on a selective basis.
- Carry out new planting to provide long-term replacements for riverside trees, including native black poplar, alder and willows.
- Carry out small scale piecemeal coppicing of shrubs/scrub to maintain a graded edge on the landward side, preserving any mature elder with established epiphytic lichen and bryophyte flora
- Remove fly-tipping and litter on a regular basis

6.3.2 Compartment 2

Description

A mixed compartment containing areas of scrub, tall herb and grassland vegetation. The latter is situated around the Weir Road entrance and has been maintained by regular mowing. A planted hedge runs along the western edge of the compartment for much of its length.

Objectives

To conserve and enhance the existing grassland

To provide areas of short grassland habitat alongside footpaths

To maintain scrub and tall herb habitats

To maintain the planted hedgerow

To provide information to visitors

To control fly-tipping and litter

Prescription

- Mow grassland on an annual basis in late summer (August/September).
- Maintain a 1 metre wide strip of short grassland along either side of footpath by monthly mowing during the growing season (April-September).
- Carry out rotational cutting of tall herb areas in late summer (August/September), $\frac{1}{3}$ of total area per annum.
- Carry out piecemeal coppicing/cutting in scrub areas to maintain structural diversity.
- Carry out additional planting to gap-up hedge.
- Erect interpretation board near the Weir Road entrance.
- Remove fly-tipping and litter on a regular basis.

6.3.3 Compartment 3

Description

An area of elder dominated scrub growing on an embankment. Some Laburnum also occurs, together with hawthorn, buddelia and sycamore saplings. Tall herb vegetation grows along the margins. A low lying area alongside the path is subject to temporary flooding in the winter and supports a small area of wetland vegetation including reed canary-grass and pendulous sedge.

Objectives

To maintain and enhance scrub

To conserve wetland vegetation

To provide areas of short grassland habitat alongside footpaths

To control fly-tipping and litter

Prescription

- Carry out piecemeal coppicing/cutting in scrub areas to maintain structural diversity, preserving any large elders or other shrubs with an established epiphytic lichen and bryophyte flora.

- Maintain a 1 metre wide strip of short vegetation along either side of footpath by monthly mowing during the growing season (April-September).
- Preserve wetland vegetation in wet hollow by maintaining high water table and preventing scrub colonisation through occasional piecemeal cutting.
- Remove fly-tipping and litter on a regular basis.

6.3.4 Compartment 4

Description

An area of mature elder scrub growing in a lower area by the river. Also contains a number of grey sallow shrubs and occasional small crack willow trees. The riverbank in this section is fairly open and is potentially suitable for enhancement.

Objectives

To enhance riparian zone by encouraging development of emergent vegetation

To maintain and enhance scrub

To control fly-tipping and litter

Prescription

- Liaise with Environment Agency to investigate possible methods of encouraging the development of emergent vegetation along the river margin.
- Carry out piecemeal coppicing/cutting of scrub to maintain structural diversity, preserving any large elders or other shrubs with an established epiphytic lichen and bryophyte flora.
- Remove fly-tipping and litter on a regular basis.

6.3.5 Compartment 5

Description

An area of higher ground alongside the western boundary supporting an extensive area of coarse grassland. A hedge has been planted along the boundary fence in the northern half of the compartment. An area of tall herb vegetation with abundant burdock occurs on the eastern side of the path.

Objectives

To conserve and enhance the existing grassland

To provide areas of short grassland habitat alongside footpaths

To maintain tall herb habitats

To maintain and extend the planted hedgerow

To control fly-tipping and litter

Prescription

- Cut grassland on a rotational basis in late summer (August/September), 50% of area each year.
- Maintain a 1 metre wide strip of short grassland along either side of footpath by monthly mowing during the growing season (April-September).
- Carry out rotational cutting of tall herb habitat in late summer (August/September), $\frac{1}{3}$ of total area per annum.
- Carry out additional planting to extend hedge along entire length of western boundary.
- Remove fly-tipping and litter on a regular basis.

6.3.6 Compartment 6

Description

This compartment is dominated by mature hybrid black poplars growing along the Wandle riverbank. Several crack willow trees also occur, including one strikingly contorted specimen in the central part of the compartment. Old concrete channels, now partially in-filled, occur on top of the riverbank below the trees.

