HOGSMILL LOCAL NATURE RESERVE

MANAGEMENT PLAN 2017-2117

First Review 2017 – 2027

Produced by:
Epsom and Ewell Borough Council
Countryside Team

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ACKNOWLEDGEMENTS

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Further records have also been provided by Ann Sankey (BSBI Recorder for Surrey), John Edwards (County Ecologist), and Martin Skipper (a Friend of The Hogsmill).

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INTRODUCTION

This management plan succeeds the 2006-2016 plan and aims to update and build on the progress made during the implementation of the previous plan which was the first to be agreed formally and implemented by Epsom & Ewell Borough Council. The previous plan succeeded in significantly improving access, improved biological monitoring, increased volunteer activity and securing the substantial external funding required to achieve the above.

Subject to ten year reviews this plan aims to describe the important features of the Hogsmill Local Nature Reserve (LNR) and set out an agreed approach for the continued management of the site to benefit both the people and wildlife of Epsom & Ewell for the next one hundred years. This plan prescribes in detail how the site will be managed from 2017 to 2027, ensuring that the Hogsmill LNR continues to provide excellent access to nature whilst at the same time protecting an internationally important habitat (Chalk Stream) and providing a home for wildlife of national and local importance.

The Hogsmill LNR is approximately 38ha which comprises the former Hogsmill and Bonesgate Open Spaces.

This management plan has been produced following a review of available ecological, historical and other information. It focuses upon, and attempts to achieve a realistic balance, between a range of issues that include:

- Nature conservation
- Maintaining and enhancing historical, landscape and cultural value
- Providing appropriate facilities for public recreation and enjoyment
- Encouraging opportunities for education in all aspects of the Local Nature Reserve's ecology, history, culture and landscape.

A PLAN FOR THE NEXT 100 YEARS

Over the last 100 years The Hogsmill LNR has undergone great change. A once rural landscape that resulted from local and national economic pressure to provide pasture for grazing and water power for both flour and gunpowder mills, today provides local people with fresh air, exercise and protection for wildlife. As readers of this plan will discover The Hogsmill LNR is of both national and international importance for its habitats and wildlife and maintaining that value requires an informed, consistent, systematic and long term approach to habitat management and public access.
For example, urban rivers require careful management to restore and maintain their ecological health; trees live for hundreds of years and biological monitoring often yields really valuable information after many years of recording effort.

This plan provides a regularly reviewed (10 years) 100 year approach to the management of the Hogsmill LNR to ensure the protection, maintenance and

enhancement of the wildlife and heritage of the Hogsmill LNR whilst also ensuring good public access to a wonderful place!

The key components in managing the Hogsmill LNR which are unlikely to change in the next one hundred years are as follows:

- Ensuring the protection, maintenance, monitoring and enhancement of biodiversity and cultural heritage of the Hogsmill LNR.
- Assisting the Environment Agency in the management and maintenance of the important features of the river channel.
- Ensuring good public access via a network of well-maintained and signed paths.
- Encouraging and supporting the work of volunteers.
- Interpreting the Hogsmill LNR to the public
- Maintaining a close working relationship with the owners of the Hogsmill River and banks (Environment Agency) and other partners such as the South East Rivers Trust (SERT).

STAGE ONE - DESCRIPTION

1.1 Introduction

The Hogsmill Local Nature Reserve (LNR), incorporating the former Hogsmill and Bonesgate Open Spaces (Map 1), covers a total area of approximately 38ha. It represents the remains of farmland that once ran along the banks of the River Hogsmill and the Bonesgate Stream before the development of housing that surrounds most of the site today. The individual parcels of land that made up the Hogsmill Open Space were purchased in several stages between 1932 and 1937, whilst the Bonesgate Open Space was all purchased in 1937. More recently, an addition to the Hogsmill LNR in 2006 is the area of land known as Riverview Copse (part of compartment 2), formerly leased by Surrey County Council.

All but a tiny portion of the site is designated as Metropolitan Green Belt in the current Epsom & Ewell Local Plan. In October 2013, after having had the Borough's Sites of Nature Conservation Importance (SNCI) resurveyed by EEBC Countryside Officer Pete Howarth, it was agreed by the Local Sites Partnership that the entire Hogsmill LNR would retain its designation as a SNCI, which is also recognised under the current Epsom & Ewell Local Plan (Appendix 1).

The site is linear in character and comprises a mosaic of habitats that includes internationally important chalk stream, woodland of varying maturity and composition, a range of (primarily amenity) grasslands and a number of scrub types. Several large, mature stand-alone Oak trees and over-stood pollarded Willows are also present. The nationally rare (RDB1) Ladybird *Clitosthetus arcuatus* has also been found at the site. The species is associated with Ivy and has also been recorded from several other locations in Surrey relatively recently.

The Environment Agency (EA) owns the riverbed and banks of the Hogsmill River and has responsibility for its management. The Bonesgate Stream however is owned by EEBC and Royal Borough of Kingston upon Thames upon Thames (RBK). This highlights the need for liaison with the EA and RBK over the management of the two watercourses, including the ways that day-to-day management might impact upon wildlife and amenity value. The last plan included proposals to restore more natural channel characteristics to the two watercourses, which was achieved and this plan looks to continue with this along further stretches of the watercourses.

There is open public access to the whole site, which forms an important local amenity for informal recreation. The site is adjoined for the most part by residential housing and there is easy access to the public from a number of points.

During the lifetime of the last management plan significant improvements have been achieved on the ground to improve the site for both public access and

wildlife. This has included: the creation of 5km/3 miles of surfaced paths; 3 new bridges installed over the water courses and 1 restored bridge; many new benches; artificial channelisation and concrete weirs removed; meanders and riffles created along the water courses; improved biological monitoring including a butterfly transect and of water quality indicator species; hedgerows planted; species-rich grassland, scrub and woodland being actively managed and the installation of information boards at all main entrances..

1.2 Location

The site lies in the northern part of the Borough of Epsom and Ewell (Map 1). The Hogsmill LNR runs from the Lower Mill on the Hogsmill River, in a roughly north-westerly direction as far as the bridge that takes the A240 Kingston Road over the river. From here it turns north-eastwards and continues to the Borough boundary with the Royal Borough of Kingston upon Thames upon Thames; opposite the Hogsmill Public House on Worcester Park Road. The former Bonesgate Open Space comprises a narrow strip of land alongside the Bonesgate Stream that runs from near the William Bourne Public House on Chessington Road, north eastwards to the Watersedge Estate, where it joins the Hogsmill River.

County: Surrey

District/Borough: Epsom and Ewell

Local Planning Authority: Epsom & Ewell Borough Council

National Grid Reference: TQ 210 635 (Hogsmill); TQ 196 644 (Bonesgate)

Map Coverage:

First Edition of the Ordnance Survey (1871 – present day, held on GIS by EEBC, also available at www.old-maps.co.uk)

Ordnance Survey Landranger series at 1:50,000 scale, sheet number 187

Ordnance Survey Explorer series at 1:25,000 scale, sheet number 161

Ordnance Survey 1:10,000 series sheets TQ16NE, TQ26NW.

Ordnance Survey maps at 1:2500 series sheets TQ 1963, 1964, 2063, 2064, 2065, 2163

Ordnance Survey map at 1:1250 scale.

The site lies within the Thames Basin Lowlands. Natural area profiles can be obtained from Natural England.

1.3 Land Tenure and Associated Statutory Requirements

All of the land covered by this plan, including half of the Bonesgate Stream and the Epsom and Ewell bankside is in the ownership of Epsom and Ewell Borough Council (EEBC) and was purchased in stages during the period of 1932 to 1937. The various conveyance documents can be found in the Town Clerk and Chief Executives Department of the Council. The Hogsmill River and its banks are owned by the Environment Agency.

Much of the adjacent land is in private residential ownership. A significant exception is the Tolworth Court Farm Meadows Local Nature Reserve, which lies to the north west of the Bonesgate Stream, situated within and owned by the Royal Borough of Kingston upon Thames upon Thames. In addition, mid-way along the Hogsmill (and not forming part of the Open Space) is Ewell Court Manor and Gardens (owned by EEBC), and to the south of this lies the King George V playing fields (Poole Road Recreation Ground – again owned by EEBC). East of here lies the West Ewell allotment gardens, also owned by Epsom and Ewell Borough Council.

It has recently been discovered that the Green Lane feeder-stream is owned by Surrey County Council (SCC), which highlights the need for liaison with SCC over the management of this tributary and its effects on the water quality and wildlife value of the river and nature reserve.

The Natural Environment and Rural Communities Act 2006 (NERC) places a requirement in law on all public bodies to take reasonable measures to enhance the aesthetic, cultural, historical and biological interest of its open spaces.

Services

A large sewage pipe crosses the Hogsmill near to the Curtis Road Playground, whilst a further sewage pipe, together with a gas pipeline, crosses the Bonesgate Stream at Cox Lane. What is also probably a further sewage pipe crosses the Hogsmill River behind Worcester Park Road. These represent only the most obvious known features and the appropriate utilities should be contacted for up to date information, before any work likely to affect any underground or overground services is undertaken.

1.4 Photographic Coverage

Aerial photographs taken in 2003, 2009, 2011 and 2013 are held by the EEBC GIS Section. More recent aerial photographs of the site are available online from Google Maps, Apple Maps and Bing Maps.

1.5 Summary Description

1.5.1 Physical

1.5.1.1 Climate

Meteorological Office data (1981-2010 averages) for Wisley (approximately 10km due west), show an annual rainfall average of 656.6mm per year (no measurements have been taken on the Hogsmill LNR itself). During this period, there was an average of 112.2 days per year with more than 1mm of rainfall recorded. An average total of 1564.2 hours sunshine was recorded per year, along with 47.7 days of air frost. The average monthly maximum temperature was 15.0^{o}C (July being the hottest, at 23^{o}C), whilst the average monthly minimum temperature was 6.5^{o}C (with February being the coldest at 1.7^{o}C).

Such climatic conditions are typical for a lowland site in this part of the country. It is interesting to note that the previous plan used 1961 -1990 data and the average monthly maximum temperature has increased by 0.8 ^{o}C.

1.5.1.2 Geology

The site lies over London Clay, River Alluvium and unclassified terrace gravels. Further details of the geology can be seen in the Geological Survey maps for the area.

1.5.1.3 Topography and Hydrology

The site comprises two narrow strips of land beside the associated watercourses and is fairly level, with variations in topography being gently undulating. Ground level is in the order of 30m above sea level at its greatest and around 20m at its lowest.

The Hogsmill River itself is a tributary of the Thames. Its catchment consists almost entirely of built-up land within Epsom and Ewell. Upstream of Green Lane, water feeding into the river originates from springs arising from the chalk, whereas downstream of this point, water joining the Hogsmill runs off clay substrates. The Green Lane feeder-stream itself originates at Barons Pond on Epsom Common. Below this point, several smaller feeder streams join the Hogsmill River, before being eventually met by the Bonesgate Stream (which is thus also a tributary of the Hogsmill River). The Bonesgate Stream has a somewhat larger catchment, rising in countryside to the south of Chessington and including parts of Epsom and Ashtead Commons, and Horton Country Park.

Due to the narrow, linear character of the site, water flow along the two watercourses is not so much influenced by precipitation falling within the site itself (there is insufficient ground surface to generate much input), but primarily by rapid urban run-off from the surrounding areas. To try and accommodate high flow events, there are storm water tanks located beside the Hogsmill and the Green Lanes Stream (there are none on the Bonesgate). Unfortunately these tanks regularly overflow during heavy rain allowing raw sewage to enter

the water courses. There remains a potential for flash flooding to occur and properties adjacent to Ruxley Lane Bridge have been flooded in recent years.

Both the Hogsmill River and the Bonesgate Stream were once very artificial watercourses, much modified from their original meandering character and contained within straightened, artificial banks. A short section of the original course of the Hogsmill River near Ewell Court remains, by-passed by an artificial channel constructed c1960.

During the course of the previous plan short sections of the river have been naturalised by restoring meanders, removing toe boards, creating riffles and removing weirs to allow improved fish passage and slow flows when the channel is in spate.

2006 saw the implementation of the Doorstep Green Project (please see section1.5.3.3 Public Access and Recreation for more details). Leading on from this project and the relationships built up with the local residents and Environment Agency, the momentum was carried on by the management plan and the implementation of a range of improvements. This saw the river running alongside the Watersedge Estate being realigned to a more natural line and a back-water (wildlife refuge) created on the old channelised section. The banks were then planted up with native flowers and grasses. Deflectors were also positioned along the banks to encourage the river to meander and erode a more natural line.

In addition to improvements along the Hogsmill River attention has also been focussed along the Bonesgate Stream under the banner of the Green Arc Initiative which focuses on improvements to the peri-urban area around London. An exemplar project called Thames 2 Downs was set up to carry out landscape scale improvements and improve access and habitats for people and wildlife all the way from the North Downs to the Thames at Kingston upon Thames. A section of the Bonesgate Stream near to Gatley Avenue Playground was realigned removing several concrete weirs, adding new meanders and riffles. In addition logs were positioned along the banks and backfilled to created artificial meanders to allow the water to naturally erode the banks in to a more natural line. At the confluence of the Bonesgate Stream and Hogsmill River the concrete stream bed and weir were completely removed.

More recently, EEBC has been working with the South East Rivers Trust (SERT) and Environment Agency (EA) to remove all the concrete weirs in the Hogsmill River to aid fish passage. The weir located just upstream of the Alway Avenue bridge and the weir beside the running track of Poole Road Recreation Ground were removed in 2013.
Work has also taken place where the Green Lane Stream joins the Hogsmill River to naturalise the confluence with the removal of the concrete base and stone side walls in 2014. In 2015 a rock ramp was installed immediately downstream of the A240 bridge and volunteers began a programme of managing vegetation along the banks to ensure more light reaches the river and the banks. In addition some of the material produced by the volunteers'

activity has been used (2016) to create artificial berms to help scour the river channel and naturalise flows.

EEBC would like to continue working with SERT and the EA via the now established Hogsmill Catchment Partnership. It is hoped that partnership working can deliver some major improvements such as that proposed for Chamber Mead where there is an opportunity to create a wetland area by diverting the Green Lanes stream across Chamber Mead to a new confluence just upstream from the 'Stepping Stones'. There are other improvements planned to enhance habitat diversity, which will be explained in more detail in the following sections of the plan.

Across the site as a whole, the combination of clay soils and fairly level ground means that unsurfaced paths tend to become waterlogged and muddy in wet weather, due to poor surface drainage (probably exacerbated by soil compaction). Adjacent to Meadow Walk, in the south-eastern part of the Hogsmill Open Space, the margin of the site includes a small depression that contains swamp vegetation.

1.5.1.4 Soils

There is little information available on the soils underlying the Hogsmill LNR. However, an Environmental Report prepared for the Environment Agency called 'Hogsmill River Rehabilitation Project' suggests that this part of the Hogsmill River catchment supports shallow clayey soils and a fine deposit of alluvium over terrace gravels. Most soil within the site itself has been modified in some way, either through excavation, deposition of dredged river material, or of imported materials (Anon, 2005).

1.5.2 Biological

For the most part, there has been very limited biological recording at the site. Apart from the baseline habitat survey conducted during the course of preparing the 2006-16 management plan, the only known botanical surveys are one conducted of the Hogsmill (but not the Bonesgate) by Surrey Wildlife Trust during 1998 as part of the Surrey SNCI project (this also listed some fauna). The other is a repeat SNCI survey, which covered the entire Hogsmill LNR and was carried out by Countryside Officer Peter Howarth during 2013, results of which are in appendix I.

A number of biological surveys were commissioned in connection with the Environment Agency's 'Hogsmill River Rehabilitation Project' (Anon, 2005), which proposed re-modelling the river channel just south of its confluence with the Bonesgate Stream. Several surveys have also been conducted within the Tolworth Court Farm Meadows LNR area, on the Kingston side of the Bonesgate Stream. Although this area lies adjacent to and therefore outside the area being considered under this management plan, these surveys provide useful information on the ecological resource within which the nature reserve lies. A majority of other records have been informally derived, such as the list

of bird sightings. A local enthusiast, Timothy Tomkins, has been providing bird records for the site since 2009 for which we are very grateful. During the last plan a butterfly transect was set up in 2011 and is walked weekly by volunteers resulting in 26 different species of butterfly recorded. Our thanks goes to our transect walkers; Bob and Carole Guille, Pam Harwood, Robb Reeves and Pat Lowe.

1.5.2.1 Flora and Vegetation Communities

Records to date indicate a vascular plant flora, with nearly 250 taxa recorded to date (including non-native species). This figure compares with a total of around 400 for the nearby Horton Country Park LNR, but that site is very much larger and has also seen a much greater recording effort.

For the purpose of preparing this management plan, a survey of habitats and vegetation communities was conducted. A brief outline of the main habitats is given below, with more detailed information being provided in Appendix II. The distribution of the main habitat types is summarised in Map 2.

Woodlands, Scrub and Trees

Woodland communities are somewhat variable and poorly-defined, although broadly speaking, there are three main types. At the most recent end of the spectrum are a series of woodlands that were planted around 40 years ago, often upon what was originally grassland habitat. Also present is a suite of older-established and broadly 'semi-natural' woodlands, although even these tend to support a proportion of planted species. Finally, there are also discrete areas of older plantation woodland, generally occurring as small stands within the 'semi-natural' types. Many areas of woodland are disturbed, often scrub-like and patchy in their characteristics, with a generally poor representation of ground flora species.

Of the more-established, broadly 'semi-natural' woodlands, the most widespread species are Ash (*Fraxinus excelsior*), Oak (*Quercus robur*) and Sycamore (*Acer pseudoplatanus*). However, due to the variability of stand types, even these can vary in frequency from being dominant (in the case of Ash) or frequent (in the case of Oak and Sycamore), but all being rare in other areas. Alder (*Alnus glutinosa*) occurs occasionally in some wet areas.

A wide range of other, often planted, trees occur within the canopy; either as infrequently scattered individuals or small stands of long-established plantation. Planted (and subsequently self-sown) tree species include Ornamental Cherries/Plums (*Prunus* spp.), Norway Maple (*Acer platanoides*), Narrow-leaved ash (*Fraxinus angustifolia*), Willows (*Salix* spp.), Limes (*Tilia* spp.), Horse-chestnut (*Aesculus hippocastanum*), London Plane (*Platanus* x *hispanica*), Turkey Oak (*Quercus cerris*), False-acacia (*Robinia pseudoacacia*), Poplars (*Populus* spp.), Beech (*Fagus sylvatica*) and Scots Pine (*Pinus sylvestris*).

The most common shrub species across the site are Hawthorn (*Crataegus monogyna*) and Elder (*Sambucus nigra*) (one of the plantation woodland areas contains a multi-stemmed, veteran Elder tree TQ 20745 63796). Elm (*Ulmus* spp.) and Blackthorn (*Prunus spinosa*) are locally common with a very notable mature Elm located at TQ 21054 63580. Widely occurring field layer associates include Bramble (*Rubus fruticosus* agg.), Ivy (*Hedera helix*), False-brome (*Brachypodium sylvaticum*), Wood Avens (*Geum urbanum*), Cow Parsley (*Anthriscus sylvestris*), Common Nettle (*Urtica dioica*) and Cleavers (*Galium aparine*). A number of woodland stands have been disturbed by playing children and there are varying amounts of litter and dumped rubbish, including garden refuse.

Broad-leaved woodland planted in recent times occupies significant areas within the Hogsmill Open Space and largely comprises discrete copses planted-up on what was formerly grassland habitat. Mowing of surrounding amenity grasslands has created a very abrupt edge to these woodlands although this has improved under the guidance of the previous plan and the grounds maintenance team continue to be instructed to leave margins around the copses and woodlands, A wide range of tree species are present and include Hornbeam (*Carpinus betulus*), Ash, Narrow-leaved Ash, Limes, Birches (*Betula* spp.), Horse-chestnut, Ornamental Plum/Cherry and Pear (*Pyrus* sp.), plus Grey/White Poplar (*Populus* x *canescens*/*alba*). The field layer is generally extremely sparse.

Away from woodlands, there are a number of much older, larger trees present. Notable examples include a number of fine old Pedunculate Oak trees. The largest such specimen, in the south of the Hogsmill Open Space, has a diameter at breast height (DBH) of 1.75m. There are also a number of larger Oak trees to be found alongside the Bonesgate Stream. An area alongside the Hogsmill River contains a number of veteran, lapsed pollarded White Willows (*Salix alba*), which appear to be aligned along the course of the former river channel. In addition, there are also two avenues of established White Willows beside the Hogsmill River itself.

Scrub of all types occupies approximately 35% of the site, although in places, it is difficult to make a clear separation between scrub and woodland habitat. As with many other habitats, it tends to occur in narrow strips, reflecting the linear character of the site. The three most frequent and extensive scrub types are dominated by Bramble, Hawthorn and Blackthorn. Less common species include Elder, Elm and Field Maple (*Acer campestre*).

The recently incorporated Riverview Copse represents a significant area of established scrub-woodland, bordered on its margin by a narrow fringe of dense Blackthorn scrub. During the last plan work took place to punch through a section of this Blackthorn to open up a pathway through the copse, with vegetation managed on either side. In addition the blackthorn is now managed by scalloping on a rotational basis to ensure a diverse age structure. Brown Hairstreak eggs have been found on young blackthorn at this location.

Mature trees, especially of Oak and Ash, are occasionally present throughout scrub-dominated habitats, enhancing structural diversity. As with woodlands, scrub can be quite disturbed as a result of trampling by children and the dumping of litter and other rubbish, including garden refuse along the site margins.

A number of trees in the Watersedge area were examined to assess their potential suitability for roosting bats during a bat survey undertaken in 2004 (Bailey, 2005). The results of this work are discussed under Section 1.5.2.2. In 2015 work on bank side willows was carried out by the Environment Agency to address the safety issues resulting from a tree safety inspection.

Grasslands

Grasslands as a whole form one of the most extensive habitat types within the site, much of this taking the form of the regularly-mown amenity grassland areas that typify the Local Nature Reserve, along the Hogsmill in particular. These swards are typically dominated by Perennial Rye-grass (*Lolium perenne*) within a generally species-poor sward. Common associates include White Clover (*Trifolium repens*), Dandelions (*Taraxacum officinale* agg.), Greater Plantain (*Plantago major*), Ribwort Plantain (*Plantago lanceolata*), Daisy (*Bellis perennis*) and Wall Barley (*Hordeum murinum*). Along sections of the Hogsmill, Tall Fescue (*Festuca arundinacea*) also occurs as a component of the sward.

Amenity grassland alongside the Bonesgate Stream appears less frequently-mown than alongside the Hogsmill River. Thus, although Perennial Rye-grass still tends to dominate, the sward is generally taller and more 'weedy' than those of the Hogsmill, with species such as Common Chickweed (*Stellaria media*), Shepherd's Purse (*Capsella bursa-pastoris*), Cow Parsley (*Anthriscus sylvestris*), White Dead-nettle (*Lamium album*), Broad-leaved Dock (*Rumex obtusifolius*) and Hogweed (*Heracleum sphondylium*).

Very locally there are indications of a somewhat more diverse sward marked, in particular, by Common Knapweed (*Centaurea nigra*) and, less commonly, Common Bird's-foot-trefoil (*Lotus corniculatus*).

In addition to these main areas of mown amenity grassland, there are smaller, more marginal areas of generally unmanaged, rank grasslands, especially beside the two watercourses. This vegetation is characterised by often species-poor vegetation dominated by grasses such as False Oat-grass (*Arrhenatherum elatius*) and Common Couch (*Elytrigia repens*). Other common and frequent associates include Cock's-foot (*Dactylis glomerata*), Field Bindweed (*Convolvulus arvensis*), Cleavers, Creeping Thistle (*Cirsium vulgare*) and Tall Fescue, with more local Common Nettle and Hogweed.

One of the larger areas of rank grassland lies at the edge of the recently incorporated Riverview Copse, notable for the presence of frequent ant-hills. This rough grassland margin has been maintained along the southwestern edge of the copse and sections are cut and cleared on rotation by volunteers.

Small or infrequent areas of somewhat more species-rich, but still unmanaged grassland, occupy a 'middle ground' between the frequently managed Perennial Rye-grass swards and these tall, unmanaged swards. The dominant grass here tends to be Creeping Bent (*Agrostis stolonifera*), but with Perennial Rye-grass still present at varying frequency. Other common grasses and herbs include Red Fescue (*Festuca rubra*), Timothy (*Phleum pratense*), Yorkshire Fog (*Holcus lanatus*), Meadow Barley (*Hordeum secalinum*) and Cock's-foot, Red Clover (*Trifolium pratense*) Greater Plantain, Creeping Cinquefoil (*Potentilla reptans*), Autumn Hawkbit (*Leontodon autumnalis*), Yarrow (*Achillea millefolium*) and Dandelion. Hairy Sedge (*Carex hirta*), Ox-eye Daisy (*Leucanthemum vulgare*) and Cranesbills (*Geranium* spp.) are infrequent. For example the area of rough grassland by the stepping stones, which is now being managed in sections, being cut and cleared on rotation by volunteers.

Nettle and other weed-dominated communities

A number of stands of vegetation dominated by Common Nettle and other weed species occur across the site. In many stands, Nettle is overwhelmingly dominant, with Cleavers being the only constant associate. This type of vegetation is especially common along the unmanaged fringes of the site, including beside the two watercourses. Beside the Bonesgate Stream, this vegetation used to support locally abundant Himalayan Balsam (*Impatiens glandulifera*). However, an annual volunteer task to pull it up has significantly reduced its presence with only a few stands left. This plant, an invasive, invasive species, also occurs along the Hogsmill River downstream of where it is joined by the Bonesgate Stream, but is not present on the Hogsmill upstream of the confluence. Volunteer effort has also been put in to removing Himalayan Balsam from the Bonesgate stream within the Royal Borough Kingston Upon Thames by the Lower Mole Partnership.
Elsewhere, Common Nettle is not so dominant and other species such as Thistles (*Cirsium* spp.), Hedge Bindweed (*Calystegia sepium*), Field Bindweed, Hogweed and Bramble are present. Less frequent plants include Black Horehound (*Ballota nigra*), Russian Comfrey (*Symphytum* x *uplandicum*), Burdock (*Arctium* sp.), Greater Willowherb (*Epilobium hirsutum*) and White Dead-nettle (*Lamium album*).

Small stands dominated by Greater Willowherb are present in a few places, as well as a stand of Rose-bay Willowherb (*Chamerion angustifolium*). Two small stands of the invasive alien, Japanese Knotweed (*Fallopia japonica*) persist beside the Bonesgate Stream. Treatment has taken place but the problem does still remain and further treatment is required.

Other types of weed-dominated vegetation are present in some recently-disturbed parts of the site. One example occurs on the banks of the Hogsmill River, following ground disturbance caused by reconstructing the B284 Ruxley Lane road-bridge. A further example is located along recently-constructed earth bunds beside a path crossing the Bonesgate at Cox Lane. This vegetation is characterised by an abundance of Oraches (*Atriplex* spp.) and Goosefoots (*Chenopodium* spp.). Other species present (not necessarily at both locations) include Mugwort (*Artemisia vulgaris*), Scentless Mayweed

(*Tripleurospermum inodorum*), Smooth Sow-thistle (*Sonchus oleraceus*), Knotgrass (*Polygonum aviculare*), Burdocks, Creeping Thistle, Nipplewort (*Lapsana communis*), Poppies (*Papaver* sp.), Prickly Lettuce (*Lactuca serriola*), Bristly Ox-tongue (*Picris echioides*), Russian Comfrey, and Shepherd's Purse. The Bonesgate stand also includes Hoary Mustard (*Hirschfeldia incana*) and the invasive alien, Goat's Rue (*Galega officinalis*).The Goat's Rue has been pulled by volunteers and only a very small patch remains which needs to be tackled.

Watercourses, water margin and swamp vegetation

Map 3 shows the location of the Hogsmill River and the Bonesgate Stream, plus their associated watercourses. Their vegetation was not included in the field surveys when writing the last plan, as it is understood that responsibility for management of watercourses and their banks lay with Environment Agency. However, during the repeat survey carried out in 2013 to determine if the Hogsmill LNR still qualified for SNCI status, Peter Howarth did survey the banks. Updated species lists are in appendix III. In general the Hogsmill River has a restricted aquatic and marginal vegetation as the result of channelisation, sometimes within a concrete concourse. Locally, however, the vegetation is well-established and includes Watercress, Fool's Watercress, Branched Bur-reed (*Sparganium erectum*), Brooklime (*Veronica beccabunga*), Reed Canary-grass, Curled Pondweed (*Potamogeton crispus*) and Common Water-starwort (*Callitriche stagnalis*).

During the lifetime of the 2006-16 plan, EEBC has facilitated work carried out in conjunction with the Environment Agency and more recently the South East Rivers Trust removing much of the concrete channelling and weirs. Species are colonising quickly and it will be a priority for this plan to facilitate and encourage surveys of the aquatic and bankside vegetation in these areas.

One section of watercourse that was surveyed in 2006 is part of the original course of the Hogsmill River (Cpt 11 around the clinker bridge), where Reed Sweet-grass (*Glyceria maxima*) is abundant, along with Common Duckweed (*Lemna minor*) and Fool's Watercress (*Apium nodiflorum*).

A further small example of swamp vegetation within the Hogsmill LNR (Cpt 11 at the far south east of the site) is dominated by Reed Canary-grass (*Phalaris arundinacea*). Associates include Meadowsweet (*Filipendula ulmaria*), Hairy Sedge, Greater Willowherb, Water Figwort (*Scrophularia auriculata*), Pendulous Sedge (*Carex pendula*), Bulrush (*Typha latifolia*) and Watercress (*Rorippa nasturtium-aquaticum*).

Non-native and invasive species

In addition to many of the planted trees (see above), and invasive non-native weeds like Himalayan Balsam, Japanese Knotweed and Goat's Rue, a number of plants have been introduced to the site as a result of the dumping of garden rubbish. These are listed in Appendix III).

Bryophytes

Peter Howarth carried out a survey of bryophytes along the Hogsmill LNR in October 2015. A total of 28 bryophytes were recorded. An interesting and nationally scarce species was found; *Hennediella macrophylla,* a moss which is spreading along British watercourses. Previous to this survey there had been no systematic recording of bryophytes The only species previously recorded are *Brachythecium rutabulum* and *Eurhynchium praelongum* (from both sites), plus *Rhytidiadelphus squarrosus* (from the Bonesgate section of the LNR only).

Fungi

There has been no known recording of fungi at the site.

Lichens

There has been no known recording of lichens, although *Xanthoria parietina* was noted whilst conducting the habitat survey for the 2006-16 management plan.

1.5.2.2 Fauna

Invertebrates

A number of invertebrates (mainly butterflies) were recorded during the Surrey Wildlife Trust SNCI survey in 1998. Since April 2011, a butterfly transect has been set up and walked initially by staff and volunteers and is now entirely carried out by volunteers. A list of butterflies recorded on the site is listed in appendix III.

In total, 26 species of butterfly have been recorded, which can be largely divided into two main groups. The first covers those whose larvae feed upon Common Nettle, namely Comma (*Polygonia c-album),* Red Admiral (*Vanessa atalanta) and* Small Tortoiseshell (*Aglais urticae).* As can be seen from the above habitat description, there is an abundance of suitable food for these species at both the Hogsmill and the Bonesgate Open Spaces.

The second main group feed upon a variety of grasses and includes Gatekeeper (*Pyronia tithonus),* Large Skipper (*Ochlodes venata faunus),* Meadow Brown (*Maniola jurtina),* Ringlet (*Aphantopus hyperantus*) and Small Skipper (*Thymelicus sylvestris).*All tend to be associated with scrub/grassland habitat and therefore are well provided for at both sites. Although each has its preferred range of food plant, it is the fine-to-medium range of leaves that are favoured, and coarse swards dominated by False Oat-grass tend to be less suitable, as are the frequently mown and trampled Perennial Rye-grass amenity swards. Therefore it is probably some of the smaller areas of rather ‘intermediate’ grassland that are the most important to this group of butterflies.

Another species whose larvae feed on grasses (mainly Common Couch and Cock's-foot) is Speckled Wood (*Pararge aegaria*). However, this prefers shadier conditions and tends to be associated with wooded habitat.

There are also those within in the Pieridae family present on site, including the Small White (*Pieris rapae) and* Large White *(Pieris brassicae)* which have larvae that feed on members of the cabbage family. The Orange Tip (*Anthocharis cardamines)* feeds on cuckoo flower and garlic mustard which are common plants on the site and the Brimstone's (*Gonepteryx rhamni*) larval food plant is Alder buckthorn and Buckthorn.

Speceis regularly recorded since the transect was set up are from the Lycaenidae family, Common blue (*Polyommatus Icarus)* whose larval food plant is Common bird's foot trefoil and Holly Blue (*Celastrina argiolus)* whose larval food plant is Holly and Ivy. It is important to ensure all these plants encouraged and maintained.

Importantly, the rare Brown Hairstreak butterfly has been recorded on site, both eggs and adult sightings. Considering the abundance of Blackthorn, the larval food plant, the Hogsmill LNR is an important site for this butterfly. A timed count survey in which the eggs are looked for has taken place on the nearby Horton Country Park with good results. The Blackthorn should therefore be managed to encourage the Brown Hairstreak.

During 2016 a concerted effort was made in conjunction with Butterfly Conservation to monitor the presence of Elm and the associated White Letter Hairstreak butterfly, a butterfly species of conservation concern in Surrey. As mentioned above a notable large Elm was discovered as was the presence of the White Letter Hairstreak butterfly which relies on the flowers of Elm and Wych Elm.

A number of species of dragonfly have been noted within the Hogsmill LNR. Limited recording during the summer of 2004 resulted in confirmation of the presence of Common Darter (*Sympetrum striolatum*), although Southern Hawker (*Aeshna cyanea*) may also be present. Also known to be present along both watercourses are Common Blue Damselfly (*Enallagma cyathigerum*), Large Red Damselfly (*Pyrrhosoma nymphula*) and Beautiful Demoiselle (*Calopteryx virgo*) (S. Cocker, pers. comm.). The two watercourses undoubtedly represent good potential habitat for dragonflies and damselflies and it is likely that other species await recording. Consequently it is a priority of this plan to improve the recording of Odonata along the watercourses.

The Environment Agency (EA) monitors the biological quality of watercourses by assessing the number of macroinvertebrate taxa present and their individual susceptibility to pollution (as part of the General Quality Assessment (GQA) system, which also encompasses chemical quality as well). The purpose of this monitoring is therefore to provide a measure the environmental quality and is not especially relevant for assessing nature conservation value. For example, macroinvertebrates are generally only identified down to broad groupings and not to the individual species present.

Since 2014, under the guidance of Zoological Society London (ZSL), a survey of macroinvertebrates in the Hogsmill River and Bonesgate Stream is being carried out by volunteers, also to assess water quality.

A strategic EA macroinvertebrate survey of the Hogsmill River and its tributaries (date and reference unknown) identified over 130 species, including London rarities. Particularly rich assemblages of water beetles, molluscs and water bugs were found. However, the variety of caddisflies, mayflies and dragonflies, which are more sensitive to water quality, was lower. The upper reaches of the Hogsmill River had the most diverse macroinvertebrate communities which included several taxa characteristic of a chalk stream, whilst the Bonesgate and Horton Streams were identified as supporting communities typical of lowland headwater streams.

One of the most notable findings during a macroinvertebrate study of the Hogsmill River in 2005 was the presence of the leech *Dina lineata,* which was found approximately 20m north of the 'stepping stones' (M. Skipper pers. comm.). The discovery of this species so far south in the UK is thought to be unusual. The same observer also reports that Freshwater Shrimp *Gammarus pulex* was understandably the most numerous of the aquatic invertebrates noted during this study.

Of greater interest is the Ladybird *Clitosthetus arcuatus*. This species is listed as nationally rare (endangered) and was recorded from Ivy at several locations in Surrey during 2005 by entomologist Ian Menzies. It is a priority of this plan to re-survey for *Clitosthetus arcuatus*.

Other invertebrates recorded for the site are Water Cricket (*Velia caprai*) (actually a bug), 7-spot Ladybird (*Coccinella 7-punctata*) and Common Wasp (*Vespula vulgaris*).

Vertebrates

Birds

Birds are the best-recorded group of fauna, within the Hogsmill LNR. The list includes a number that are included on either the 'Red' or 'Amber' Lists of the RSPB, and/or Annex 1 of the EC 'Birds Directive' (see Appendix III).

A significant proportion of the recorded species are common residents, or frequent visitors to the site. Breeding species include Blue Tit (*Parus caeruleus)*, Great Tit (*Parus major*), Blackcap (*Sylvia atricapilla)*, Chiffchaff (*Phylloscopus collybita),* Pied Wagtail (*Mocatilla alba*, Grey Wagtail (*Motacilla cinerea*)and Greenfinch (*Carduelis chloris*) (all LBAP), in addition to Wren (*Troglodytes troglodytes*), Robin (*Erithacus rubecula)*, Blackbird (*Turdus vulgaris*) and Chaffinch (*Fringilla coelebs)*. The 'Amber', LBAP and EC 'Habitats Directive' Annex 1 listed Kingfisher (*Alecdo atthis*) also breeds here and is regularly seen along the Hogsmill. The 'Amber'/LBAP listed Green Woodpecker (*Picus viridis*) has been recorded from both the Hogsmill and Bonesgate.

Common visitors throughout the year include Grey Heron (*Ardea cinerea*) and Mallard (*Anas platyhynchos*), as well as Sparrowhawk (*Accipiter nisus*) (LBAP) and Starling (*Sturnus vulgaris*) ('Red' listed). Ring-necked Parakeets (*Psittacula krameri*) are frequent visitors to the Hogsmill and probably also the Bonesgate. Summer visitors include Swallow (*Hirundo rustica*) and House Martin (*Delichon urbica)* (both 'Amber'/LBAP listed) in addition to Swift (*Apus apus*). Birds recorded as winter visitors or on passage include Linnet (*Carduelis cannabina*), Skylark (*Alauda arvensis*) (both 'Red'/LBAP Listed), Fieldfare (*Turdus pilaris*), Redwing (*Turdus iliacus*) and Meadow Pipit (*Anthus pratensis*) (all 'Amber'/LBAP listed).

The Little Egret (*Egretta garzetta*) has been seen quite regularly and is included on the Amber List as a rare breeding species. It is a recent colonist of the UK and it is most common along the south and east coasts of England, and in Wales. They are an increasingly common sight in inland areas too and are gradually increasing their range northwards. They can be seen all year round, although numbers increase in autumn and winter as birds arrive from the Continent.

Fish

The last fisheries survey of the Hogsmill River was undertaken in 2016 and the results of this are to be found in Appendix III. This survey was carried out at Chamber Mead, Oakland Way and Worcester Park Road. Species found were European Eel (*Anguilla anguilla*), 3-spined Stickleback (*Gasterosteus aculeatus*), Bullhead (*Cottus gobio*) a species listed under Annex II the EC 'Habitats Directive', Minnow (*Phoxinus phoxinus)*, Chub (*Squalius cephalus),* Rudd (*Scardinius erythrophthalmus),* Dace (*Leuciscus leuciscus),* Gudgeon (*Gobio gobio)*, Roach (*Rutilus rutilus).*
It is clear that since the improvements to the Hogsmill River channel and the Environment Agency releasing (2006) several native fish species in to the river between the new meander and the confluence with the Bonesgate Stream the fish population has been significantly improved.

As directed by the European Water Framework Directive the South East Rivers Trust (SERT), working in partnership with the Environment Agency and EEBC, have recently (c2013) removed several large concrete weirs to enable fish passage upstream and have also added 'in channel' features such as berms to encourage fish to re-colonise the river. This work is coordinated by the Hogsmill Catchment Partnership which is hosted by SERT.

Reptiles and Amphibians

No records have been made.

Mammals

There has been limited recording of mammal activity with most relating to bats. A bat survey of the Watersedge area was conducted during 2004 (Bailey,

2005). The area covered by this survey encompassed the section of the Hogsmill LNR between Ruxley Lane and Kingston Road. It also included a large field (part of Tolworth Court Meadows LNR), beyond the confluence of the Hogsmill River with the Bonesgate Stream – this is outside the area covered by this management plan.

At least four species of bat were recorded. These were Common (45 kHz) Pipistrelle (*Pipistrellus pipistrellus*), Soprano (55 kHz) Pipistrelle (*Pipistrellus pygmaeus*), Noctule (Nyctalus noctula) – Soprano and Noctule are species of principal importance under section 41 of the Natural Environment and Rural Communities Act (NERC), in addition to an unidentified myotid, thought most likely to be Daubenton's Bat (*Myotis daubentonii*) was recorded. Most frequent was the 45 kHz Pipistrelle, which appears to use the site for foraging on a regular basis, followed by the 55 kHz Pipistrelle, also probably foraging. For Noctules, this section of the Hogsmill is likely to represent part of a regularly-used flight line, rather than a foraging area. Likewise, the unidentified myotid bat was considered most likely to be a commuting individual. All species of bat are included under Schedule 5 of the 1981 Wildlife and Countryside Act and also Annex IV of the EC 'Habitats Directive'.