Objectives

To conserve mature riverside trees

To provide for the long term replacement of riverside trees

To control fly-tipping and litter

Prescription

- Maintain riverside trees by pollarding/coppicing on a selective basis.
- Preserve contorted crack willow
- Carry out new planting to provide long-term replacements for riverside trees, including native black poplar, alder and willows.
- Remove fly-tipping and litter on a regular basis

6.3.7 Compartment 7

Description

Scrub of elder, buddleia, and bramble, with occasional sycamore and turkey oak growing on an embankment along the western margin. The scrub is quite open and does not provide an effective screen to the adjacent industrial estate. To the south the scrub becomes denser, and occasional goat willow is present together with abundant Russian vine. Tall herb vegetation dominated by stinging nettle mixed with bramble covers most of the eastern half of the compartment. Giant hogweed is frequent in the northern part. The lined channel of a tributary stream crosses the southern part of the compartment.

Objectives

To maintain scrub and tall herb habitats

To screen the industrial estate

To control Giant hogweed

To enhance the tributary stream

To provide areas of short grassland habitat alongside footpaths

To control fly-tipping and litter

Prescription

- Carry out piecemeal coppicing/cutting in scrub areas to maintain structural diversity.
- Carry out rotational cutting of tall herb areas in late summer (August/September), $\frac{1}{3}$ of total area per annum.
- Plant hedgerow along western boundary in the northern half of the compartment to screen industrial estate.
- Control giant hogweed through an on-going glyphosate and cutting programme.
- Liaise with Environment Agency to investigate possible methods of enhancing the lined tributary stream.

- Maintain a 1 metre wide strip of short grassland along either side of footpath by monthly mowing during the growing season (April-September).
- Remove fly-tipping and litter on a regular basis.

6.3.8 Compartment 8

Description

A small compartment containing three pollarded crack willow trees, together with a small area of elder scrub.

Objectives

To conserve mature riverside trees

To provide for the long term replacement of riverside trees

To maintain scrub habitat

To control fly-tipping and litter

Prescription

- Maintain mature crack willows by repeat pollarding, as required.
- Carry out new planting of willows to provide long-term replacements.
- Carry out piecemeal coppicing/cutting of scrub to maintain structural diversity, preserving any large elders or other shrubs with an established epiphytic lichen and bryophyte flora.
- Remove fly-tipping and litter on a regular basis.

6.3.9 Compartment 9

Description

Sycamore dominated secondary woodland covers most of the compartment. Bramble, stinging nettle and ivy grow in the field layer, together with occasional garlic mustard. A small area of mature elder scrub occurs in the west central part of the compartment, whilst hazel, hawthorn and other shrubs have been planted around a small utilities building in the north.

Objectives

To conserve and enhance secondary woodland

To maintain scrub habitat

To control fly-tipping and litter

Prescription

- Carry out piecemeal coppicing along woodland margins as required to maintain a graded edge and provide structural diversity.
- Carry out piecemeal coppicing/cutting of scrub to maintain structural diversity, preserving any large elders or other shrubs with an established epiphytic lichen and bryophyte flora.
- Remove fly-tipping and litter on a regular basis.

6.3.10 Compartment 10

Description

A narrow section of the reserve sandwiched between the River Wandle and the former Wimbledon football ground. An unsightly corrugated sheet fence forms the boundary with the derelict football ground. Vegetation is largely restricted to the eastern (river) side of the path, although a narrow strip of coarse grassland occurs on the western side in the north. Most of this section is covered by stinging nettle and bramble, with scattered elder scrub.

The scrub becomes denser near the Plough Lane entrance, where patches of Japanese knotweed also occur. A small area of sycamore woodland occurs in the north and a large crack willow grows on the riverbank in the centre of the compartment. A narrow shelf occurs at the base of the riverbank in places, with potential for re-grading and the establishment of emergent vegetation.

Objectives

To maintain scrub and tall herb habitats

To conserve existing grassland

To conserve crack willow, sycamore and other riverside trees

To control Japanese knotweed

To enhance riparian zone by encouraging development of emergent vegetation

To enhance the western boundary

To provide information to visitors

To control fly-tipping and litter

Prescription

- Carry out piecemeal coppicing/cutting in scrub areas to maintain structural diversity.
- Carry out rotational cutting of tall herb areas in late summer (August/September), $\frac{1}{3}$ of total area per annum.
- Mow grassland on an annual basis in late summer (August/September).
- Manage crack willow by coppicing, as required.
- Conserve sycamore trees, pruning as required to maintain access.
- Control Japanese knotweed through an on-going glyphosate and cutting programme.
- Install interpretation board near the Plough Lane entrance
- Liaise with Environment Agency to investigate possible methods of encouraging the development of emergent vegetation along the river margin
- Liaise with Planning Department and others with a view to procuring boundary and other enhancements as part of the forthcoming redevelopment of the former Wimbledon football ground.
- Remove fly-tipping and litter on a regular basis.