The author of the survey also suggested that although not recorded, the site could be suitable as an occasional flyway for Brown Long-eared Bat (*Plecotus auritus*), also a species of principal importance. It is a common and widespread species in Surrey with a known roost in Horton Country Park, but is difficult to pick up using echolocation.

A number of trees and groups of trees were examined to assess their likely suitability for roosting bats. Whilst many of the trees are in 'good locations' (one of the grading criteria), it was generally found that their potential value as bat roost sites was limited by a lack of decaying wood or rot. Eighteen out of the total 66 of these trees/groups occur within the Hogsmill LNR. Using a grading system of 1 (very low probability) to 5 (very high), half of them were placed in either categories 1 or 2. Of the remaining nine, all but one fell within Category 3 (medium probability), which encompasses mature trees, with more than one type of potential roost site, or many holes and crevices, but in poor location (from a bat point of view).

Only one tree was placed in category 4, a dead willow (now felled) with some split branches and much peeling bark, and situated on the river-bank, immediately south of Kingston Road. Category 4 trees (high probability) are mature, in a good location with obvious deadwood and many holes and crevices, representing a variety of potential roost sites. During the survey as a whole, no trees were found to be in the highest category of suitability (category 5).

The author stresses that although the habitat suitable for bats within the site is limited in both size and quality, it represents an important linear habitat corridor for bats linking known better quality habitats to the south, north and west.

A separate, survey (Fure 2004) noted the presence of feeding Pipistrelles (species unspecified) in the vicinity of the car park of the William Bourne Public House, situated at the extreme south-western point of the Hogsmill LNR. This 'protected species survey' was conducted in advance of works to strengthen the culvert beneath the Moor Lane Bridge over the Bonesgate Stream.

Peter Howarth and Stewart Cocker carried out a limited bat survey in 2015 around compartments 11, 12 and 13. Bats heard included pipistrelles and noctules/leislers, indicating the need for a more comprehensive survey

An arboricultural bat habitat survey was carried out by Alison Fure and Daniel Simmons in 2015, looking at trees from Ruxley Lane to the A240 prior to tree safety works being carried out by the Environment Agency. Trees of high potential were noted between the Ruxley lane and Riverview footbridge.

Grey Squirrels (*Sciurus carolinensis)* are frequent throughout. Foxes (*Vulpes vulpes*) are also likely to be common inhabitants and Roe Deer (Capreolus capreolus) are known to be present c2016.

Despite a number of visits to the Hogsmill River in recent years, no sightings of Water Vole (*Arvicola terrestris*) have been made (D. Williams, pers. comm.), although it is cited as one of the Surrey 'refuges' for populations of this species. A survey at the confluence of the Hogsmill with the Bonesgate Stream in 2003 (Fure, 2004) also found no evidence of Water Vole presence. Brown Rats (*Rattus norvegicus*) are present along the Hogsmill River and it is likely these are being encouraged by the feeding of birds (D. Williams, pers. comm.).

There has been no formal recording of the small mammal population on the site, or of the large mammal population. However, there are records of hedgehogs in the vicinity. When the last plan was written there was no known badger activity on the site. However, a large sett has developed over the last few years and is being monitored.

Non-native species

Mink (*Neovison vison*) has been sighted in the river catchment area in the nearby Horton Country Park LNR and Epsom Common LNR.
Signal Crayfish (*Pacifastacus leniusculus*) has also been spotted recently in the Hogsmill River near the confluence of the Bonesgate Stream.

1.5.3 Cultural

1.5.3.1 Archaeology

There are no scheduled archaeological features within the site. The 1871 Ordnance Survey map highlights the original meandering course of both watercourses as compared with the much channelised features present today.

However, a section of the meandering course of the Hogsmill River still exists, south of Ewell Court. As previously mentioned, during the last plan work was carried out to remove some of the channelisation by re-creation of meanders and in channel berms to encourage the formation of meanders. There is significant scope for continuing that process.
Little evidence remains today of the once extensive Ewell Gunpowder Mills beside the Hogsmill River. The swathes of farmland that once occupied this part of Surrey have all but disappeared, including Ruxley Farm (beside what is now the Ruxley Lane Bridge). However, Talworth (now Tolworth) Court Farm (in the Royal Borough of Kingston upon Thames) still exists on land north of the Bonesgate Stream.

1.5.3.2 Land Use

The 1871 Ordnance Survey map shows that in the mid-nineteenth century this part of Surrey was largely farmland with no significant settlements. The one exception was the complex of Gunpowder Mills, situated along the Hogsmill River between Ewell Court Gardens and Chamber Mead, which fell into decline in the latter part of the 19th Century. Today, the site is one of the few surviving fragments of this agricultural landscape, although much-modified, and is now used for public amenity and nature conservation.

1.5.3.3 Public Access and Recreation

Access

Subject to the various byelaws (Appendix IV), there is open public access across the entire site, which is accessible on foot or by bicycle with a variety of surfaced paths being provided. No horse riding is permitted under the byelaws. There are numerous access points throughout the reserve.

Definitive rights of way crossing the site are all public footpaths (Map 3). Two public footpaths cross the southernmost section of the reserve (one of these appearing on the 1871 O.S. map), whilst a third runs along the northernmost edge of this portion, in the proximity of Ewell Court Gardens. A single public footpath bisects the Bonesgate Stream at Cox Lane. In 2010 the path running along the Bonesgate Stream from Chessington Rd to where the Hogsmill meets the A240 was designated as a public footpath to assist in securing grant aid to restore the surface. This section is a part of the Thames Down Link, a 15-mile long distance footpath linking the Thames Path and the North Downs Way. In addition, the London Loop (Section 8) long distance footpath passes through the Hogsmill LNR, forming a link between Ewell and Royal Borough of Kingston upon Thames upon Thames.

In 2004 The Doorstep Green Project was implemented under the banner of the Hogsmill Improvement Project, which involved the now defunct Ruxley Community Partnership, and the Environment Agency. The project led to the creation of the Friends of the Hogsmill. Lottery funding was provided via the

Countryside Agency (Doorstep Green Scheme) which paid for a 2.5m wide hard surfaced path from the A240 to Ruxley Lane, with feeder paths to Curtis Rd playground and Riverview footpath. The scheme also paid for new benches, new entrance gates and new information boards, (including maintenance of the new amenities provided for a 25-year period). In addition to the Doorstep Green, the Environment Agency created a new meander and retained the old river channel as a backwater (wildlife refuge). They also funded the refurbishment of the green bridge crossing the Hogsmill River just before the confluence of the Bonesgate Stream. A Living Spaces Grant secured funding for the construction of a new bridge across the Bonesgate Stream just before it joins the Hogsmill River

Following on from the investment of the Doorstep Green Project, during the lifetime of the previous plan further sections of path along the Hogsmill and Bonesgate Open Spaces have been surfaced, totalling 5km/3 miles of new footpaths/cycleways. It is now possible to walk the entire length of the LNR and beyond on a surfaced path, from Bourne Hall, to the A240 Kingston Road and along the Bonesgate Stream to Chessington Road. In addition, the surfacing of the path along the Bonesgate was upgraded in 2012 with the laying of 'Fibredeck' surfacing. This was paid for by SUSTRANS and was carried out as part of the Thames2Downs landscape scale project under the banner of the Green Arc initiative.

A further two new bridges have also been installed, one across the Bonesgate Stream near Gatley Avenue, linking the Royal Borough of Kingston upon Thames upon Thames with Epsom and Ewell and across the Green Lane Stream just before its confluence with the Hogsmill River.

There have also been new benches and information boards installed along the length of the reserve.

Recreational use

Being surrounded by residential housing, the site represents a valuable resource to the local community. The site is popular for a variety of uses that include walking, picnicking, nature watching, exercising of dogs, and cycling. The reserve also includes two children's playgrounds, which are fenced and provided with safety surfacing. One playground is located near to Curtis Road, whilst the other playground is at the end of Gatley Avenue

The creation of a Community Green for the benefit of adjoining housing at Gatley Avenue was completed in 2016, and is known as Gatley Green. The children's playground was refurbished along with improvement and realignment of paths to allow access to this area. New benches have also been installed along with a bespoke wooden sign saying Gatley Green. In addition, a BMX/skate ramp has been installed in the reserve at the end of Cox Lane.

Educational use and site interpretation

A variety of promotional and educational literature has been provided for the site. The general information leaflet adopts a 'house style' employed for similar ones that describe Epsom Common and the Horton Country Park Local Nature Reserves. These provide an overview of features of interest, including the ecological and historical aspects of each of the three sites. In addition, the Hogsmill LNR is featured on the Epsom & Ewell Borough Council website, which includes information on history and wildlife.

During 2004, as part of the Hogsmill Doorstep Green project the EEBC Countryside Team launched the Friends of the Hogsmill initiative to encourage local people to become involved in a range of activities. This led to some very successful community litter picking days. However in more recent times, activity has decreased the Friends of the Hogsmill have now become a 'virtual' group. An email list of interested people is kept by The Countryside Team enabling them to be contacted and to receive occasional newsletters. Volunteering opportunities are provided with regular practical conservation tasks and opportunities to help with biological monitoring of the site, supported by the Countryside Team and partnership working with the South East Rivers Trust, the Lower Mole Partnership and Zoological Society of London (ZSL). These partner organisations will continue to be supported

The creation of the Hogsmill Doorstep Green has brought some educational benefits, with the local Riverview School having used it to find out more about the wildlife on their doorstep.

Over the duration of the last plan, in total, 7 new interpretation boards have been installed at main entrance points on to the reserve, containing a map of the LNR and a space for posting notices and task programmes.

The Lower Mole Partnership continues to play a significant role carrying out practical work. For example; the construction of a path to the white bridge over the Bonesgate Stream, signage of routes such as the London Loop, Round the Borough Hike & Bike and the Thames Down Link, hedge planting, (Lower Mole volunteers planted a hedge along the southern boundary with Ruxley Lane in 2006 and returned to the hedge in Feb 2015 to lay it in the traditional style) and channel improvements to the Hogsmill River in 2016.

Site boundaries/security

Site boundaries are largely formed by those of the adjoining properties, or the Bonesgate, stream itself (which runs along the Royal Borough of Kingston upon Thames upon Thames/Borough of Epsom and Ewell boundary). In some parts of the reserve, the boundary runs beside public roads and there is no physical barrier as such. However, all site entrances have barriers to prevent inappropriate access (e.g. by vehicles).

A major problem affecting the site is the illegal dumping of refuse, primarily (although not exclusively) of garden origin, along the fringes. This activity tends to be most noticeable where there are private gardens bordering directly onto the site. In a few cases within the Hogsmill section of the LNR, there has been

direct encroachment by householders of adjacent properties. A number of measures are being taken to address these unwelcome activities. During the last plan owners of adjacent properties were written to asking them to cease such infringements Further litter-picking days were held by the Hogsmill 'Friends' and the possibility of clearing some areas of dense vegetation along property boundaries is a possible approach.

In 2010 a trial approach was carried out using a £25,000 grant which removed 250 tons of rubbish from the back of the properties along Rowden Rd. The aim was to create a cleared 8 metre swathe that would be regularly mown and maintained as open grassland to dissuade dumping, ease access and also provide a community space. Unfortunately, the maintenance of the strip has proved problematic and vegetation is encroaching once more, encouraging dumping to return, although it is less than previously, pointing to the concept having worked to some extent. Littering and dumping issues do still occur occasionally but the situation is much improved.

STAGE TWO – EVALUATION AND OBJECTIVES

2.1 International and National Status

The Hogsmill LNR is not subject to any international designation. The designation of the entire site as a Local Nature Reserve was confirmed in late 2006.

2.2 Local Designations

During 2013 the borough's Sites of Nature Conservation Importance (SNCIs) were re-surveyed and the entire Local Nature Reserve has been designated SNCI (see appendix I). The Hogsmill LNR is also designated as River Biodiversity Opportunity Area (BOA) a county designation recognised in the Epsom & Ewell Local Plan aimed at recognising and enhancing biodiversity on a landscape scale. In addition, the whole area of the Hogsmill LNR is designated as Green Belt. Within the new planning policies of Epsom and Ewell Borough Council, a greater importance is being given towards green infrastructure and the protection of habitat links. The Hogsmill LNR is a vital green corridor within the Borough and so will be protected by the planning policies

2.2.1 Byelaws and Other Statutory Information

These are included in Appendix IV.

2.2.2 SNCI Descriptions

The description from the 2013 survey of the entire Local Nature Reserve is re-produced in appendix I.

2.3 Criteria for Evaluation

Size

The site as a whole covers an area of 38.3ha. Although the area involved is relatively small, it represents an important resource of undeveloped land in what is otherwise an urban area.

Diversity

Overall diversity of species and habitat types is low. For the Hogsmill LNR, around 250 vascular plant species have been recorded. These figures should be compared with the total of around 400 for Horton Country Park LNR

(although this is a much larger and more diverse site and has been the focus of a greater recording effort).

A total of 101 birds have been recorded from the site as a whole, confirming that the site is a very valuable habitat for them. However, it should be noted that a small proportion of these are migrants passing overhead, rather than specifically visiting the site.

Monitoring of aquatic macroinvertebrates within the Hogsmill River and its tributaries suggests an interesting diversity of species are present, especially so in its upper reaches where several taxa characteristic of a chalk stream have been recorded. However, only a small number of other invertebrate species have been recorded (again largely from the Hogsmill River, with only two from the Bonesgate). Of these, the greater proportion are butterflies, with a set butterfly transect route being walked annually since 2011. The records are passed to Butterfly Conservation, contributing to the national recording effort

It is important to stress that, with the exception perhaps of aquatic macroinvertebrates for the purposes of monitoring water quality, there has been no systematic recording of many groups and the current lists (Appendix III) should be regarded as incomplete.

Naturalness

The present day Local Nature Reserve represents a much-modified remnant of the former river-margin habitat mosaic, which includes relatively large areas of planted woodland and improved amenity grassland. However, the reserve includes a short surviving section of the original meandering river-bed, now by-passed by a man-made channel and where there is scope for its reconnection to the current main channel.

As mentioned in the description, over the lifetime of the last plan, much has been done to naturalise and restore the Hogsmill River and Bonesgate Stream channels e.g. removal of weirs and concrete channelling. The re-naturalisation can be continued over the lifetime of this plan.

A majority of species recorded from the Hogsmill River and the Bonesgate Stream are believed to be site-native. However, a significant number of accidentally or deliberately introduced invasive (neophtye) plant species are known. A number of the larger Pedunculate Oak trees clearly date back to the earlier agricultural landscape and could be ‘semi-natural’ in origin.

Rarity

Given their relatively small extent and condition, none of the habitats can be considered as rare, even at the county level. The Natural Environment and Rural Communities Act, along with the Epsom and Ewell Biodiversity Action Plan recognises the importance of woodlands at the local level, with ‘Broadleaved mixed and Yew woodland’, being a ‘Broad Habitat’ category and ‘Lowland Mixed Deciduous’ being a priority habitat category. However, even

the most-mature woodlands of the site are either of quite recent origin or much modified by planting. 'Rivers and Streams' are also classed as a priority habitat hence the Surrey BOA designation. .

Some of the free-standing trees date back to the former agricultural landscape and are thus remnants of a much larger mature tree population. Most notably these include the mature Pedunculate Oak trees and the row of lapsed veteran White Willow pollards along a former course of the Hogsmill River. Such trees take many centuries to reach maturity and are becoming increasingly rare in the English Countryside.

There are no records for any nationally rare or scarce vascular plant species on the reserve. However, there is a 1939 record from reserve near Tolworth for Summer Snowflake (*Leucojum aestivum* ssp. *aestivum*) (Ann Sankey, pers. com.), although it is highly likely that this species has since been lost.

Native Black Poplar (*Populus nigra* ssp. *betulifolia*) is rare in the county (Leslie, 1987). Trees of Black Poplar (*Populus nigra*) at the site are of planted origin and therefore unlikely to be the native species. The various types of Lime could also include Small-leaved Lime (*Tilia cordata*), a further rare species in the county, but again, these have all been planted in recent times.

The most notable invertebrate is the nationally rare (RDB1/endangered) Ladybird *Clitosthetus arcuatus*. The species has possibly been overlooked in the past, and was found by Ian Menzies on Ivy at a number of sites locally during 2005.

Another interesting invertebrate is the rare Brown Hairstreak butterfly. As noted in the description it has been recorded on site, both eggs and adult sightings. Considering the abundance of Blackthorn, the larval food plant, the Hogsmill LNR is undoubtedly an important site for the butterfly. A timed count of egg survey has taken place on the nearby Horton Country Park with good results. The Blackthorn should therefore be managed in a way that incorporates the requirements of the Brown Hairstreak.

Of the birds recorded, only two can be considered to be local important in Surrey, namely Skylark (*Alauda arvensis*), a species on the RSPB "Red List" of birds of conservation concern, together with Marsh Tit (*Poecile palustris*). The full list of birds includes a further three species from the RSPB "Red List", plus fourteen from the "Amber List", the most notable of these being Kingfisher (*Alecdo atthis*) (a species appearing on Annex 1 of the EC 'Birds Directive'), (see Appendix III).

The upper catchments of rivers such as the Hogsmill are possibly some of the last refuges within the county for Water Vole (*Arvicola terrestris*). The species is largely absent from the larger river systems primarily due to the presence of predatory Mink (*Mustela vison*). Whilst there have been no recent Water Vole sightings within the Hogsmill LNR itself, there have been more recent sightings in nearby Horton Country Park LNR and Epsom Common LNR. The last sighting was in 2012. Work has taken place to improve suitable habitat in Horton

Country Park LNR with the hope of possibly reintroducing water voles in the future, reflecting at the national desire of encouraging its return.

Fragility

Habitats and species occurring along the Hogsmill River and the Bonesgate Stream have developed to exist within the current, amenity-focussed management regime and are thus mainly quasi-artificial in nature and not especially fragile. Current threats to the grasslands of the site include habitat loss through tree-planting, plus the possible loss of more diverse swards under the current mowing regime.

Scrub is a relatively robust habitat, although in the longer term, a lack of management will allow the development of a dense and closed scrub cover, with a consequent loss of structural diversity, and an eventual succession to woodland.

Woodlands are primarily at risk of general habitat degradation through the combined effects of illegal tipping and trampling. The main threats to the mature tree population are deliberate damage through vandalism (e.g. fire) and disease (e.g. Chalara – Ash Dieback). There is also a risk of over-zealous pruning on the grounds of public safety, coupled with that of losses through 'natural' causes (e.g. the large White Willow tree that toppled over during the winter of 2003/2004). Further threats include stresses posed by atmospheric pollution, coupled with the loss of site-native trees in the presence of so many exotic species. Some habitat features at the site could be at risk due to possible channel realignments. Whilst these will be carried out to provide a net overall environmental gain, important features, such as the row of lapsed veteran pollarded willows, should be protected from any adverse effects resulting from such drastic topographical and hydrological modifications.

Some invasive plant species can lead to a loss of habitat and the displacement of native flora and fauna. Two of the most problematic on a national scale are Japanese Knotweed and Himalayan Balsam, with Goat's Rue being especially widespread in the Greater London area.

Many of the groups of fauna associated with the site are vulnerable to unfavourable habitat changes and indeed this site illustrates what can happen when watercourses are inappropriately managed. Water Voles are a particular example, in that they require a mosaic of habitats that includes tall, diverse bank-side herbaceous vegetation, free from grazing, without excessive scrub cover, and where water levels do not fluctuate too greatly throughout the year. Such a fragile balance of habitat conditions could all too easily be disturbed by a lack of sympathetic management and it is perhaps therefore understandable why the species has not been recently seen at the site.

Typicalness

The traditionally managed farming landscape is now virtually unrecognisable and only a small section of the original course of the Hogsmill River survives. Much of the site is fairly typical of amenity-managed parkland in an urban/suburban location.

Recorded history

From about 1754 to 1875 land on the south-western side of the Hogsmill was occupied by an extensive Gunpowder Mill complex. At its height, in the mid-19th Century, this employed 156 men. The location of the Mill complex is clearly visible on the 1871 O.S. map, although there is little physical evidence remaining on the ground today.

There is very little information about the site prior to this period (i.e. the manor estate and before) and further research would be welcome (S. Cocker, pers. comm.).

With a single exception (a botanical record from 1939), there are only three known biological surveys, the older of these dating from 1998. Therefore the recorded history of the site in terms of biological information is poor.

Position in ecological unit

The site represents a significant 'wildlife corridor' in the Borough of Epsom and Ewell. The open space in the reserve either side of the Hogsmill River forms the most southerly extension of such a corridor, which extends northwards from the Epsom and Ewell Borough boundary, well into the Royal Borough of Kingston upon Thames upon Thames, almost to the River Thames itself. The Bonesgate Stream in turn forms a tributary of the Hogsmill Rver and this eventually forms a link with Horton Country Park.