Part 7: Work Programme

7.1 5 year work programme

Task	Compartment	Year				
		2001/02	2002/03	2003/04	2004/05	2005/06
Annual tree inspection	All	✓	✓	✓	✓	✓
Pollarding/coppicing of riverside trees	1, 6, 8, 10	As required				
Planting of replacement riverside trees	1, 6, 8	✓		✓		✓
Piecemeal coppicing of shrubs/scrub to produce graded edge	1, 9	As required				
Piecemeal coppicing of scrub to maintain structural diversity	2, 3, 4, 7, 8, 9, 10	As required				
Pruning of trees along path margins	10	As required				
Planting of new hedge/gapping up of existing hedge	2, 5, 7,	✓				
Annual mowing of grassland	2,10	✓	✓	✓	✓	✓
Monthly mowing of path margins during growing season	2, 3, 7	✓	✓	✓	✓	✓
Rotational cutting of coarse grassland (50% p.a.)	5	✓	✓	✓	✓	✓
Rotational cutting of tall herb vegetation ($\frac{1}{3}$ p.a.)	2, 5, 7, 10	✓	✓	✓	✓	✓
Conserve wetland vegetation by occasional cutting to prevent scrub colonisation	3	As required				
Herbicide treatment/cutting of giant hogweed	7	✓	✓	✓	✓	✓
Herbicide treatment/cutting of Japanese knotweed	10	✓	✓	✓	✓	✓
Liaison with EA to investigate enhancement of Wandle riverbanks	4, 10	✓	✓	✓		
Liaison with EA to investigate enhancement of tributary stream channel	7	✓	✓	✓		
Liaison with Planning Dept. and others re. re-development of former Wimbledon football ground.	10	✓	✓	✓		
Liaison with anglers	1, 4, 6, 7, 8, 9, 10	✓	✓	✓	✓	✓
Install interpretation boards	2, 10		✓			
Regular removal of fly-tipping and litter	All	✓	✓	✓	✓	✓
Conduct further botanical survey in spring/summer 2001	All	✓				
Conduct breeding bird survey	All		✓			
Conduct invertebrate survey	All		✓			
Carry out photographic monitoring	All	✓		✓		✓
Review management plan	All					✓

7.2 Annual Work Programme Financial Year 2001/02

<u>Timing</u>	<u>Compartments</u>	<u>Management Task</u>
Quarter 1 April – June	2, 3, 7	Monthly mowing of path margins
	7	Herbicide treatment of giant hogweed, with subsequent cutting and re-treatment of re-growth
	10	Herbicide treatment of Japanese knotweed, with subsequent cutting of re-growth
	All	Remove fly-tipping and litter on a regular basis
	All	Conduct further botanical survey
Quarter 2 July – September	All	Carry out photographic monitoring
	2, 3, 7	Monthly mowing of path margins
	2, 10	Annual mowing of grassland
	5	Rotational cutting of coarse grassland (50% of area)
	2, 5, 7, 10	Rotational cutting of tall herb vegetation ($\frac{1}{3}$ of total area in each compartment)
	10	Repeat herbicide treatment of Japanese knotweed
	4, 10	Establish liaison with EA re. enhancements to Wandle riverbank
	7	Establish liaison with EA re. enhancements to tributary stream
	10	Establish liaison with Planning Dept. and others re. redevelopment of football ground
	1, 4, 6, 7, 8, 9, 10	Establish liaison with anglers
	All	Remove fly-tipping and litter on a regular basis
Quarter 3 October – December	All	Carry out tree inspection and select any trees which require or which would benefit from pollarding/coppicing
	1, 6, 8	Carry out pollarding/coppicing of selected trees
	1, 9	Carry out any piecemeal coppicing of shrubs/scrub required to produce graded edge
	1, 6, 8	Plant long-term replacement trees
	2, 3, 4, 7, 8, 9, 10	Carry out any piecemeal coppicing of scrub required to maintain structural diversity
	2, 5, 7	Plant new sections of hedge and gap up existing hedge
	All	Remove fly-tipping and litter on a regular basis
Quarter 4 January – March	10	Prune trees along path margins
	All	Remove fly-tipping and litter on a regular basis

References

Child, L. & Wade, M. 2000 *The Japanese Knotweed Manual*, Packard Publishing, Chichester.

Cooke, A.S. 1988 *Japanese Knotweed: Its Status as a Pest and its Control in Conservation Areas*, Nature Conservancy Council, Peterborough.

London Ecology Unit 1998 *Nature Conservation in Merton*, London Ecology Unit, London.