Potential for enhancement

The site is an important 'green corridor' and also a place where people and nature meet. There are a range of opportunities for enhancing the value of both these facets. The major areas are discussed below.

To improve diversity of both flora and fauna young plantation woodland would benefit from a programme of thinning and under planting with hazel to provide an understorey and potentially useful by-products. Clearing rubbish and other encroachments, in conjunction with public education and enforcement would improve appearance in certain locations, such as the rear of Fendall Road. Invasive tree species could be gradually thinned-out and replaced with native stock. All veteran trees require appropriate safeguards, including reducing competition and arboricultural surgery, to maintain longevity.

Scrub management could be undertaken to improve structural diversity and the potential value to a range of species (e.g. birds, invertebrates). Ensuring the

continuity of the scrub habitat is one of the most important aspects of wildlife management across the site. To retain a varied scrub age structure rotational cutting and especially scalloping of scrub edges should take place.

Localised areas of more species-rich grassland would benefit from being mown less frequently, to further encourage their botanical diversity, whilst the spread of invasive species such as Himalayan Balsam, Goats Rue and Japanese Knotweed needs to be controlled.

Much of the channel of the River Hogsmill and the Bonesgate Stream remains currently over-engineered – i.e. artificially straightened, steep-sided and in places concrete-lined. This restricts the potential for the development of aquatic and marginal vegetation and reduces the ability of the watercourses to absorb excess water at times of flooding. It is also damaging to the aesthetic qualities of the river corridor, which has encouraged neglect by the local community and a general low appreciation of its value. There is opportunity a need to continue working in partnership with the Environment Agency and South east Rivers Trust to continue the restoration and progress made since 2006 to bring the two watercourses back to a more natural channel and bank profile. Not only will this enhance the wildlife value of the river corridor, it will provide an aesthetic improvement and enable it to play a more effective role in flood alleviation.

There are opportunities to promote the site as an educational resource and make better provision for public interpretation.

During the previous plan very significant improvements to public access were achieved with new paths and bridges. There remains scope for improvement, for example, opposite the confluence where the Green Lanes Stream joins the Hogsmill River a well-used but very wet and muddy section of path would benefit from a hard surface. In addition there is space for new benches and most importantly the new paths, bridges, benches, etc. need to be looked after to maximise their useful lives.

Intrinsic appeal

Given its urban fringe location, the Local Nature Reserve represents an important and well-used recreational facility, forming a ‘green corridor’ in a heavily urbanised area. Individual specimen trees, stands of woodland and scrub, open areas of grassland and the rivers themselves provide an attractive landscape where people and wildlife can come together. The site has a long history, representing remnants of the former agricultural riverside landscape. The Hogsmill has its past associations with the gunpowder-making industry of the 18th and 19th centuries. In addition, this stretch of the Hogsmill River is where the pre-Raphaelite painters John Everett Milais painted his famous “Ophelia” and Holman Hunt painted “The Light of the World”. The Bourne Hall Museum has an early Twentieth Century collection of photographic material showing what the area looked like around this time.

Demonstration of excellence

The Hogsmill LNR in Borough terms is an important areas for public access and amenity in an urban setting, as well as being an important 'wildlife corridor'. The designation of the site as a Local Nature Reserve and re-affirmation as an SNCI offers a clear incentive to enhance the management of the site and thereby increase both its wildlife and amenity value. This in turn will promote a greater understanding and appreciation of nature conservation within an urban fringe setting.

The partnership working between EEBC, Surrey County Council, the Lower Mole Partnership, the Environment Agency and in more recent years the South East Rivers Trust, has achieved a broad and very significant raft of improvements to public access, the river channel and biodiversity. The work in naturalising the river channel is challenging both financially and in engineering terms but is set to continue and is a clear demonstration of excellence that has and can transform the reserve both visually and for nature.

2.4 Identification/Confirmation of Important Features

Site Features	National Importance	Regional Importance	Local Importance
1. Habitats			
Remnant mosaic of river-corridor habitats (including 'Rivers and Streams' of NERC)	*		
Mature and veteran trees			*
Lowland mixed deciduous woodlands (NERC)			*
Scrub			*
Fen swamp			*
Neutral grasslands (NERC)			*
2. Species groups			
Plants			*
Bird assemblage (Red and Amber Listed)			*
Mammal assemblage (Bats – Soprano pipistrelle, Noctule and Brown Long-Eared – NERC. and Badgers – Badger Act 1992)	*		*
Invertebrates - *Clitosthetus arcuatus* RDB1	*		
Butterflies - White Letter Hairstreak, Brown Hairstreak and White Admiral - NERC			*

Site Features	National Importance	Regional Importance	Local Importance
3. Culture and amenity			
Public recreation			*
Educational opportunities			*
Historical, landscape and cultural features			*

NERC – Natural Environment and Rural Communities Act (2006) habitats and species designations.
RDB1 – Red Data Book 1

2.5 Ideal Long-term Management Objectives 2017-2017

The ideal long-term management objectives outlined below have been determined from reviews of historical data and aerial photographs, liaison with various individuals and organisations and new information gained during recent site surveys (see also Maps 5 and 6).

2.5.1 Objectives for Nature Conservation

- Continue to work with partners Environment Agency (EA), South East Rivers Trust (SERT), Lower Mole Partnership (LMP), Royal Borough of Kingston upon Thames upon Thames (RBK) and Surrey County Council (SCC) to facilitate habitat and wildlife enhancements of the LNR and river catchment

- To manage the site as an important 'wildlife corridor' by ensuring the continuity of semi-natural habitat, in a way that is compatible with achieving the recreational, educational, cultural and historical objectives.

- To maintain and enhance the mature and veteran tree population by protecting individuals from damage through vandalism, 'releasing' competition, appropriate surgery and ensuring veteran tree recruitment.

- To maintain and enhance the woodland habitat by selective thinning of plantations and non-native trees, re-planting with appropriate native stock and encouraging natural regeneration of an understorey that could allow coppicing to take place in future.

- To maintain and enhance the scrub and scrub-margin habitat by rotational cutting (scalloping) and planting where appropriate.

- To maintain and enhance the grassland habitat by reducing the frequency of cutting in selected areas.

- To work in partnership to secure effective, sustainable long-term management of the watercourses, water-margin and other wetland habitats in a way that encourages the restoration of more natural channel dynamics through close liaison with the EA and other key partners such as the SERT.

- To monitor and control the spread of invasive species such as Japanese Knotweed, Himalayan Balsam, Goat's Rue, Mink and Signal Crayfish.

- To maintain and enhance the ornithological interest across all habitats present by ensuring habitat management meets with species requirements.

- To maintain and enhance populations of key mammal species, such as bats and to encourage the return of species such as water voles, by ensuring appropriate habitat management.

- To maintain and enhance the invertebrate interest, including the RDB1 ladybird *Clitosthetus arcuatus,* across all habitats.

- To maintain and enhance the botanical interest across all habitats present by ensuring habitat management is compatible with species requirements.

- To work in partnership to maintain and enhance aquatic fauna in both the Hogsmill River and Bonesgate Stream.

- Continue to support and facilitate the monitoring of pollution, particularly at the outfalls in conjunction with SERT, ZSL and the EA.

- Maintain a biological monitoring programme by conducting appropriate surveys and using results this to inform subsequent habitat management.

2.5.2 Objectives for Access, Recreation, Education, Historical and Cultural Value

- To maintain and enhance public access and recreational use and to provide facilities for members of the public to enjoy the LNR in a way that is compatible with achieving the nature conservation objectives.

- To maintain and enhance the landscape value of the site by appropriate management such as grassland mowing, scrub/woodland cutting and tree/scrub planting.

- To enhance the aesthetic qualities of the site by addressing issues of inappropriate use through a programme of litter and other rubbish removal, public education and enforcement.

- To promote and encourage an understanding and appreciation of the nature conservation, landscape, cultural and historical value of the Open Space by the provision of appropriate interpretation and other resources.

Possible sources of funding

Resources for management of the Hogsmill LNR are likely to be available from the following principal sources:

- EEBC core budget
- Community Infrastructure Levy (CIL)
- Environment Agency
- South East Rivers Trust
- Heritage Lottery Funding

2.6 Rationale

2.6.1 The Site as an Important Wildlife Corridor

The most important ecological feature of the site is the 'green corridor' that it forms in what is otherwise a largely built-up area. Thus, strips of scrub, woodland and coarse grassland form an almost continuous link along the length of the site, mainly along its margins and also beside the two main watercourses. A major focus of this management plan will therefore be aimed at maintaining the linear continuity of habitats and enhancing where possible. This work is addressed under the individual habitat headings. In general, it will be achieved by managing scrub, woodland and grassland areas, and allowing wider fringes of un-mown grassland to develop that will then form links between the existing features.

2.6.2 Mature and Veteran Trees

The site supports some notable veteran trees, in particular the lapsed pollard White Willows along the old course of the Hogsmill plus the two White Willow avenues beside the existing river channel. In addition, there are also the very large Pedunculate Oaks in the east of the Hogsmill Open Space (compartment 13), plus some further large Oaks along the margins of the Bonesgate Stream. As well as the potential value that these veteran trees have in terms of their decaying timber resource, they are also important for the aesthetic qualities they bring to the landscape of the Reserve.

Damage through vandalism (e.g. fire) poses a major threat to these trees. There are a number of examples of mature trees within the LNR that have been damaged in this way. The presence of decay at the base of a tree seems to be a temptation to vandals to set fire to a tree at this point. The occurrence of such activities may to some extent be encouraged by the levels of litter and rubbish giving an uncared for impression in some scrub/woodland areas of the site. Continued clearance of rubbish from these areas may help to reduce the temptation for such acts of vandalism. The situation also reinforces the need for a greater on-site presence, which will again discourage acts of vandalism in general.

A proportion of these veteran trees are currently at risk of collapse – resulting in the loss of a valuable ecological resource. It is perhaps these old trees where the risk of collapse is currently most acute, but the possibility has to be considered for all of the LNR's major trees. Therefore it is proposed that an arboricultural specialist survey these trees to establish what work is required to maintain their long-term stability and minimise any risk to the public. The veteran Elder in compartment 6 needs particular attention as it is showing signs of decline.

In a few situations, large trees including some veterans are currently 'hidden' by surrounding regeneration of younger specimens. This may offer a degree of protection from the attention of vandals. However, the 'release' of some individuals by thinning of competing younger trees will help not only the tree itself, but will improve the landscape character of the site. One such example is a large Ash tree on the edge of the area formerly used for the disposal of silt dredged from the pond at Ewell Court, (Compartment 10). This individual is currently surrounded by extensive regeneration of Grey Poplar trees which could be thinned to make a feature of the tree. As it lies in a very conspicuous location, the increase in risk of vandalism here would probably be fairly minimal. A further group of trees that would benefit from a reduction in potential competition are the large maiden Oaks in the extreme south of the Hogsmill Open Space (compartment 13) (as discussed under Section 2.6.3).

With all veteran trees, care should also be taken to prevent any other activity that could result in soil compaction around their roots (e.g. by driving vehicles too close to them). Whilst it is generally unlikely that this might happen at this site, such impacts should be considered if any vehicular access is being planned. For example, tractor-mounted mowing around the large Pedunculate Oak trees in the south of the Hogsmill Open Space should avoid the area directly beneath the canopy to reduce the risk of soil compaction around their root systems.

The current population of veteran Oak and White Willow specimens is rather even-aged and action is needed to ensure a continuity of such trees when this generation expires. To some extent this can be achieved through retaining and managing existing planted trees to become mature specimens. However, there are at present no younger specimens that could take the place of the veteran White Willows and therefore suitable stock should be planted and encouraged in this area. In addition, it would be appropriate to plant a number of young Oak trees, grown from acorns collected from veteran Oaks already present, which could become parkland trees of the future. As well as planting in areas where veterans currently exist, scattered individuals will be planted out into open grassland areas, primarily to improve the landscape character of the Local Nature Reserve. Any planted trees will require appropriate stakes and tree guards to protect them from damage in their early years (e.g. grazing by deer and other herbivores, and vandalism).

To enhance the continuity of habitats along the corridor there is a case for planting new scrub margins. This subject is considered below under Section 2.6.4.

There is a need to continue managing the two avenues of White Willows beside the Hogsmill River. The more southerly feature (compartments 11 and 12) supports multi-stemmed trees that have obviously been coppiced or pollarded in the past. These trees would therefore be suitable for re-pollarding and coppicing. This would be better achieved over a number of years to maintain the canopy structure and visual elements of the landscape. There is also a need to plant new specimens into gaps between existing trees and manage these by coppicing and pollarding in future.

The more northerly avenue of trees (compartment 3) are mature and rather tall, but not veteran in character. The main value of these specimens lies in the visual impact they possess in this relatively narrow part of the site, sandwiched in between areas of housing on either side. It would therefore be inappropriate to coppice these trees to ground level, as this visual function would be severely compromised. Instead, it would be beneficial to undertake careful thinning and crown reduction to maintain them roughly at their current extent.

Trees beside the two watercourses are regularly inspected by EEBC and the EA. The EA are responsible for the management of trees on the riverbank, so continued liaison with them on the management of these features is essential. In 2015 work on the northern avenue of willows was carried out by the EA to address the safety issues resulting from tree safety inspection.

2.6.3 Broadleaved Woodlands

Within the plantation woodlands, there is a need to change the balance of tree species more in favour of native ones over time. A majority of stands have developed to a stage where thinning of the canopy is required, which can be followed by the planting of Hazel to create an understorey. The plantation in compartment 6 has a veteran Elder tree on its margin, which should be protected when thinning takes place. Some of these woodlands can also be extended or developed to enhance the continuity of semi-natural habitats along the length of the site, through the planting of appropriate native tree and shrub species. The impact of this proposed management upon the quantity of Ivy present within the Local Nature Reserve, needs to be considered (as potential habitat for the RDB1 ladybird *Clitosthetus arcuatus*). However, it is likely that good amounts of Ivy are present in woodlands that will not be managed in this way and mature trees elsewhere within the Local Nature Reserve.

In some areas where good linear habitat already exists, thinning of recent plantations can be very extensive, retaining only a fraction of the ‘more interesting’ trees. This will effectively convert these stands back to open grassland with scattered ‘parkland’ tree specimens. A suitable location is an area of plantation beside the Hogsmill River within compartment 6, where specimens of Lime, Pear, Hornbeam and possibly some riverside Willows could be retained as specimen trees. .

Some areas of recent plantation would also benefit from a diversification of their fringes, through scalloping and planting of shrub species such as Hawthorn and Blackthorn. Where mature, established, native trees exist within plantation areas, the surrounding canopy should be thinned to 'release' them.

Areas of plantation woodland in the extreme east of the Hogsmill LNR lie very close to a number of fine old maiden Oak trees and indeed their canopies are starting to touch. Thinning of these woodlands should include 'halo release' of any trees that impinge on the canopy of these mature trees.

The more mature woodlands will also benefit from the thinning of non-native species in favour of native ones. The creation of glades will improve structural diversity. Natural regeneration can be enhanced through supplementary planting with site-native stock. The structural diversity of woodland and existing glade margins (e.g. Riverview Copse) can again be improved by scalloping the edges and encouraging a denser shrub layer in these areas. Again, any impact on the quantity of Ivy needs to be considered.

Within Riverview Copse, the secondary scrub-woodland is to be encouraged to develop as woodland. The Hawthorn should be thinned and natural regeneration of native broadleaved species to create future canopy and understorey should be promoted. Supplementary planting can be carried out if necessary.

Although at the time of writing this management plan, the impact of Ash Die Back and the Oak Processionary Moth is unknown, liaison with the Forestry Commission should continue to ensure EEBC can respond accordingly.

2.6.4 Scrub and Scrub Margins

The importance of scrub to the overall habitat corridor has already been highlighted. The two main priorities are to manage existing scrub to improve its nature conservation value and to improve habitat continuity.

Many stands of scrub remain are rather uniform and overgrown in character and would benefit from rotational cutting to improve age and structural diversity for the benefit of animals such as birds. Frequent amenity mowing has often produced an abrupt edge to existing stands of scrub. The nature conservation value of this marginal habitat can be enhanced by the continued 'scalloping' of the edges to improve age and structural diversity. Under the previous plan sections of scrub in the following compartments were managed; 2, 6, 9, 11, 12, 13, 14 and 16 which should be continued.

Measures to maintain habitat continuity could involve the planting of new areas of scrub and trees. Areas to consider would be the margins of the site. If the EA approved works to clear scrub along the river channel take place, care needs to be taken to maintain habitat continuity of scrub habitats. .

An existing stand of plantation woodland in compartment 6 to the rear of houses on Pam's Way might be more effectively adopted as the 'nucleus' of new scrub/woodland, by thinning around 75% of the non-native tree canopy and re-planting with native trees and shrubs.

On the southern side of Ruxley Lane, a length of new hedgerow was planted in 2006 and is now managed using traditional techniques. It was laid for the first time by volunteers during the winter of 2015 and will be repeated every 7-10 yrs. A section of hedgerow was also planted along the boundary of the service road behind the houses of Eastcroft Rd in 2007 which will need future maintenance, possibly by laying.

There is a large area of scrub currently not within the boundary of the Local Nature Reserve, located to the South West of the site. It is bounded by compartment 12 of the LNR, the back gardens of houses along Northcroft Road and the allotment gardens. It is a large area of developing scrub and should be managed as such to prevent it progressing in to woodland. An aspiration of this management plan will be to incorporate this area in to the Local Nature Reserve and manage as an area of rotational scrub.

2.6.5 Grasslands

Grassland is a major habitat component of the site and given its important amenity value, the major focus will need to be upon regular mowing of swards for this type of land use. The smaller areas of rough grassland, mainly around the periphery of the site (and their associated nettle-dominated vegetation), form an important element of the linear habitat corridor. Their tall structure and tussocky growth pattern represents a valuable potential invertebrate habitat (few invertebrates are able to withstand regular destruction of their habitat through mowing). In particular, ant-hills have developed in some areas of rough grassland, for example in the Stepping Stones meadow (compartment 11) and they are especially frequent within the grass fringe around Riverview Copse (compartment 2). Nettles are a food plant for several common species of butterfly, whilst thistles represent an important nectar source for many flying invertebrates.

There is a great opportunity to make an increase in the extent of rough grassland by leaving wider, un-mown fringes beside some of the amenity grassland areas e.g. beside the watercourses and around and between the existing small tree plantations. These areas are shown in map 5. However, to maintain the maximum range of structural habitat conditions, areas of rough grassland will benefit from periodic, small-scale rotational mowing, again to encourage invertebrates.

Botanical diversity of the intensively-managed amenity swards is generally very limited. However, there are local areas where species diversity seems somewhat better. It would be possible to develop one such area, in what is a relatively 'quiet' part of the site, into a wild flower meadow, by cutting much less frequently than the current regime. This is the area next to Riverview Copse,

now known as Riverview Meadow. The spoil from creating the backwater and new meander in March 2006 was deposited here and then seeded with wildflowers. Any perception that management of the site is being 'cut-back', can be countered by the educational opportunity that this will provide to see the flower sward develop (Common Knapweed and Common Bird's-foot Trefoil already occur in this area). Monitoring of the sward will be undertaken to follow any changes that occur in its composition and structure. See map 5 for grassland management regime.

Traditionally, much of the land beside the Hogsmill would have been managed as either permanent pasture or as hay meadow. As a demonstration of the latter management technique, it was an aim of the last plan for part of the area known as Chamber Mead (compartment 12), which had not been cut for some time, to be developed as a wildflower meadow by annual cutting and clearing of the arisings. In 2014 and the area was cut and cleared for the first time by the Council's GM Team. Chamber Mead provides an opportunity for the monitoring of impact upon plants and invertebrate populations under an annual cut and clear regime. Following years of management as amenity grassland there were concerns about public reaction to grass being allowed to grow long but to date the public have been accepting. The Council's GM team cut a wide four to five metre swath around the edges which affords somewhere for dogs and children to exercise. It should be noted that in 2016 EEBC and the SERT put forward a plan to the Hogsmill Catchment partnership that involves diverting the Green Lanes stream across Chamber Mead to join the Hogsmill just upstream of the stepping stones. This have the effect of creating a wetland within Chamber Mead and several hundred metres of Chalk Stream by moving the Hogsmill River/Green Lanes stream confluence downstream. This is discussed in more detail in section 2.6.6 below.