Appendix 1: Plant Species List for the Lower Wandle Local Nature Reserve

Species	Abundance ¹
<i>Ranunculus repens</i> (Linnaeus) 22/02/2001	F
<i>Ranunculus ficaria</i> (Linnaeus) 22/02/2001	R
<i>Ranunculus penicillatus</i> (Dumort. Bab.) LEU (1998)	?
<i>Chelidonium majus</i> (Linnaeus) 22/02/2001	R
<i>Urtica dioica</i> (Linnaeus) 22/02/2001	D
<i>Parietaria judaica</i> (Linnaeus) 22/02/2001	R
<i>Quercus cerris</i> (Linnaeus) 22/02/2001	R
<i>Quercus ilex</i> (Linnaeus) 22/02/2001	R
<i>Quercus robur</i> (Linnaeus) 22/02/2001	R
<i>Betula pendula</i> (Roth) 22/02/2001	O
<i>Corylus avellana</i> (Linnaeus) 22/02/2001	R
<i>Stellaria media</i> (Linnaeus) Villars) 22/02/2001	F
<i>Cerastium fontanum</i> (Baumg.) 22/02/2001	O
<i>Silene dioica</i> (Linnaeus) Clairv.) 22/02/2001	O
<i>Fallopia japonica</i> (Houtt.) Ronse Decraene) 22/02/2001	F
<i>Fallopia baldschuanica</i> (Regel) Holub) 22/02/2001	F
<i>Rumex obtusifolius</i> (Linnaeus) 22/02/2001	F
<i>Hypericum perforatum</i> (Linnaeus) 22/02/2001	F
<i>Malva sylvestris</i> (Linnaeus) 22/02/2001	O

¹ **DAFOR Scale:** This provides an estimate of the relative abundance of each species recorded, whereby D = Dominant; A = Abundant; F = Frequent; O = Occasional and R = Rare.

Species	Abundance
<i>Populus x canadensis</i> (Moench) 22/02/2001	F
<i>Salix fragilis</i> (Linnaeus) 22/02/2001	F
<i>Salix caprea</i> (Linnaeus) 22/02/2001	O
<i>Salix cinerea</i> (Linnaeus) 22/02/2001	O
<i>Sisymbrium officinale</i> (Linnaeus) Scop.) 22/02/2001	O
<i>Alliaria petiolata</i> (M.Bieb.) Cavara & Grande) 22/02/2001	O
<i>Cardamine pratensis</i> (Linnaeus) 22/02/2001	R
<i>Hirschfeldia incana</i> (Linnaeus) Lagr.-Fossat) 22/02/2001	O
<i>Potentilla reptans</i> (Linnaeus) 22/02/2001	F
<i>Crataegus monogyna</i> (Jacq.) 22/02/2001	O
<i>Rubus fruticosus</i> (Linnaeus)agg. 22/02/2001	A
<i>Vicia sativa sativa</i> 22/02/2001	O
<i>Trifolium repens</i> (Linnaeus) 22/02/2001	F
<i>Laburnum anagyroides</i> (Medikus) 22/02/2001	R
<i>Epilobium hirsutum</i> (Linnaeus) 22/02/2001	O
<i>Cornus sanguinea</i> (Linnaeus) 22/02/2001	O
<i>Ilex aquifolium</i> (Linnaeus) 22/02/2001	R
<i>Acer pseudoplatanus</i> (Linnaeus) 22/02/2001	O
<i>Geranium dissectum</i> (Linnaeus) 22/02/2001	O
<i>Geranium molle</i> (Linnaeus) 22/02/2001	O
Species	Abundance
<i>Hedera helix</i> (Linnaeus)	

22/02/2001		A
<i>Anthriscus sylvestris</i> (Linnaeus) Hoffm.)		
22/02/2001		A
<i>Conium maculatum</i> (Linnaeus)		
22/02/2001		F
<i>Heracleum sphondylium</i> (Linnaeus)		
22/02/2001		O
<i>Heracleum mantegazzianum</i> (Sommier & Levier)		
22/02/2001		F
<i>Calystegia silvatica</i> (Kit. ex Schrader) Griseb.)		
22/02/2001		F
<i>Pentaglottis sempervirens</i> (Linnaeus) Tausch ex Linnaeus Bailey)		
22/02/2001		O
<i>Ballota nigra</i> (Linnaeus)		
22/02/2001		F
<i>Lamium purpureum</i> (Linnaeus)		
22/02/2001		O
<i>Glechoma hederacea</i> (Linnaeus)		
22/02/2001		F
<i>Callitriche</i> sp.		
LEU (1998)		?
<i>Plantago lanceolata</i> (Linnaeus)		
22/02/2001		F
<i>Buddleja davidii</i> (Franchet)		
22/02/2001		F
<i>Fraxinus excelsior</i> (Linnaeus)		
22/02/2001		O
<i>Ligustrum ovalifolium</i> (Hassk.)		
22/02/2001		R
<i>Veronica chamaedrys</i> (Linnaeus)		
22/02/2001		R
<i>Galium aparine</i> (Linnaeus)		
22/02/2001		F
<i>Sambucus nigra</i> (Linnaeus)		
22/02/2001		F
<i>Dipsacus fullonum</i> (Linnaeus)		
22/02/2001		F
<i>Arctium minus</i> (Hill) Bernh.)		
22/02/2001		F

Species

Abundance

Cirsium arvense (Linnaeus) Scop.)
22/02/2001

F

<i>Cirsium vulgare</i> (Savi) Ten.) 22/02/2001	O
<i>Picris echioides</i> (Linnaeus) 22/02/2001	O
<i>Taraxacum officinale</i> (Linnaeus) agg. 22/02/2001	F
<i>Aster sp.</i> 22/02/2001	F
<i>Artemisia vulgaris</i> (Linnaeus) 22/02/2001	F
<i>Achillea millefolium</i> (Linnaeus) 22/02/2001	F
<i>Senecio jacobaea</i> (Linnaeus) 22/02/2001	O
<i>Senecio vulgaris</i> (Linnaeus) 22/02/2001	O
<i>Eupatorium cannabinum</i> (Linnaeus) 22/02/2001	R
<i>Sagittaria sagittifolia</i> (Linnaeus) LEU (1998)	?
<i>Elodea nuttallii</i> (Planch.) H. St. John) LEU (1998)	?
<i>Potamogeton natans</i> (Linnaeus) LEU (1998)	?
<i>Potamogeton pectinatus</i> (Linnaeus) LEU (1998)	?
<i>Carex pendula</i> (Hudson) 22/02/2001	R
<i>Festuca rubra</i> (Linnaeus) 22/02/2001	O
<i>Lolium perenne</i> (Linnaeus) 22/02/2001	F
<i>Poa annua</i> (Linnaeus) 22/02/2001	F
<i>Poa compressa</i> (Linnaeus) 22/02/2001	1
<i>Dactylis glomerata</i> (Linnaeus) 22/02/2001	F
Species	Abundance
<i>Arrhenatherum elatius</i> (Linnaeus) P.Beauv.) 22/02/2001	A
<i>Phalaris arundinacea</i> (Linnaeus)	

22/02/2001	R
<i>Elytrigia repens</i> (Linnaeus) Desv.)	
22/02/2001	F
<i>Sparganium emersum</i> (Rehmann)	
22/02/2001	F
<i>Hyacinthoides hispanica</i> (Miller) Rothm.)	
22/02/2001	O
<i>Narcissus pseudonarcissus major</i> (Curtis) Baker)	
22/02/2001	O
<i>Iris foetidissima</i> (Linnaeus)	
22/02/2001	R