2.6.6 Watercourses, Water Margin and other Wetland Habitat

A major feature of the two watercourses as they stand at present is their extensive modification through a process of channelisation. Although a great deal of progress has been made to naturalise the watercourses over the lifetime of the last plan, the channel is often constrained to a pre-defined course by artificial banks, whereas originally, it would have meandered naturally across the floodplain area and its margins would have supported areas of marginal and swamp vegetation. A natural mosaic of habitats such as this is able to 'absorb' excess water at times of high flow, which helps to reduce the extent of flooding. The creation of artificial, straightened water channels, generally lacking in marginal vegetation, greatly increases the risk of flash flooding, as the river system has no capacity to contain rising water levels.

In the light of this, a major objective of this management plan is to build on the progress made during the last plan and continue to work in partnership with the Environment Agency, South East Rivers Trust, Royal Borough of Kingston upon Thames upon Thames, Surrey County Council and the Lower Mole Partnership, to find ways of restoring more natural channel dynamics and river marginal habitat to the two watercourses. The Environment Agency is the key partner

as the responsibility of managing the two watercourses and their banks ultimately rests with them. The Bonesgate Stream lies along the boundary between Epsom and Ewell and the Royal Borough of Kingston upon Thames and is owned in part by both local authorities, highlighting a need for close liaison with this stakeholder. Surrey County Council is responsible for the Green Lane Stream which is a key tributary of the Hogsmill therefore liaison with them is essential. The South East Rivers Trust and Lower Mole Partnership are vital partners in actually organising and carrying out practical work.

The South East Rivers Trust (SERT) has carried out significant improvements to the Hogsmill River over the last few years and act as 'Catchment Partnership Hosts' a key role in delivering the European Water Framework Directive that aims to improve the water quality of rivers across Europe. The continuation of partnership working and facilitating the work of SERT will play a key role in delivering this plan.

There are several proposed projects aimed at improving both water quality and biodiversity within the boundary of the reserve. These include the following:

-The creation of a wetland at Chamber Mead by diverting the Green Lanes stream through Chamber Mead, extending the chalk stream section of the Hogsmill River by several hundred metres and creating a wetland which will improve water quality, habitats, and also have flood risk benefits.

-Habitat improvement works are proposed for the section of the Hogsmill River, up stream of the Green Lanes Confluence, to immediately upstream of Ruxley Lane. The work aims to improve habitat diversity and abundance. Measures are to include: removal of stone banks and toe boarding, softening and naturalising banks; channel narrowing to restore natural flow velocity; large woody material and gravel introduction to create flow sinuosity; planting with native aquatic species. This would complement the fish passage project. It is hoped these measures will allow for the reintroduction of Brown Trout to the Hogsmill River in the future. Ideally this will be carried out, preferably in phases, along the entire length of the river.

As mentioned previously, the EA owns the Hogsmill River and banks and therefore has the ultimate say over the management of them. However, working in partnership, EEBC staff & volunteers are helping to manage sections of bank on a regular basis. Recent volunteer tasks have involved opening up the banks to allow more light to encourage the bank side vegetation to flourish. This in turn will improve the habitat for invertebrates, providing more food for fish and birds. Volunteers from SERT and LMP have also been carrying out similar vegetation management, also including the creation of burms to improve water flow.

An important area of management cooperation with the EA involves the back-water (wildlife refuge) between compartment 2 and 14 that was created by the EA in 2006. By realigning the river running alongside the Watersedge Estate to a more natural line a new meander was created, leaving the old channel as back water, providing refuge in times of high flow. The shallow bank of the

meander was planted up with native flowers and grasses and has developed well. Over the 10 yrs since it was created, the vegetation now in the middle of the river has become quite scrubby and should be managed to ensure it doesn't get too overgrown. The back-water itself is also silting up and should be monitored to ensure it continues to provide the function it was designed for.

Via the Hogsmill Catchment Partnership SERT has been working with Thames Water, the EA, ZSL and the local community to investigate how often the Epsom and Ewell Storm Tanks overflow. Depending on the outcome the data obtained will assist in building a case for measures to be put in place to prevent overflows of raw sewage in to the Hogsmill River and Green Lane Stream. Currently the work carried out by volunteers includes mapping and monitoring the outfalls and also sampling the invertebrates near outfalls. This volunteer effort is coordinated by SERT and ZSL and should continue to be supported and facilitated by EEBC.

A section of former Hogsmill River channel pre the 1960 channelisation remains close to the Ewell Storm Tanks. This bypassed section still fills with water in wet conditions. This feature now supports one of the most extensive surviving fragments of water marginal habitat within the site; although it is currently very over shaded by adjoining trees and would benefit from thinning the canopy to allow more light to reach the water. Ultimately it may be possible to restore it as part of the river channel network, even if the present course is also retained as the main flow and there is also potential for a wetland that would assist with both flood prevention and biodiversity. The EA and SERT have shown interest and the idea has been put forward as a possible project at the Hogsmill Catchment Partnership. Additional survey work is required to measure land levels along the various channels in this area to help with establishing the feasibility of such a proposal. Where possible we would support other projects involving reconnecting the river to its flooplain due to the ecological and flood risk benefits.

Whilst the foregoing focuses upon possible ways of restoring more natural channel dynamics to the two watercourses, potential impacts on existing habitat features have also to be considered as part of this process. As an example, further evidence of the existence of the former Hogsmill river channel can be seen in the form of the veteran, lapsed pollard White Willow trees that appear to lie along the edge of an earlier river channel (but now some distance from where the river now runs). These trees are of such ecological significance that their conservation should take precedence over any proposed river realignment near to them. Environment Agency standards of tree maintenance would be incompatible with maintaining the current levels of decaying timber on these trees and any realignment here should be engineered to keep these trees a safe distance away.

The boundary of the Nature Reserve at its eastern end is currently the railway running between Meadow Walk and Station Avenue. However, the area known as the Upper Mill and the Lower Mill contains ponds and the beginnings of the Hogsmill River which are fed by chalk springs, making the water courses here internationally important. This area also contains valuable woodland and there

is an opportunity, working with partners, to improve it ecologically and create flood alleviation benefits. There is potential to reconnect the river to its paleochannel and rechannel it to provide fish passage past the mill ponds and create wet woodland habitiat. It is proposed that over the next 10 years, the Nature Reserve boundary is extended to include the Upper and Lower Mill, up to Chessington Rd. It is already part of the SNCI so would make a valuable addition to the mosaic of habitats contained within the Nature Reserve.

A further important issue regarding the management of water-margin habitat is its potential value as habitat for of Water Voles (see Section 2.6.9).

The stand of fen-swamp vegetation within compartment 11 lies in a small depression, hydrologically unconnected with the main river channel, at the extreme south-eastern margin of the Hogsmill Open Space. The developing scrub and trees should be closely monitored and thinned out when necessary.

2.6.7 Non-native/Invasive Species

The most extensive invasive species is Himalayan Balsam. Over the lifetime of the last plan a great deal of work has been carried by volunteers hand weeding the plant along the entire length of the Bonesgate Stream and area short section of the Hogmsill River at the confluence with the Bonesgate Stream. This work has been successful in preventing the spread of Himalayan Balsam upstream along the Hogsmill river and whilst still present and prone to outbreaks along the Bonesgate Stream Himalayan Balsam could now be considered to be under control. There remains a difficult to access infestation in the upper reaches of the stream well to the north of the reserve and until eradicated is likely to lead to infestations re-appearing. The South East Rivers Trust and Lower Mole Partnership are working to solve the problem.

Complete eradication of Himalayan Balsam is impractical, so the main focus of management should be to discourage its spread to new areas, especially along the Hogsmill upstream of the Bonesgate confluence and maintain the annual hand weeding volunteer sessions to keep the plant at a low level Chemical treatment is an option, close proximity to the watercourse requires an application to be made to the Environment Agency to give consent. Continued monitoring is required to identify new colonies as they develop to prevent the plant from spreading elsewhere.

There are scattered colonies of Japanese Knotweed on the Bonesgate Stream. The plant is infertile in Britain and only spreads vegetatively. Therefore, the risk of progressive spread along the watercourse is lower than a viable seed-producing plant like Himalayan Balsam. All locations have been treated with most areas successfully eradicated but several remain and are being monitored prior to further chemical treatment.

It should be noted that physical control of Japanese Knotweed is also possible (Coleshaw 1999, 2001), such as regular cutting or digging up the rhizomes, although these activities pose the risk of spreading the plant accidentally (and

the plant can re-grow from a single remaining fragment). As it is an offence to cause the plant to grow in the wild, all cut material and any excavated rhizomes should either be carefully collected and disposed of on site (e.g. burning), or taken to an appropriately licensed landfill site. Cutting in particular may take many years to be effective, as the rhizomes are very long-lived, whilst excavating rhizomes is also a very labour intensive process, further suggesting that herbicide may be the best option. As with Himalayan Balsam, continued monitoring of the occurrence of Japanese Knotweed will be required to ensure that existing colonies are being effectively treated and to look out for any new infestations before they take a hold.

A single small stand of Goat's Rue exists near to Cox Lane and has been hand pulled to keep under control and is currently minimal in extent.

More recently Mink (*Neovison vison*) have been recorded in the catchment area, in nearby Horton Country Park LNR and Epsom Common LNR indicating their likely presence as the reserve is downstream of both sites and Mink are likely to have moved upstream to reach them. A survey should be carried out to decide if Mink are present within the reserve and consideration given to their removal.

There have also been sightings (2016) of Signal Crayfish (*Pacifastacus leniusculus*), another invasive species. Considering that the native crayfish is not present, Signal Crayfish do not present an immediate problem; however, numbers should be monitored.

2.6.8 Ornithological Interest

The main value of the Local Nature Reserve for birds is the habitat they provide for a range of common residents. The proposed management of the mosaic of habitats present should further enhance their ornithological value. The fact that birds are easily seen and recognised has meant that they are the best-recorded group of fauna within the reserve, and ideally suited, at this level to volunteer recording, which will continue to be encouraged and supported. The only species where a particular focus is required at present, is the Kingfisher, where a detailed survey to establish nesting sites along the Hogsmill River and Bonesgate Stream is required. Again, this could probably be undertaken by volunteers. The results of this and other bird survey data and on-going monitoring could then be used to inform subsequent habitat management.

2.6.9 Fish

Ongoing monitoring of fish numbers is carried out by the Environment Agency and is supported by the work of SERT. To improve the river for fish SERT have recently, c2013-16, removed obstacles to fish passage (Weirs) and carried out in channel habitat improvements. Fish are known to be responding to these improvements and the fish populations released in to the Hogsmill River by the EA c2007 now have the opportunity to move both up and downstream. The

latest surveys indicate that populations of bullhead and minnow have been able to repopulate upstream to Chambermead, where they were absent before.The ultimate indicator of success is generally accepted to be the return of Brown Tout to the upper reaches of the Hogsmill River, although this will probably require translocation as opposed to natural repopulation. The regular sightings of King Fisher point to a healthy population of smaller fish species in both the Hogsmill River and Bonesgate Streams. In the latest EA fisheries survey (2016) at Chamber Mead, Oakland Way and Worcester Park Road, Bullhead, Minnow, European Eel, 3-Spined Stickleback, Chub, Rudd, Dace, Gudgeon and Roach were recorded.

2.6.10 Reptiles and Amphibians

Currently there are no records indicating the urgent need for a baseline survey carried out in suitable locations across the reserve.

2.6.11 Water Voles

Water Voles (*Arvicola terrestris*) are a "Species of Principal Importance" under Section 41 of the Natural Environment and Rural Communities Act. The species has suffered dramatic declines in recent decades and Water Vole "places of shelter" are afforded protection under Schedule 5 of the 1981 Wildlife and Countryside Act. In recent years the lack of findings has suggested that Water voles should now be considered extinct in Surrey, however, efforts are being made and consideration is being given to their reintroduction. However, this requires both the control of Mink and management of suitable habitat.

In view of the high conservation priority attached to Water Voles both watercourses should be managed as potential habitat for this species. The main habitat requirements include a well-developed marginal vegetation fringe, with a low level of tree shading, and fairly constant water levels. Achievements made during the 2006-16 plan and future plans to re-naturalise the banks of the river should accommodate this requirement here, although achieving more constant water levels presents the greatest challenge due to the high rate of runoff from the surrounding urban areas. Nevertheless records suggest that Water Voles were present along the Hogsmill until relatively recently suggesting they can cope with fluctuating water levels. In addition, reducing tree cover along the section of the old Hogsmill River Channel margins will encourage more prolific marginal vegetation growth in currently shaded areas.
On-going monitoring will establish whether any of this and other management aimed at encouraging the species has been successful.

2.6.12 Other Mammals

Bat surveys (Bailey 2005, Howarth & Cocker 2015 and 2016, and Fure & Simmons 2015) have revealed that the Hogsmill LNR is important as a foraging area and clearly has high potential for foraging and roosting batsespecially for the 45 khz Pipistrelle. It also forms part of a flyway for bats linking surrounding

populations (with records indicating that a total of eight species occur within range of the site – Bailey 2005).

On this evidence there is a clear need to perform bat surveys across the site as a whole and to assess the potential value of all other mature trees as potential bat roosts. This is especially important prior to any proposed tree works.

Managing and enhancing the site as a linear habitat corridor, especially with a continuity of mature trees along the watercourses, will enhance its value as a bat flyway. Thus, planting new trees and scrub to enhance this habitat feature will be of benefit to bats. Strategic planting of trees can also be used to screen artificial lighting from the site.

Where possible, old and mature trees should be retained as they provide foraging areas and potential roost sites. Surveys need to identify those trees that are the most likely to be of importance to bats so that this can be taken account of in their management. Whilst the safety of the public is an overriding concern, over-zealous pruning of decaying branches restricts the potential value of a tree as a bat roost. Therefore only the minimum amount should be removed in order to make the tree safe, whilst retaining standing stumps, split trunks, ivy growth or reduced limbs. Such work should be undertaken by an arboriculturalist with experience of managing trees to encourage bats.

Finally, plans to restore more natural channel characteristics to the watercourses should enhance the diversity and number of aquatic invertebrates and increase the value of these habitats as foraging areas for bats. This along with the many other planned nature enhancements highlights the need to monitor bats as a possible indicator of success. It is recommended that, towards the end of the first 10-year period of this plan, bat surveys need to be repeated.

Currently there are no formal records regarding small mammals, badgers, foxes or deer although anecdotally we know they are present. Baseline surveys should be carried out to inform the site's management.

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2.6.13 Invertebrates

The most notable invertebrate discovered to date is the RDB1 ladybird *Clitosthetus arcuatus*, which was found at the site during 2005; one of several recordings that year of the species in Surrey, where it appears to be preferentially associated with Ivy. At present, the exact habitat requirements are unclear and therefore the most appropriate action is to conserve the presence of Ivy on trees, probably in well-lit situations (for example through consideration during clearance/thinning of invasive tree species) and undertake monitoring of the species at the site.

As a result of introducing regular monitoring for butterflies using a transect method, the number of recorded butterfly species has increased from 15 to 26 species. This surveying carried out by volunteers and staff should continue to

be supported. One of the more notable sightings has been the Brown Hairstreak. This butterfly lays its eggs on young Blackthorn highlighting the need to manage to ensure a good age range of Blackthorn within the reserve. A good management technique is to scallop edges, ensuring there is always young blackthorn present but not to the exclusion of middle aged and mature blackthorn, which is important for the ornithological interest of the site.

A butterfly of principal concern in Surrey is the white letter hairstreak whose larval food plant is Elm. This butterfly was recorded on site during 2016. It is important to continue with the monitoring of this species and the Elm population on the site.

As with birds, the site is likely to support a range of common invertebrates associated with the habitats present. Most recording to date has been on a casual/voluntary basis and this approach could contribute significantly to baseline surveys of groups such as Dragonflies/Damselflies as it has done with the Butterfly surveying. In recent years Stag Beetles have been discovered alongside the Bonesgate Stream and with Surrey being part of a national and global stronghold for this species it is recommended that a decaying wood resource is maintained within the reserve. Given the presence of a small veteran tree population, especially the old lapsed pollard White Willows, there is a need for targeted surveys of these features to look at their invertebrate fauna (especially beetles). Invertebrate surveys could also play a role in monitoring the impacts of various forms of grassland management, such as the creation of a wildflower area at Chamber Mead.

The knowledge of aquatic invertebrates is fairly low. Although there is some monitoring being done through the work that ZSL are carrying out with the river fly monitoring, the animals are only recorded to genus level and it is carried out to monitor the water quality. It is recommended that a more thorough aquatic invertebrate survey should be carried out during the first ten year period of this plan.

2.6.14 Botanical Interest

During the last SNCI survey carried out in 2013, a reasonably comprehensive species list was recorded across the site, including some of the bankside vegetation which was excluded from the surveying carried out for the last plan. There is a need to survey the bankside vegetation more thoroughly and it is recommended that the Environment Agency are encouraged to support further survey work .

The EEBC Hogsmill LNR homepage could be used to help to promote voluntary botanical recording. On-going monitoring is also required to establish the effectiveness of certain proposed forms of management. For example, this might include the wildflower meadow grassland areas, and water margin vegetation beside the two watercourses.

A survey of the Bryophytes found on site was carried out in 2015 (Peter Howarth) and a nationally scarce species was found *Hennediella macrophylla.* It is recommended that a further survey is carried out towards the end of the first 10 year period of this plan.

Baseline surveys of the Fungi and Lichen populations should also be carried out within the first ten year period of this plan as there are currently no formal records.

2.6.15 Public Access and Recreation

Given the urbanised surroundings, the Local Nature Reserve represents an important and well-used recreational facility. Consequently the management of public access is very important. For example, maintaining paths and regular mowing of areas of open grassland play a crucial role in allowing the public to continue to enjoy the reserve all year round.

Following on from the major improvements to public access over the lifetime of the last plan as mentioned in section 1.5.3.3, there remain further opportunities to improve public access. For example, there is a short section of well used path that becomes very muddy in wet conditions. It is located in the east of the site in compartment 11, where the path runs along the north side of the river, opposite the Hogsmill River/Green Lanes Stream confluence. It would be a significant enhancement if this section could be surfaced. All path surfaces and EEBC owned bridges should be maintained to provide good public access, including the drainage of existing routes. There are many drainage pipes that have been installed which should be regularly checked and cleared of any debris to ensure they are allowed to flow freely to prevent path erosion.

During the last plan, the path alongside the Bonesgate Stream from Chessington Rd to the A240 entrance was upgraded to a Public Footpath. The possibility of having the rest of the surfaced routes designated as official Public Rights of Way (bridleways to allow both pedestrians and cyclists) will be pursued, in order to give further recognition to the value of these routes within the reserve.

Access to the stepping stones across the Hogsmill River should be improved by the refurbishment of the steps that run up the banksides from the stepping stones including repair of the considerable erosion caused by dogs.

In a number of localities areas of scrub adjoining some of the main paths have developed to such an extent that the route of access has been reduced to a narrow, shaded corridor. During the 2006-16 plan, work has begun on thinning this scrub to restore a more open access paths, following the general principles of scrub management outlined for improving its nature conservation value. These sections now need to be managed on rotation.

To enhance Gatley Green, the surrounding grassy area should be cut more frequently to allow visitors to use it for picnics etc. Note that maintenance of

playgrounds and grass cutting regime within the site are the responsibility of a separate EEBC department, so good communication with the grounds maintenance team is essential.

Within the Local Nature Reserve a number of new benches have been provided, allowing visitors to appreciate the enhancements to the site's visual environment. Additional bins have also been provided, which will further improve the site for people's enjoyment. This site furniture will require on-going maintenance.

In addition on one bank of the new meander in compartment 2, a shallow gradient was constructed to allow easy access to the river. The vegetation here should be regularly maintained to allow easy access. Another similar location was created at Gatley Green.

Land on Royal Borough of Kingston upon Thames (RBK) side of the Bonesgate Stream is for the most part situated within the Tolworth Court Meadows LNR. As the two sites effectively form part of a single 'green corridor', it is important that effective liaison is maintained with RBK over their management.

Access to the easternmost part of the Hogsmill Open Space from the Lower Mill to Mill Pond section of the Hogsmill river corridor is via a wooden footway passing beneath the Epsom to Ewell railway line. This structure is owned and maintained by Epsom and Ewell Borough Council.

Dog Control

There are a range of ecological, visual, and visitor safety/enjoyment issues relating to dogs and their owners which are negatively impacting the reserve and which pose a significant management challenge. Before identifying the key issues it is important to realise that dog owners can play a very positive role in helping to manage the reserve, in many cases they are the most frequent visitors to the site and therefore an invaluable set of 'eyes and ears' Below the issue are described.