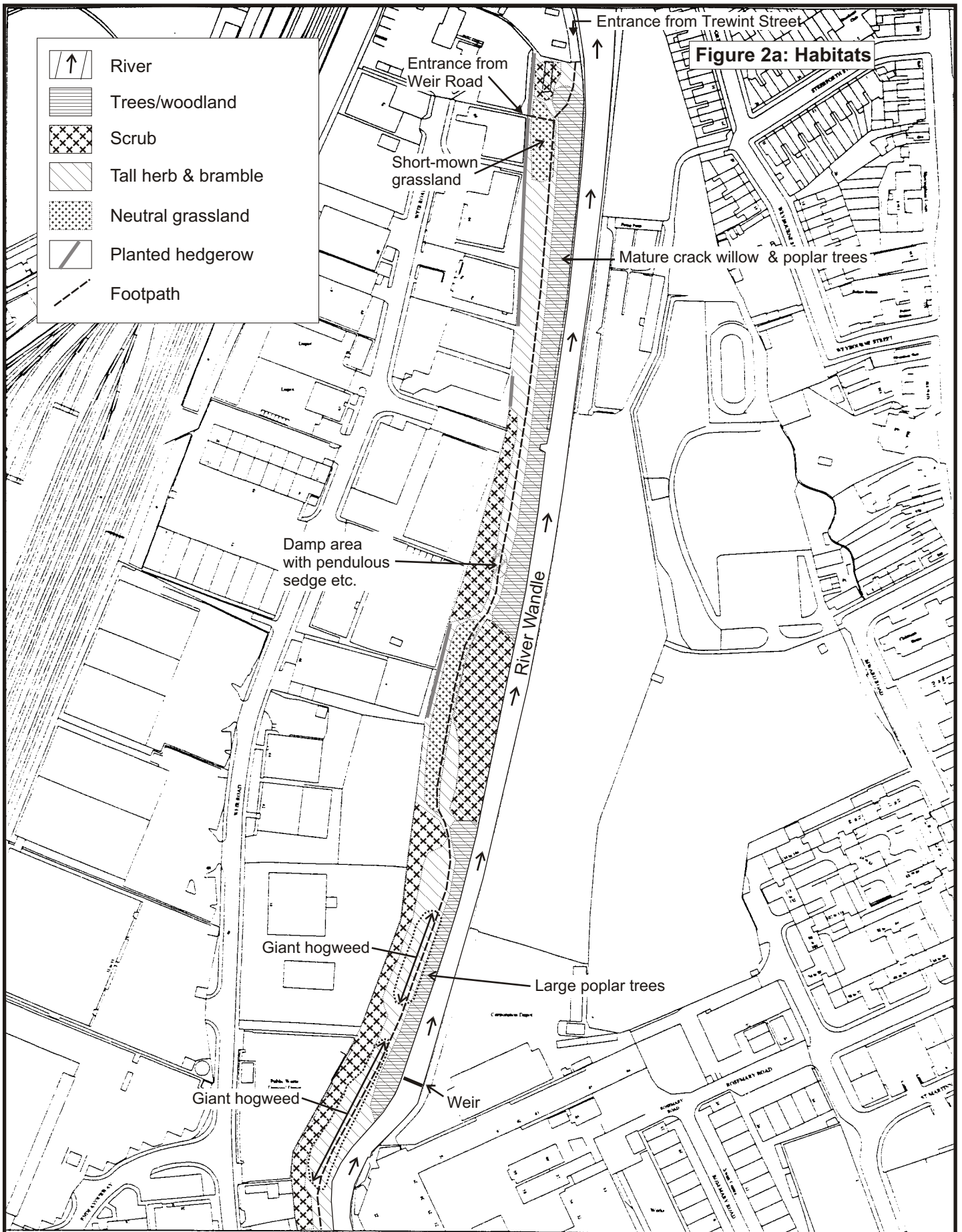


Figure 2a: Habitats

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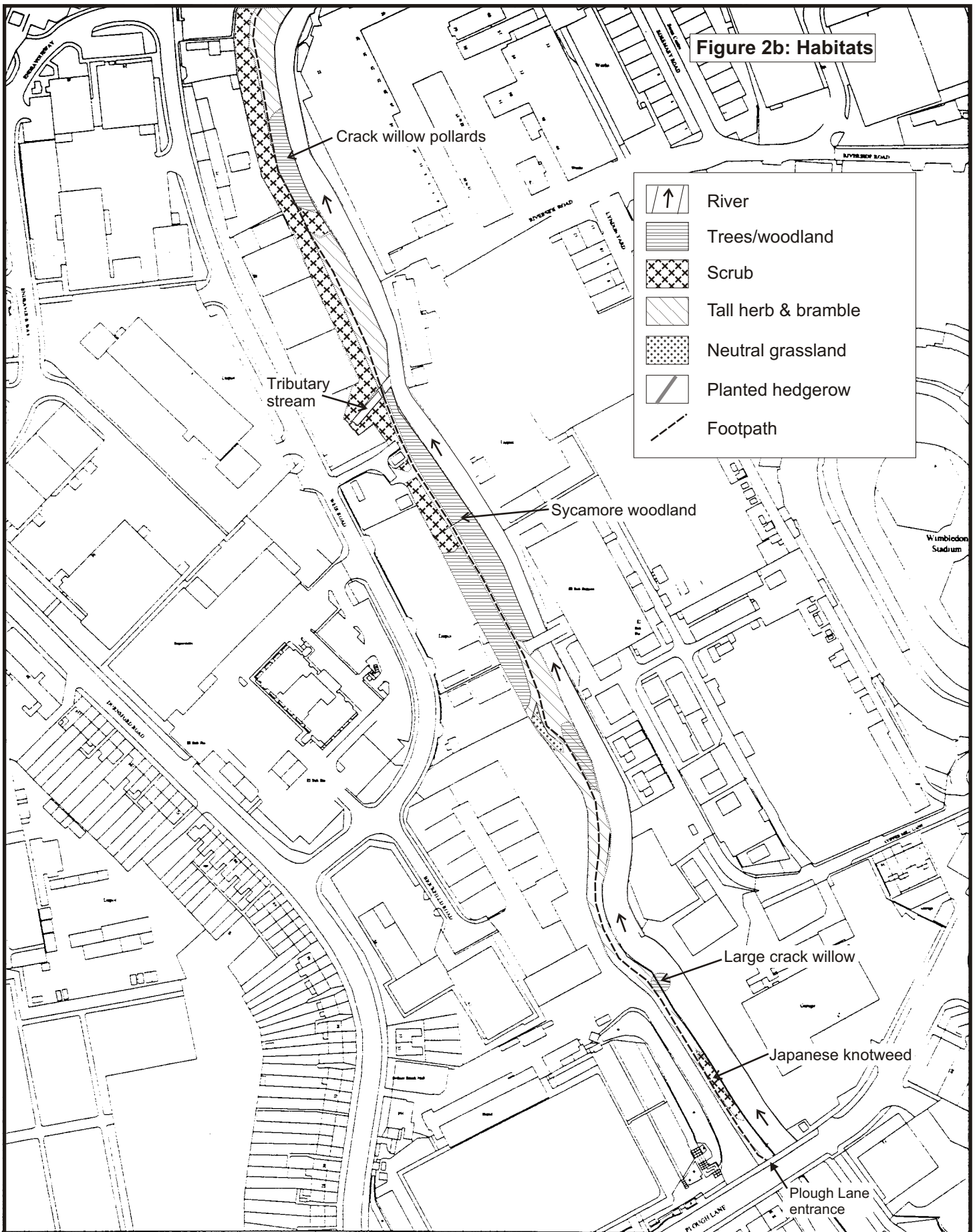
Lower Wandle