- Dogs off lead:- There is little doubt that dogs off the lead that are allowed free reign across the reserve cause disturbance to other visitors and wildlife, especially if allowed to enter the river/stream. Along path edges there is evidence of long term impacts to vegetation through both constant trampling and nutrient enrichment from defecation. The river and stream in particular are a magnet for dogs with owners not realising that their dogs seemingly innocent swim is one of many taking place every day, year in year out. Disturbance to the bed of the water courses and the consequent turbid water impacts the invertebrate life, bird life is disturbed and there can even be serious erosion problems where dogs regularly enter the river/stream. In 2012 a sum of £20,000 had to be found to repair the dam to Great Pond on nearby Epsom Common, where erosion caused by dogs was threatening the integrity of the dam. In places on the reserve eroded trenches are being created that are threatening the future integrity of the river side path

- Multiple dog walking:- The problems outlined above are often compounded by owners who bring more than one dog, bringing control issues which can be very distressing to other visitors, dog owners, and cyclists.
- Commercial dog walkers:- Again the problems outlined above are compounded but with an additional aspect where businesses are being run that impact the site but make NO contribution to the management of the site and control of the issues identified.
- Dog fouling:- Whilst dog fouling is still an issue with potential long term impacts regarding nutrient enrichment there has been a significant improvement in recent years on most public open spaces in the Borough. It is now more generally accepted that owners pick up after their dogs and there is a peer pressure to conform. Bins are placed at the main entrances for owners to use.

Identifying and understanding the issues are one aspect of the problem the other is the challenge of practical solutions that involves and does not exclude dog owners who form a very significant part of the community. Below are some potential approaches that could/should be investigated/implemented under this plan.

- Dogs off lead:- It is possible via 'Dog Control Orders'/'Environmental Improvement Orders' to insist that dog owners keep their dogs on the lead and in some places in particular where ground nesting birds are an issue this approach has been implemented. For the Hogsmill LNR there are two major issues set against the general feeling of dog walker's preference for letting their dogs off the lead. These are that the disturbance caused by dogs entering the river/stream and the impact on other visitors of dogs off leads. In addition the level of presence on the site would make enforcing a 'Dogs on Lead Control Order' very problematic. For this reason it is recommended that implementing a policy of educating dog walkers about the long term need to reduce disturbance is the only practical approach and holds out the prospect/advantage of working with dog owners rather than against them.
- Multiple dog walking:- Again it is possible to go down the 'Dog Control Order' route and in this case it might be slightly more straightforward to enforce because a lot of dog walkers would be likely to agree with some form of control. As with dogs off leads it is possible to take an educational approach but the control issues associated with multiple dog walking do seem to warrant some kind of limit. A suggested upper limit of 3 dogs per person would seem reasonable. Again however, a crucial factor will be the assessment of whether there is the ability to enforce such a rule?
- Commercial dog walkers:- There is little doubt that serious consideration should be given to charging a licence fee to commercial dog walkers and their numbers and frequency of visits limited to a sustainable level. That said Dog owner's in general but commercial dog walkers in particular, represent a possible opportunity to significantly improve the

level of organised presence on our open spaces and could play a role in policing dog walkers in general.

Dog fouling:- Whilst as described there have been noticeable improvements in the behaviour of dog owners and improved measures put in place there is still room for improvement. Aside from the unpleasant nature of dog faeces the two key concerns are public health and the long term chemical impact on soils. A continuing programme of highlighting the issues should be maintained using noticeboards and press articles, with recourse to prosecution if necessary for a persistent offender.

2.6.16 Landscape

The landscape and aesthetic qualities of the Local Nature Reserve is important to the public enjoyment and feeling of well-being that visitors gain from experiencing the site. Therefore, it is important to take into account the impact that habitat management can have upon landscape quality. Thus, mowing of grassland creates an open feel to the central corridor, whilst the margins of scrub and woodland help to screen the adjoining urban landscape, create a feeling of seclusion and reduce noise pollution.

The planting of new marginal areas of scrub and trees could further enhance this feeling by helping to reduce the extent to which urban intrusions are visible from the site. A good example of this has been the screening of Ruxley Lane from the site, by a new hedgerow. The planting of new parkland trees will help to break-up some of the more extensive and uniform areas of open grassland and add interest to the visual landscape.

2.6.17 Inappropriate Use and Site Boundary Security

In recent years, the dumping of garden (and other waste) in parts of the site has become a problem. This activity tends to be most noticeable where there are private gardens bordering directly onto the site and to some extent, it occurs on the margins of the two watercourses as well. More locally, there have been small direct physical encroachments onto the Local Nature Reserve by adjacent owners. As well as detracting from the site's aesthetic qualities and potentially introducing invasive plants, the mere presence of such waste might encourage the problem to become worse. It can also encourage acts of vandalism and other abuses that can make the site seem neglected and hostile and thereby discourage visitors.

The EEBC is keen to make improvements to the visual environment of all its Open Spaces and aims to discourage the tipping of garden waste and other refuse onto the site. As described in 15.3.3 in 2010 using a grant of £25,000 a trial project removed 250 tons of rubbish in the hope of creating an 8 to 10 metre cleared swathe that could be maintained to highlight dumping, give easier access to clear any dumping and to create a community space to improve

neighbourliness. Whilst maintaining this strip has proved problematic internally it has worked to some extent and it is recommended that consideration is given to a long-term approach of clearing along the reserve boundary, which has both biodiversity, aesthetic and community benefits to offer. Where dumping remains a problem it is recommended that EEBC should write to the owners of adjacent properties asking them to cease such infringements (letters were issued for the Bonesgate part of the reserve during 2005). Increased levels of on-site presence would also help in addressing this problem and ideally this could be achieved through the creation of a new permanent position within the Council. As a last resort, action is to be taken against persistent offenders through the use of penalty fines.

If the site is clear of waste, this enhances the visual perception of its value, making it more likely that people will want to keep it clean and tidy. Therefore, further litter-picking days will be encouraged and the possibility of clearing some areas of dense vegetation along property boundaries, where this might help to discourage the tipping of garden waste, will be investigated.

Maintenance of site boundaries is largely the responsibility of adjoining private owners and for the most part these appear well-maintained. Some owners seem to prefer to have a dense, scrub-like 'buffer zone' fronting their boundary, whilst others seem to like a more open aspect that provides a view of the site. In some parts of the Hogsmill, the boundary runs beside public roads and there is no physical barrier as such. However, most site entrances have barriers to prevent inappropriate access (e.g. by vehicles) and these will require on-going maintenance.

2.6.18 Promoting an Understanding of the Site's Value

The new interpretation boards at all main entrances provide an opportunity to promote a greater understanding about the value of the site. These will all need on-going maintenance. A further way of encouraging greater appreciation would be through conducting further guided walks in addition to the annual one led by The Countryside Team, looking at themes such as aspects of the site's wildlife or its history. There is an opportunity to encourage greater volunteer action, which could include activities such as biological recording and practical management work. In addition, people showing an interest in volunteering on the site, can be encouraged to become involved with partner organisations such as the Lower Mole Partnership and SERT as well as the EEBC Countryside Team volunteers.

A site leaflet is currently produced covering the site's history and natural history. This will continue to be produced but the need for paper leaflets will be reviewed in the light of new media.

The web pages on the EEBC website should be maintained and updated when necessary. Consideration should be given to using EEBC's Facebook and

Twitter accounts to further promote the sites' value to the public and encourage volunteer involvement.

2.7 Identification of Operational Objectives and Outline Prescriptions

Operational Objective	Outline Prescription
Manage the site as an important wildlife corridor and green infrastructure asset within the Borough	• Continue to work with partners (Environment Agency, South East Rivers Trust, Lower Mole Countryside Partnership, Royal Borough of Kingston upon Thames, Thames Water and Surrey County Council), to facilitate habitat and wildlife enhancements of the LNR and river catchment.
Maintain and enhance the mature and veteran tree population	• Protect vulnerable trees from vandalism • Thin surrounding woodland canopy where appropriate (e.g. to release mature Ash specimens in Gunpowder Copse and around maiden Oak trees behind Eastcroft Road and in Riverview Copse) • Prevent soil compaction around the roots of veteran trees • Commission assessment of veteran trees with a view to surgery to prolong life where necessary and ensure public safety • Continue to work with and encourage the Environment Agency to manage riverside avenues of Willow trees (coppice/pollard and undertake some supplementary planting) • Plant new specimen trees from appropriate native stock at specified locations (including Oaks grown from acorns of existing veteran specimens) • Protect veteran White Willow pollards in any future realignment of the Hogsmill River
Maintain and enhance the broadleaved woodland habitat	• Thin plantation woodlands to diversify structure, concentrating upon invasive canopy species. Plant hazel to improve understorey, (conserve veteran Elder in compartment 6) • To maintain a good age structure, consider planting new native stock in appropriate areas to supplement natural regeneration • Create and maintain woodland glades for example in Riverview Copse and in compartment 9 • Scallop woodland edges and plant scrub fringes to improve structural diversity of edge habitat e.g. with Hawthorn, Blackthorn

Operational Objective	Outline Prescription
	• Thin some stands to leave only a handful of 'specimen' trees Thin Hawthorn at Riverview copse and promote natural regeneration of native broadleaved species to create future canopy and understorey. Plant if necessary. • Liaise with Forestry Commission over Ash Dieback and the Oak Processionary Moth.
Maintain and enhance the scrub and scrub-margin habitat	• Continue rotational cutting of some mature stands to improve structural diversity (Compartments 2, 5, 6, 9, 11, 12, 13, 14, 15, 16) • Scallop scrub edges to increase structural diversity and to encourage younger blackthorn for the benefit of the Brown Hairstreak butterfly. • Plant/allow new areas of scrub and trees to develop to ensure continuity of semi-natural habitat corridor where appropriate (primarily along site margins, but other areas as well). • Maintain new hedgerow along Ruxley Lane and along the boundary of the service road running behind the houses of Eastcroft Rd. • Propose incorporating the area of scrub in between the Northcroft Rd allotments and the Hogsmill Open Space in to the LNR. • Continue working with EA/SERT to manage the scrub over shading the river to manage light levels in the river channel.
Maintain and enhance the grassland habitat	• Allow areas of infrequently managed grassland to develop along woodland/scrub edges and between stands of trees/copses. These areas should be rotationally cut and cleared on a 1-3 yr basis in compartments 2, 5, 6, 11, 13, 14, 16 • Manage wild flower meadow next to Riverview Copse by cutting and clearing annually • Continue to manage stepping stones meadow as rough grassland by cutting and clearing on a 3-5 yr rotation • Continue annual cut and clear of Chamber Mead to encourage a wildflower meadow. This meadow area may be reduced if the wetland creation takes place as planned. • Continue regular mowing of main amenity grassland areas
Maintain and enhance watercourses, water margin and other wetland habitats	• Work in partnership with The South East Rivers Trust, Environment Agency and Royal Borough of Kingston upon Thames, Surrey County Council, Thames Water and Lower Mole Partnership to

Operational Objective	Outline Prescription
	explore further opportunities to restore more natural channel dynamics and marginal wetland vegetation to the watercourses • Work with partners to create a new wetland and extend chalk stream, by diverting the Green Lane Stream to meet the Hogsmill River just upstream of the stepping stones. • Continue to support and facilitate through partnership working the removal of stone banks and toe boarding, softening and renaturalising banks; channel narrowing to restore natural flow velocity; large woody material and gravel introduction to create flow sinuosity; planting with native aquatic species. • Via the Hogsmill Catchment Partnership continue to support the investigation in to how often the Epsom and Ewell storm tanks flow, to build a case for their upgrade, if this is necessary. We will support and assist with facilitating a solution. • Continue to support the monitoring of pollution levels within the river in cooperation with SERT and Zoological Society London (ZSL) • Support and facilitate a possible project to reconnect the short section of the original Hogsmill channel to the existing channel, close to the Clinker Bridge. This project also includes the possibility of a wetland to help slow flows and remove pollution from both the Hogsmill River and Ewell Court Stream. • Monitor developing scrub and shading trees from fen swamp area and thin when necessary • Work with SERT and EA to manage the backwater channel as an aquatic wildlife refuge in times of high flow • Propose that over the next 10 years, the Nature Reserve boundary is extended to include the Upper and Lower Mill, up to Chessington Rd.
Monitor and control the spread of invasive species	• Continue to control invasive species e.g. Japanese Knotweed, Goat's Rue, Himalayan Balsam, Mink and Signal Crayfish • Monitor populations of these species
Maintain and enhance the ornithological interest	• Monitor breeding and winter bird populations • Carry out a Kingfisher nesting survey
Encourage Water Voles	• Carry out periodic Water Vole surveys

Operational Objective	Outline Prescription
	• Continue to work with SERT and EA to encourage development of marginal aquatic vegetation • Continue to work with the EA to manage canopy of riverside trees to prevent excessive shading
Maintain and enhance populations of other mammals	• Carry out baseline bat surveys to inform management • Further tree surveys to identify potential bat roost sites both alongside and away from the river channel • Retain and prolong life of mature and veteran trees through sympathetic management • Repeat survey in yr 10 to establish effectiveness of management • Carry out baseline small mammal survey • Monitor badger, fox and deer populations
Maintain and enhance invertebrate interest	• Undertake baseline surveys (e.g. Moths; Odonata; fauna associated with veteran trees) • Continue to support volunteers carrying out annual butterfly transect walk and ensure the records are sent to Butterfly Conservation • Conserve adequate growth of epiphytic Ivy when clearing/thinning invasive trees (as potential habitat for the ladybird *Clitosthetus arcuatus)* • Monitor populations of *Clitosthetus arcuatus* • Monitor impacts of grassland management regimes • Ensure good age structure of blackthorn to promote the Brown Hairstreak • Monitor Elm population and pay particular attention to the large elm in section 12 with regard to the White Letter Hairstreak • Carry out/liaise with and encourage the EA, ZSL and SERT to carry out regular surveys of aquatic inverterbrates. • Map locations of Stag Beetle sightings and create stag beetle loggeries where appropriate
Maintain and enhance the botanical interest	• Carry out/liaise with and encourage the EA and SERT to carry out regular surveys of bankside and aquatic vegetation • Maintain botanical recording and monitoring to inform subsequent habitat management
Maintain and enhance public access and recreational use	• Maintain path surfaces, bridges (where EEBC responsibility) and drainage of existing routes

Operational Objective	Outline Prescription
	• Fix broken land drain to the rear of houses along South Mead. • Surface the muddy and poorly drained section of footpath near confluence of the Green Lane Stream • Continue to thin scrub edge beside some of main paths • Encourage EA to repair bankside erosion immediately adjacent to steps leading to the stepping-stone crossing • Maintain access to river via shallow bank gradients by mowing vegetation in specific areas. • Work with the EA to control erosion caused by dogs entering and exiting the river (NB impact on riverside path and wildlife) • Ensure that Public Rights of Way are open and accessible at all times, including bridges • Investigate possibility of securing PROW status for all main routes within the Local Nature Reserve • Maintain all site furniture including gates, benches, signs bins etc, and install new when and where appropriate • Liaise with Royal Borough of Kingston upon Thames over the management of the bridge near the confluence of the Hogsmill River, Tolworth Court Meadows LNR, and other land adjoining the Bonesgate Stream
Maintain the landscape qualities of the LNR	• Take advantage of opportunities to enhance landscape character when planning habitat management (e.g. planting of 'parkland' trees and maintain visual screen beside Ruxley Lane) • Clear rubbish and other encroachments
Control inappropriate use of the site and maintain boundary security	• Enforcement and action against encroachments through programme of letters to householders and other literature • Continue to discourage dumping along the boundaries of the reserve. If resources permit, clear and maintain an 8-10m grassland swathe, to allow easier access for the removal of dumped material, creation of edge habitat and a community space. • If resources permit, seek to increase levels of on-site presence (ideally through the funding of a site specific post post)

Operational Objective	Outline Prescription
	• Maintain entrance barriers and other structures at site boundaries/entrances
Promote and encourage an understanding and respect for the wildlife, landscape and historical value of the site	• Maintain 7 interpretation boards • Encourage volunteer action (e.g. through 'The Friends' group), to include biological recording and practical management work • Programme of guided walks • Maintain site leaflet but review the need for them in light of new media • Maintain web pages on EEBC website • Investigate using EEBC's Facebook and Twitter accounts to further promote the Hogsmill LNR

STAGE THREE - PRESCRIPTION

The following tables outline management proposals across the Hogsmill LNR during the period 2017 to 2027. The format follows that given by Crowther and Groome (2005).

The various adopted management compartments are shown on Map 4.

Prescriptions are defined under the heading “proposed work”.

Outline costs are given for each year of the management plan. Year 1 relates to the 2017/18 tax-year, year 2 to 2018/19 etc. Costs have been calculated, during the first five years, and then during the second five-year period, on the following basis. Where ‘No Cost’ is recorded it should be noted that this is where the value of wood products or hay exceeds the operational cost of the contractor, or volunteer costs are not applicable, or volunteer work negates cost or work is included in the in house grounds maintenance schedule (GM) or Operation Services waste management (OPSER) or Ranger Service (RSER), or is the responsibility of the Environment Agency (EA):

	First five years	**Second five years**
Contractors	£170/person/day	£200/person/day
Volunteers	£5/person/day	£6/person/day
Ecological Consultants	£250/person/day	£275/person/day
Arboricultural Contractors	£250/person/day	£275/person/day

Notes:
Volunteers: In addition, use of volunteer machinery (e.g. chainsaw/brush cutters) is £50/day and the hire of heavier equipment (e.g. mini excavator/dumper) is approx. £100/day.

Where the term volunteer/contractors is used, the deciding factor will be availability of volunteers, who would normally be the first choice. In all such cases, costings have therefore been based throughout on the preferential use of volunteers.

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
Manage the site as an important wildlife corridor and green infrastructure asset within the Borough: **- all prescriptions covered under other stated objectives**													
Maintain and enhance the mature and veteran tree population:													
Whole site		Protect vulnerable trees from vandalism	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/ volunteer
2, 10, 13		Thin surrounding woodland canopy where appropriate (e.g. to release mature Ash specimen in compartment 2 and around maiden Oak trees behind Eastcroft Road and in Riverview Copse)		£1000				£1200					Contractor/Volunteer
Whole site		Prevent soil compaction around the roots of veteran trees	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/Contractors
Whole site		Commission assessment of veteran trees and undertake any necessary remedial work to prolong tree life	£2000	£2000	£2000			£2000	£2000				Arboricultural contractor/Tree Officer/ EEBC Staff
3, 11		Continue to work with and encourage EA to manage riverside avenues of Willow trees (coppice/pollard and some supplementary planting).	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	Arboricultural contractor

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
2, 6, 9, 13		Plant new specimen trees from appropriate native stock (including Oaks grown from acorns of existing veteran specimens) and provide with adequate protection and aftercare (see Map 6 for locations)	£50	£50			£50	£60			£60	£60	Volunteer
11, 12		Protect veteran White Willow pollards in any future realignment of the Hogsmill River	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
Maintain and enhance the broadleaved woodland habitat:													
6, 9 11, 13		Thin plantation woodlands to diversify structure, concentrating upon non-native canopy species. Plant Hazel to improve understorey (conserve veteran Elder in compartment 6)		£2000		£2000		£2000					Contractor/Volunteer
6, 9 11, 13		To maintain a good age structure, consider planting new native stock in appropriate areas to supplement natural regeneration		£200		£200		£200					Volunteer
2, 11,12		Create and maintain woodland glades e.g. in Riverview Copse (Cpt 2) and in Cpt 9		No cost		No cost		No cost		£1200		No cost	Volunteer/Contractor

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
6, 11, 13		Scallop woodland edges and plant scrub fringes to improve structural diversity of edge habitat e.g. with Hawthorn and Blackthorn			£200		£200		£225		£225		Volunteer
6		Thin plantation woodland to leave only a handful of more 'interesting' specimen trees of Lime, Pear, Hornbeam and riverside Willows (i.e. create parkland feel).						£1500					Contractor
2		Thin hawthorn at Riverview Copse to promote natural regeneration of native broadleaved species to create future canopy and understorey. Supplementary plant if necessary	£500										Volunteer
Maintain and enhance the scrub and scrub-margin habitat:													
2, 5, 6, 9, 11, 12, 13, 14, 15, 16,		Continue rotational cutting of some mature stands to improve structural diversity	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	Volunteer
2, 5, 6, 9, 11, 12, 13, 14, 15, 16		Scallop scrub edges to increase structural diversity	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	Volunteer
2, 3, 6, 16		Plant/allow new areas of scrub and trees to develop to ensure continuity of semi-natural habitat corridor, where appropriate (primarily site margins but other areas as well)			£100			£100			£100		Volunteer

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
5, 13		Maintain new hedgerow along Ruxley Lane and along the boundary of the service road running behind the houses of Eastcroft Rd	£100						£250				Volunteer
Adjacent to 12		Propose incorporating the area of scrub in between the Northcroft Rd allotments and the Hogsmill Open Space in to the LNR. Subsequently manage the scrub mosaic.	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	Staff/Volunteer
Whole site		Continue working with SERT to manage the scrub over shading the river to manage the light levels in the river channel.	£250	£250	£250	£250	£250	£275	£275	£275	£275	£275	Volunteer
Maintain and enhance the grassland habitat:													
2, 5, 6, 11, 13, 14, 16		Allow areas of infrequently managed grassland to develop along woodland/scrub edges and between stands of copses. These areas should be rotationally cut and cleared on a 1-3 yr basis	£100	£100	£100	£100	£100	£120	£120	£120	£120	£120	EEBC GM
2		Manage wild flower meadow next to Riverview Copse by cutting and clearing annually	£50	£50	£50	£50	£50	£55	£55	£55	£55	£55	EEBC GM
11		Continue to manage stepping stones meadow as rough grassland by cutting and clearing on a 3-5 yr rotation	No cost			No cost			No cost			No cost	Volunteers

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
12		Continue to cut and clear Chamber Mead annually to encourage a wildflower meadow. This meadow area may be reduced if the wetland creation takes place as planned	£100	£100	£100	£100	£100	£120	£120	£120	£120	£120	EEBC GM
2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 16		Continue regular mowing of main amenity grassland areas (covered by GM budget)	For cost refer to EEBC GM	For cost refer to EEBC GM	For cost refer to EEBC GM	For cost refer to EEBC GM	For cost refer to EEBC GM	For cost refer to EEBC GM	For cost refer to EEBC GM	For cost refer to EEBC GM	For cost refer to EEBC GM	For cost refer to EEBC GM	EEBC GM
Maintain and enhance the watercourses and water-margin habitat:													
Whole site		Work in partnership with Environment Agency, South East Rivers Trust, Royal Borough of Kingston upon Thames upon Thames upon Thames and Surrey Country Council, to explore further opportunities to restore more natural channel dynamics and marginal wetland vegetation to the watercourses.	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
12		Work with partners to create a new wetland and extend chalk stream, by diverting the Green Lane Stream to meet the Hogsmill River just upstream of the stepping stones	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	EA/SERT/SCC/EEBC

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
11		Via the Hogsmill Catchment Partnership, continue to support the investigation in to how often the Epsom and Ewell storm tanks flow, to build a case for their upgrade, if this is necessary.	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	Thames Water/EA/SERT/EEBC
Whole site		Continue to support the monitoring of pollution levels within the river in cooperation with EA, SERT and Zoological Society London (ZSL)	No Cost	No Cost	No Cost	No Cost	No Cost	No Cost	No Cost	No Cost	No Cost	No Cost	Partner organisations/Vollunteers
11		Work with partners to support and facilitate a possible project to reconnect the short section of the original Hogsmill channel to the existing channel, close to the clinker bridge. This project also includes the possibility of a wetland to help slow flows and remove pollution from both the Hogsmill River and Ewell Court Stream	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	EA/SERT/EEBC/Thames Water
		Propose that over the next 10 years, the Nature Reserve boundary is extended to include the Upper and Lower Mill, up to Chessington Rd.											

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
Maintain and enhance the fen-swamp habitat:													
11		Monitor developing scrub and shading trees from fen swamp area and thin when necessary	No cost			No cost			No cost			No cost	Volunteer/EEBC Staff
2		Work with EA and SERT to manage the backwater channel as an aquatic wildlife refuge in times of high flow	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	EEBC staff/EA/SERT
Monitor and control the spread of invasive species:													
Whole site		Monitor extent of Japanese Knotweed	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
15, 16		Continue to control stands of Japanese Knotweed preferably using appropriate herbicide	For cost refer to EEBC GM		For cost refer to EEBC GM		For cost refer to EEBC GM		For cost refer to EEBC GM		For cost refer to EEBC GM		EEBC GM/Contractor
Whole site		Monitor extent of Goat's Rue	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
14, 15		Continue to control Goat's Rue by hand weeding	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	Volunteer
Whole site		Monitor extent of Himalayan Balsam	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
14, 15, 16		Continue to control spread of Himalayan Balsam to new parts of the site by hand-weeding (especially Hogsmill upstream of Bonesgate confluence)	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	Volunteer
Whole site		Survey for the presence of Mink and control if necessary	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	EA/SERT/EEBC staff/Volunteers

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
Whole site		Survey for the presence of Signal Crayfish and control if necessary	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EA/SERT/Volunteers
Undertake appropriate surveys and monitoring of wildlife and habitats:													
Whole site		Monitor breeding bird populations	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/Volunteer
Whole site		Monitor winter bird populations	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/Volunteer
Whole site		Conduct Kingfisher nesting survey	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	Volunteer
Whole site		Liaise with and encourage the EA and SERT to carry out regular fish surveys	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EA/SERT
Whole Site		Carry out a baseline survey of Reptiles and Amphibians and then monitor their population	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/volunteers
Whole site		Liaise with and encourage the EA and SERT to carry out periodic Water Vole surveys	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EA/SERT
Whole site		Conduct baseline bat activity survey			TBA								EEBC staff/Consultant
Whole site		Carry out further surveys of mature trees to identify potential bat roost sites both alongside and away from the river channel			TBA								EEBC staff/EA/Consultant
Whole site		Repeat bat survey to establish effectiveness of management										TBA	EEBC staff/Consultant
Whole site		Carry out baseline small mammal survey					TBA		TBA		TBA		EEBC staff/volunteers/consultant

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
Whole site		Monitor and record badger, fox, and deer activity	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/Volunteers
Whole site		Monitor populations of *Clitosthetus arcuatus*	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/volunteers
Whole site		Undertake baseline invertebrate surveys (e.g. Moths; Odonata; fauna associated with veteran trees)	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	EEBC staff/ volunteers ZSL/EA/SERT/ Consultant
As appropriate		Carry out a baseline survey of invertebrates associated with grassland and subsequently monitor impacts of grassland management regimes upon their populations			£1500						£1750		Consultant
5, 6, 7, 8, 9, 11, 12, 13		Continue to support volunteers carrying out annual butterfly transect and ensure the records are sent to Butterfly Conservation	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/Volunteers
Whole site		Monitor the blackthorn resource to ensure a good age structure and ensure presence of young blackthorn for the Brown Hairstreak Butterfly.	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
Whole site		Monitor Elm population and pay particular attention to the large elm in section 12 with regard to the White Letter Hairstreak butterfly.	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
Whole site		Carry out/liaise with and encourage the EA, ZSL and SERT to carry out regular surveys of aquatic invertebrates.	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	EEBC/EA/SERT/ZSL
As appropriate		Map locations of Stag Beetle sightings and create stag beetle loggeries where appropriate	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/Volunteers
As appropriate		Carry out/liaise with and encourage the EA, and SERT to carry out regular surveys of bankside and aquatic vegetation	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	EEBC/EA/SERT/Consultant
Whole site		Continue regular botanical recording and monitoring to inform subsequent habitat management	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/Volunteers
Whole site		Continue to monitor bryophytes					TBA						EEBC staff/Consultant
Whole site		Carry out a baseline survey of fungi				£1000							Consultant/Volunteers
Whole site		Carry out baseline survey of lichens						£1000					Consultant/Volunteers
Manage public access and recreational use:													
Whole site		Maintain path surfaces, bridges (where EEBC responsibility) and drainage of existing routes	£2000	£2000	£2000	£2000	£2000	£2400	£2400	£2400	£2400	£2400	Contractor
11		Surface the muddy and poorly drained section of footpath near the confluence of the Green Lane Stream			£10000								Contractor/Volunteers

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
11		Fix broken land drain to the rear of houses along South Mead	£1000										Contractor
6,8,11,14, 16		Continue to thin scrub edge beside some of main paths	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	Volunteers
11, 12		Encourage EA to repair bankside erosion immediately adjacent to steps leading to the stepping-stone crossing			TBA								EA/Contractor
2, 16		Maintain access to river via shallow bank gradients by mowing vegetation.	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC GM
As appropriate		Work with EA to control erosion caused by dogs entering and exiting the river (NB impact on riverside path)	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	EA/EEBC staff
Whole site		Ensure that public rights of way are open and accessible at all times, including bridges	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
Whole site		Investigate possibility of securing PROW status for all main routes within the Local Nature Reserve	No cost	No cost									EEBC staff
As appropriate		Maintain all site furniture including gates, benches, signs, bins, information boards etc, and install new ones when and where appropriate	£2000		£2000		£2000		£2000		£2000		EEBC staff

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
N/A		Liaise with Royal Borough of Kingston upon Thames upon Thames upon Thames over the management of the bridge near the confluence of the Hogsmill River, Tolworth Court Meadows LNR, and other land adjoining the Bonesgate Stream	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
Maintain the landscape qualities of the Open Space:													
Whole site		Take account of landscape character when planning habitat management (e.g. planting of 'parkland' trees and maintain visual screen beside Ruxley Lane)	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
As appropriate		Clear rubbish and other encroachments	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	EEBC staff/ volunteer
Control inappropriate use of the site and maintain boundary security:													
N/A		Enforcement of policy on illegal tipping through programme of letters to householders and other literature, backed up with a last resort of fines	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
As appropriate		Take action against 'gardening' encroachments	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff

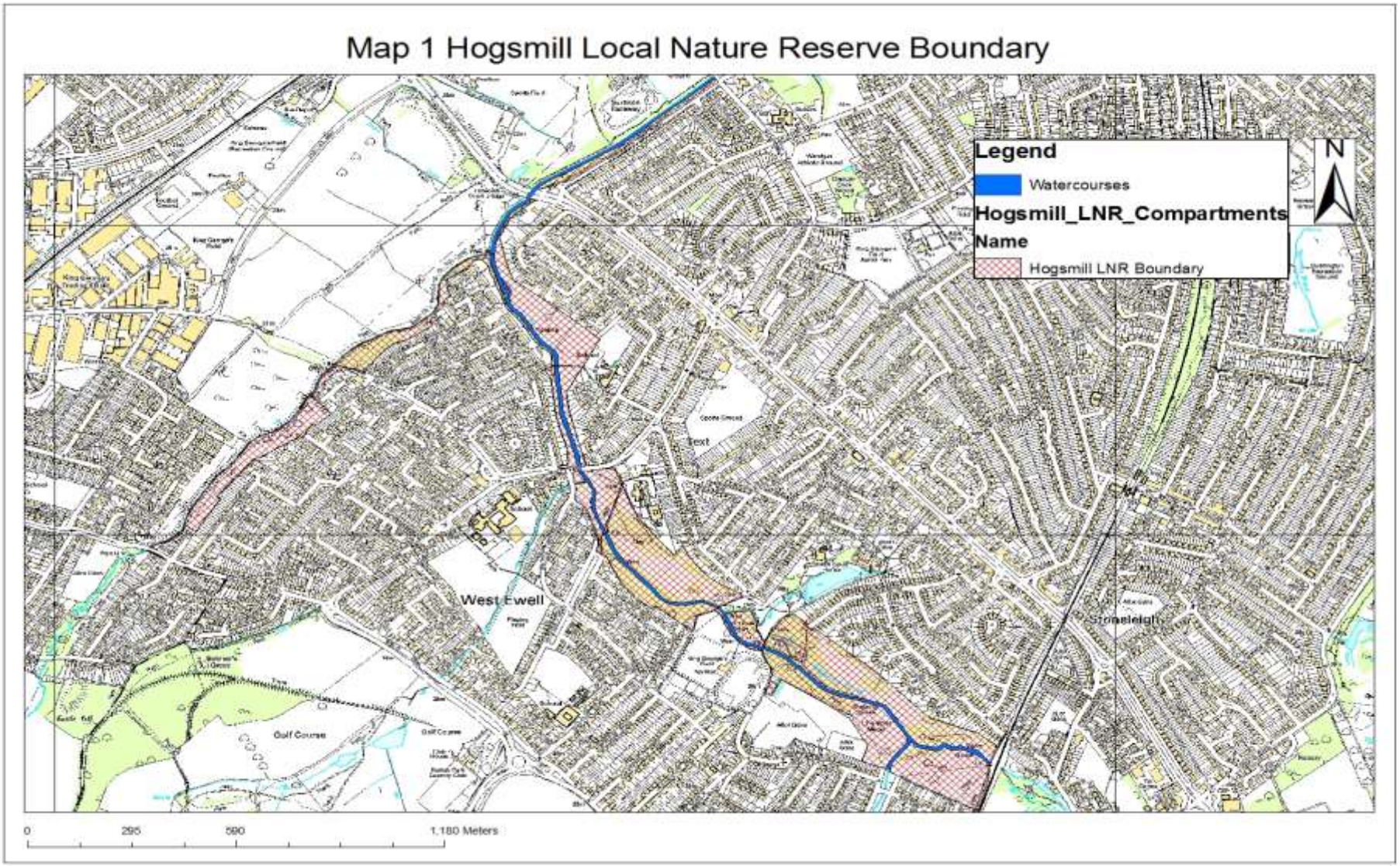
Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
14		Continue to discourage dumping along the boundaries of the reserve. If resources permit, clear and maintain an 8-10m grassland swathe, to allow easier access for the removal of dumped material, creation of edge habitat and a community space.	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	Contractor/EEBC GM
N/A		If resources permit, seek to increase levels of on-site presence (ideally through the funding of a site specific post post)	£25000	£25000	£25000	£25000	£25000	£27500	£27500	£27500	£27500	£27500	EEBC staff
Promote and encourage an understanding and respect for the wildlife, landscape and historical value of the site:													
N/A		Conduct programme of guided walks	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
As appropriate		Maintain 7 interpretation boards			£1200			£1200			£1200		Contractor
Whole site		Encourage volunteer action (e.g. through 'The Friends' group), to include biological recording and practical management work	£250	£250	£250	£250	£250	£250	£250	£250	£250	£250	EEBC staff/volunteer
		Maintain site leaflet but review the need for them in light of new media		£500				£500				£500	EEBC staff/contractor
		Maintain web pages on EEBC website	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
		Investigate using EEBC's Facebook and Twitter accounts to further promote the Hogsmill LNR	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff

Cpt		Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
TOTAL ANNUAL COSTS (inc. all estimates and averaged annual costs). N.B. does not include costs of grass cutting under grounds maintenance contract.			£33400	£33500	£44750	£30950	£30000	£40480	£35195	£31920	£36055	£31280	

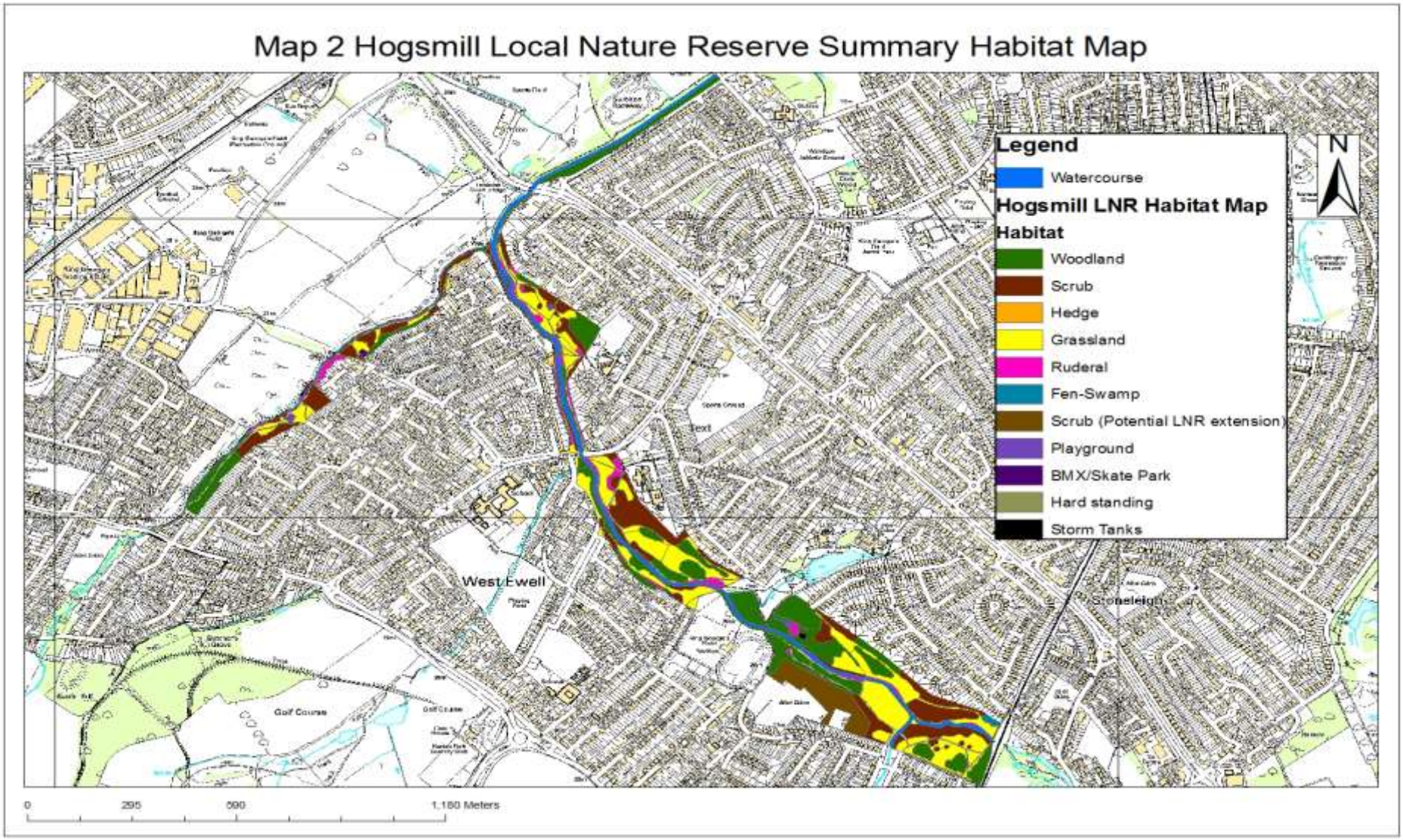
MAPS

Map 1 – Hogsmill LNR Boundary
Map 2 – Hogsmill LNR Summary Habitats
Map 3 a, b, c, d – Hogsmill LNR Watercourses and Access
Map 4 – Hogsmill LNR Manegement Compartments
Map 5 a, b, c, d – Hogsmill Grassland Management
Map 6 a, b, c, d, e – Hogsmill LNR Proposed Habitat Management

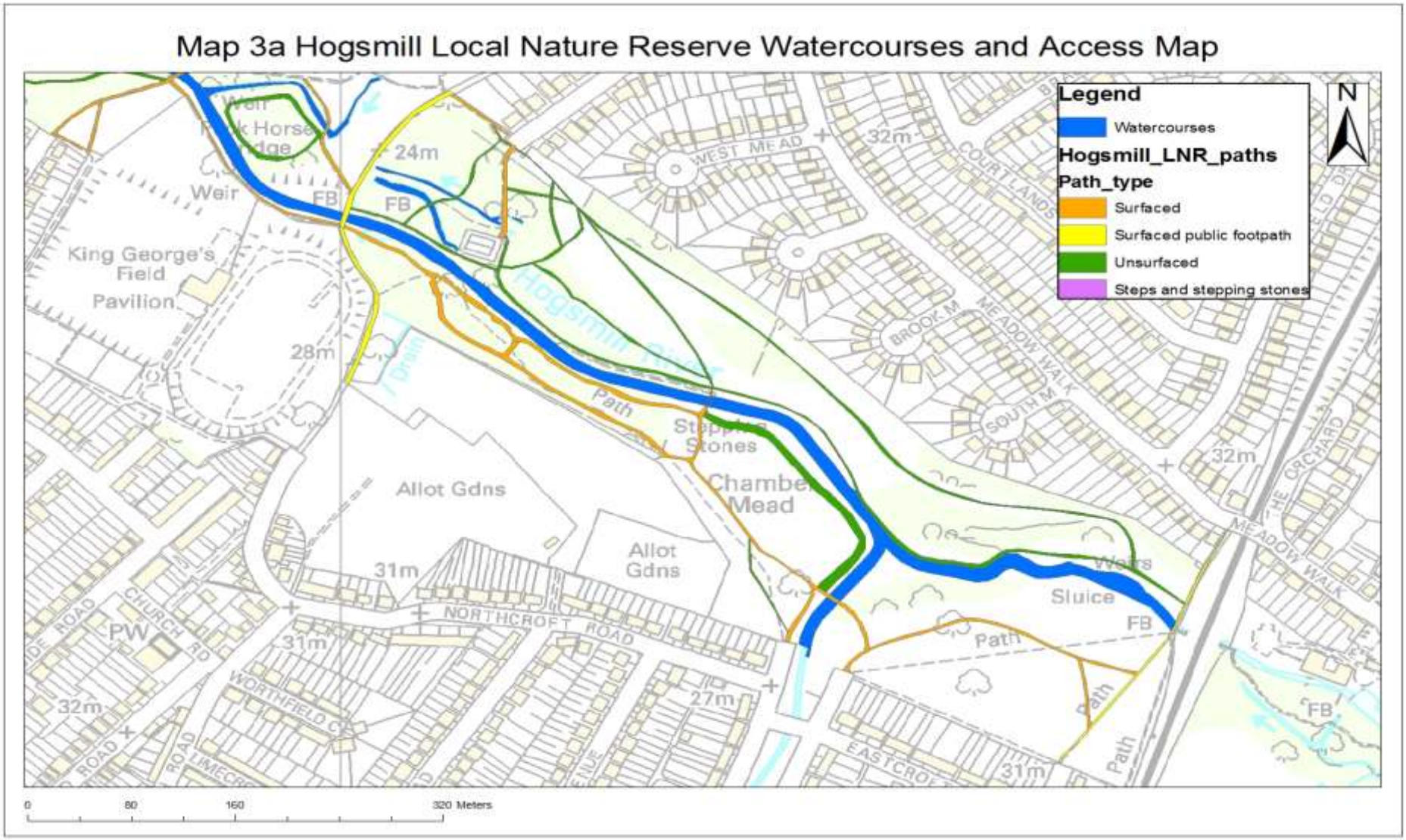
Map 1 Hogsmill Local Nature Reserve Boundary