Scale = 1: 2500

Date Printed: 22/01/01



Figure 2b: Habitats



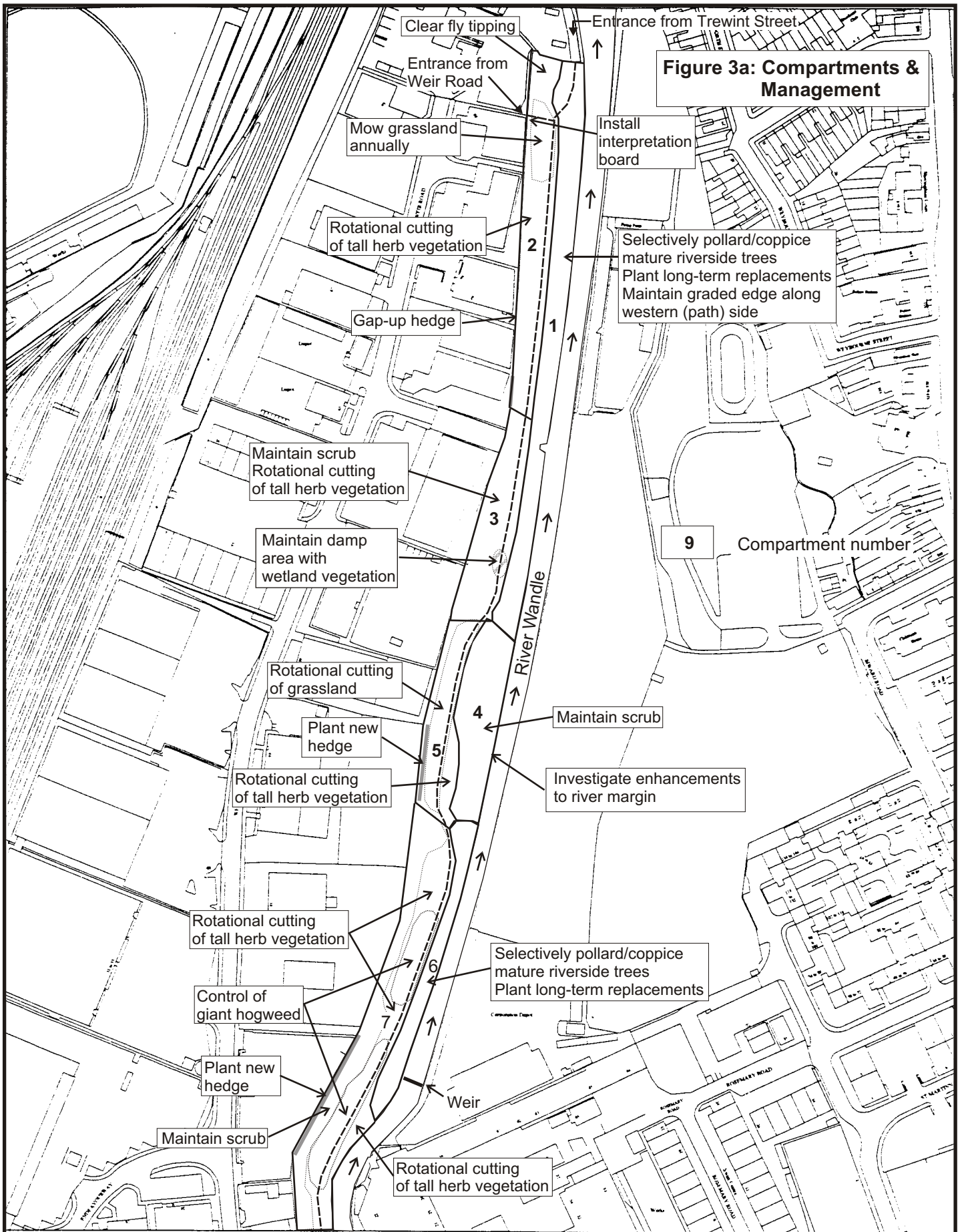
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Lower Wandle

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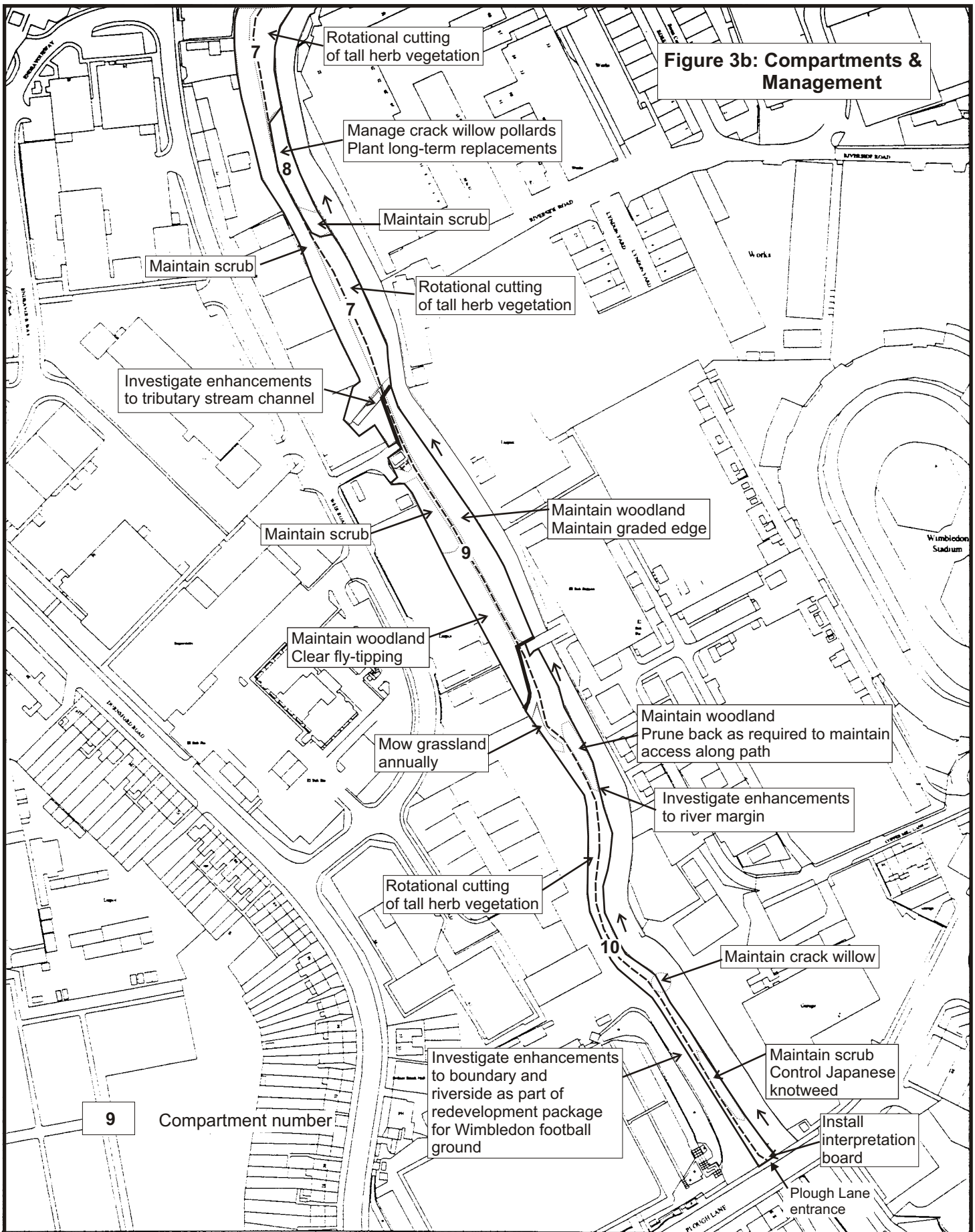
Lower Wandle

Scale = 1: 2500

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Figure 3b: Compartments & Management



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Lower Wandle



Scale = 1: 2500

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