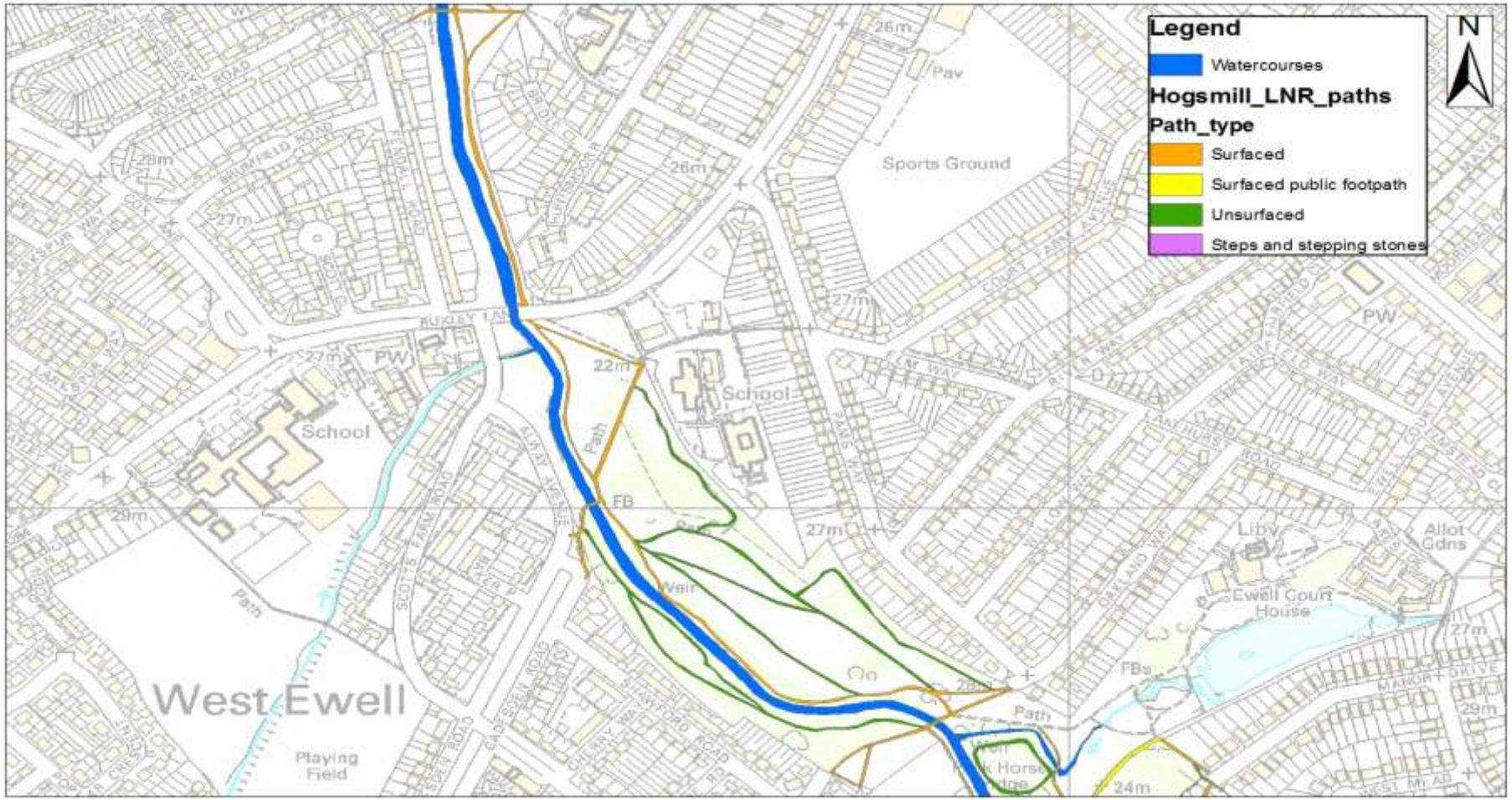
Map 2 Hogsmill Local Nature Reserve Summary Habitat Map



Map 3a Hogsmill Local Nature Reserve Watercourses and Access Map



Map 3b Hogsmill Local Nature Reserve Watercourses and Access Map



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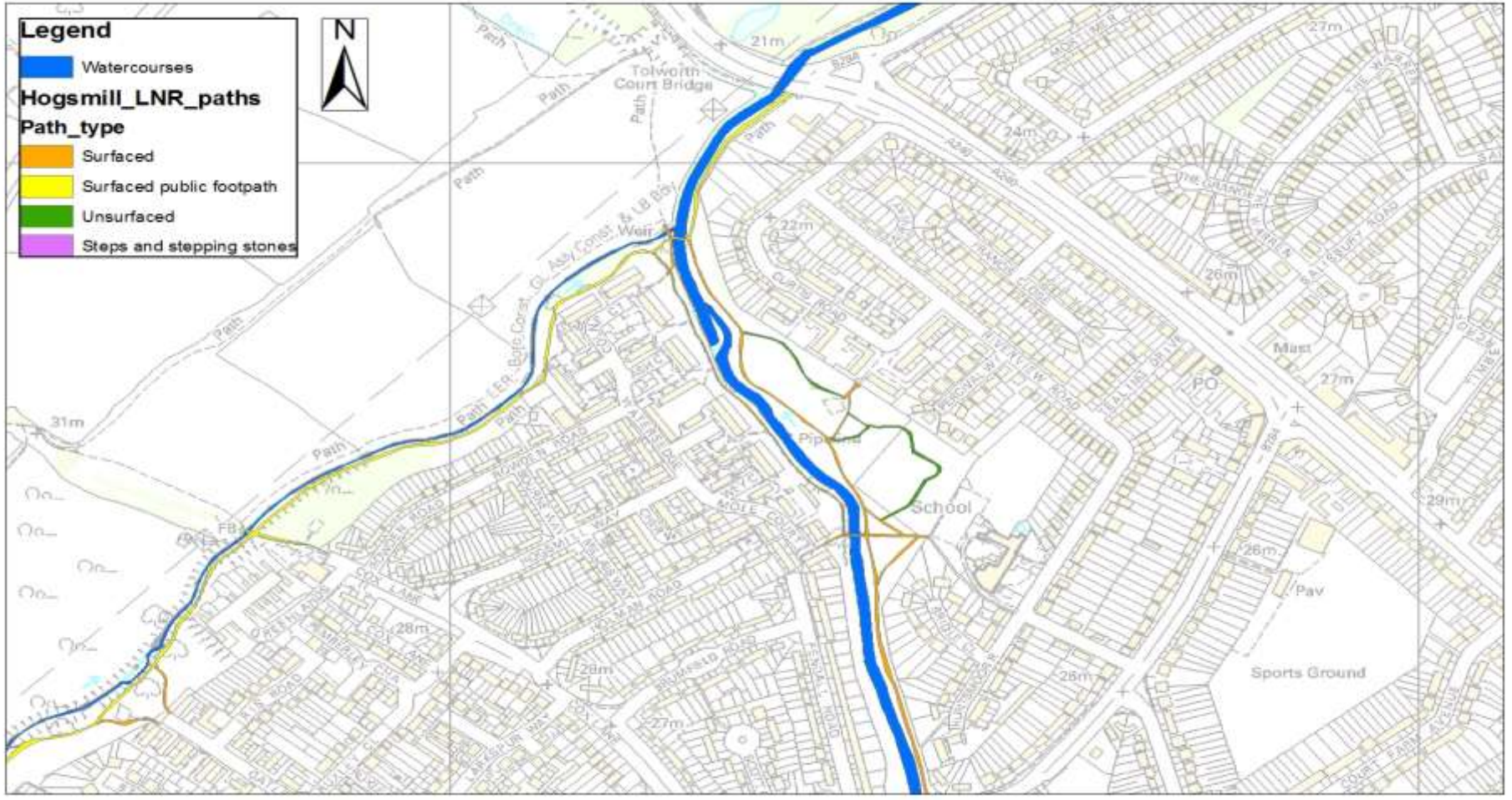
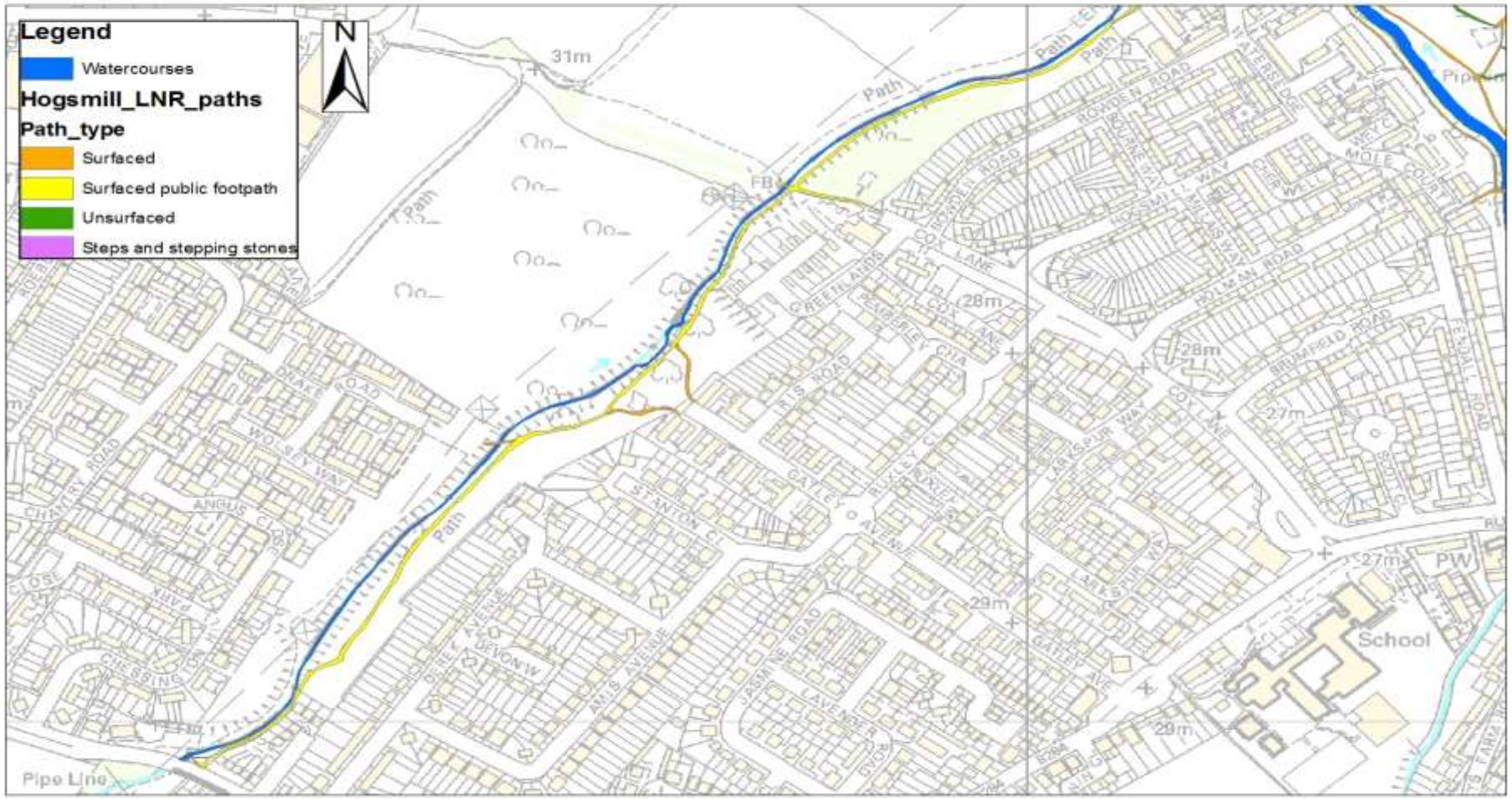
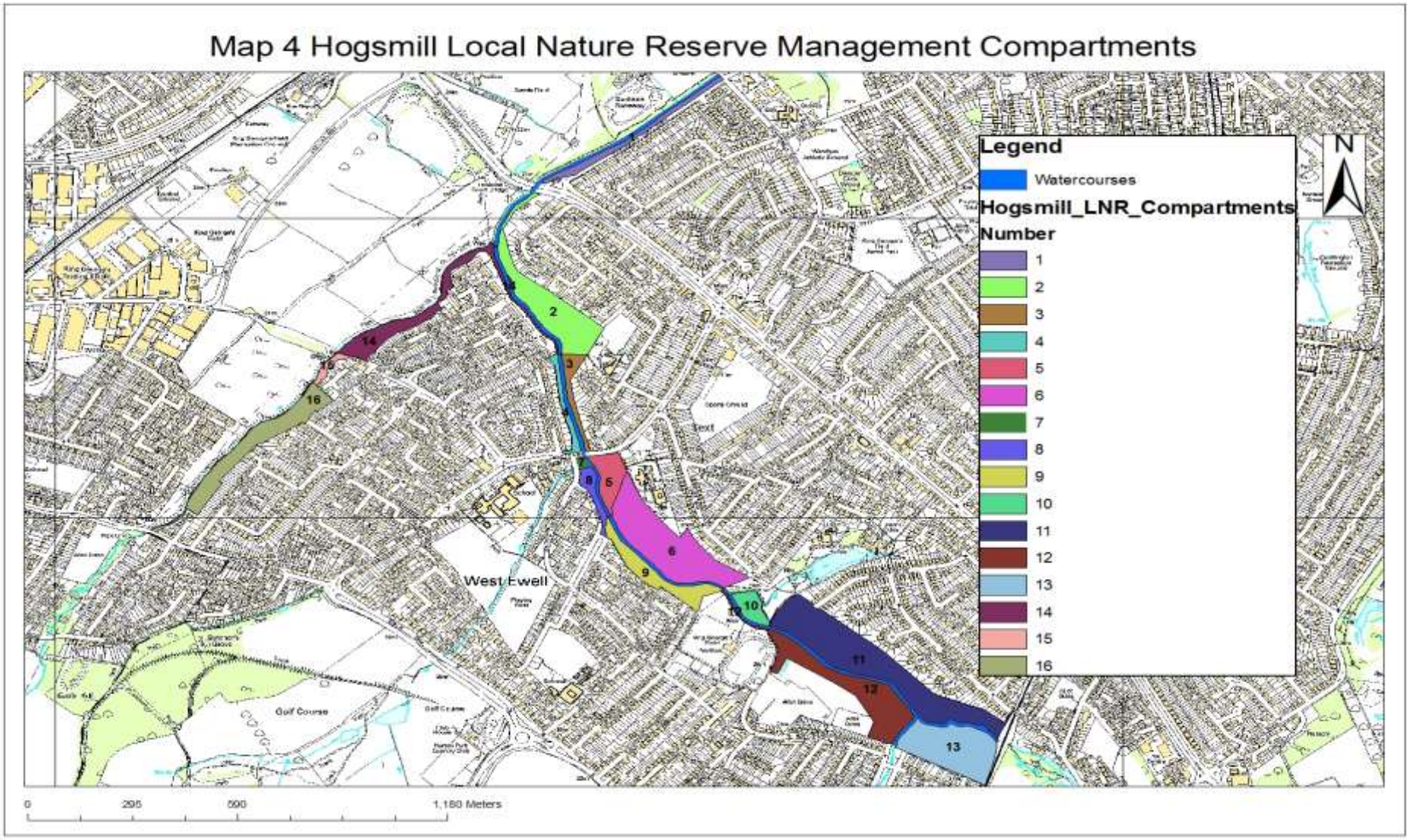


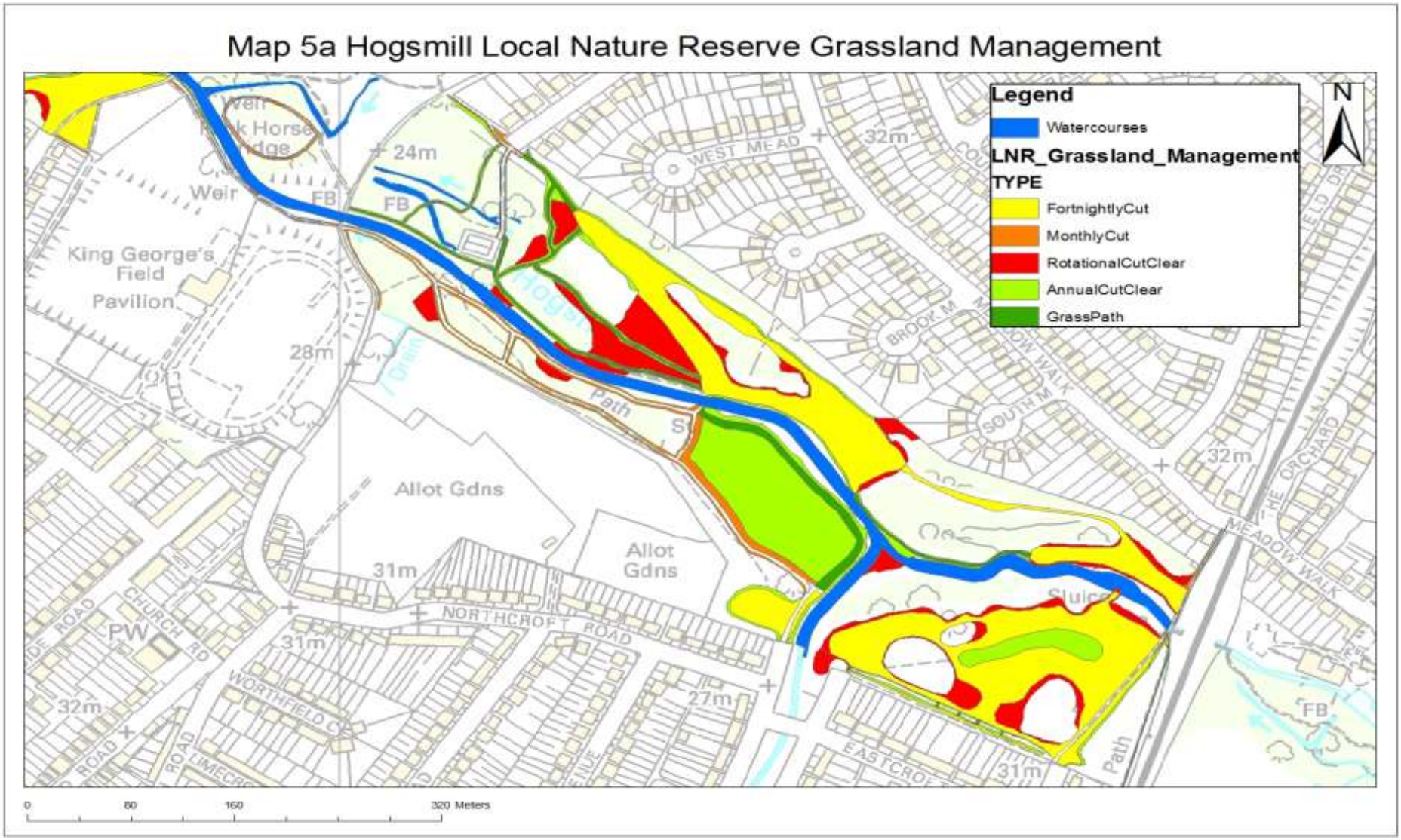
Map 3d Hogsmill Local Nature Reserve Watercourses and Access Map



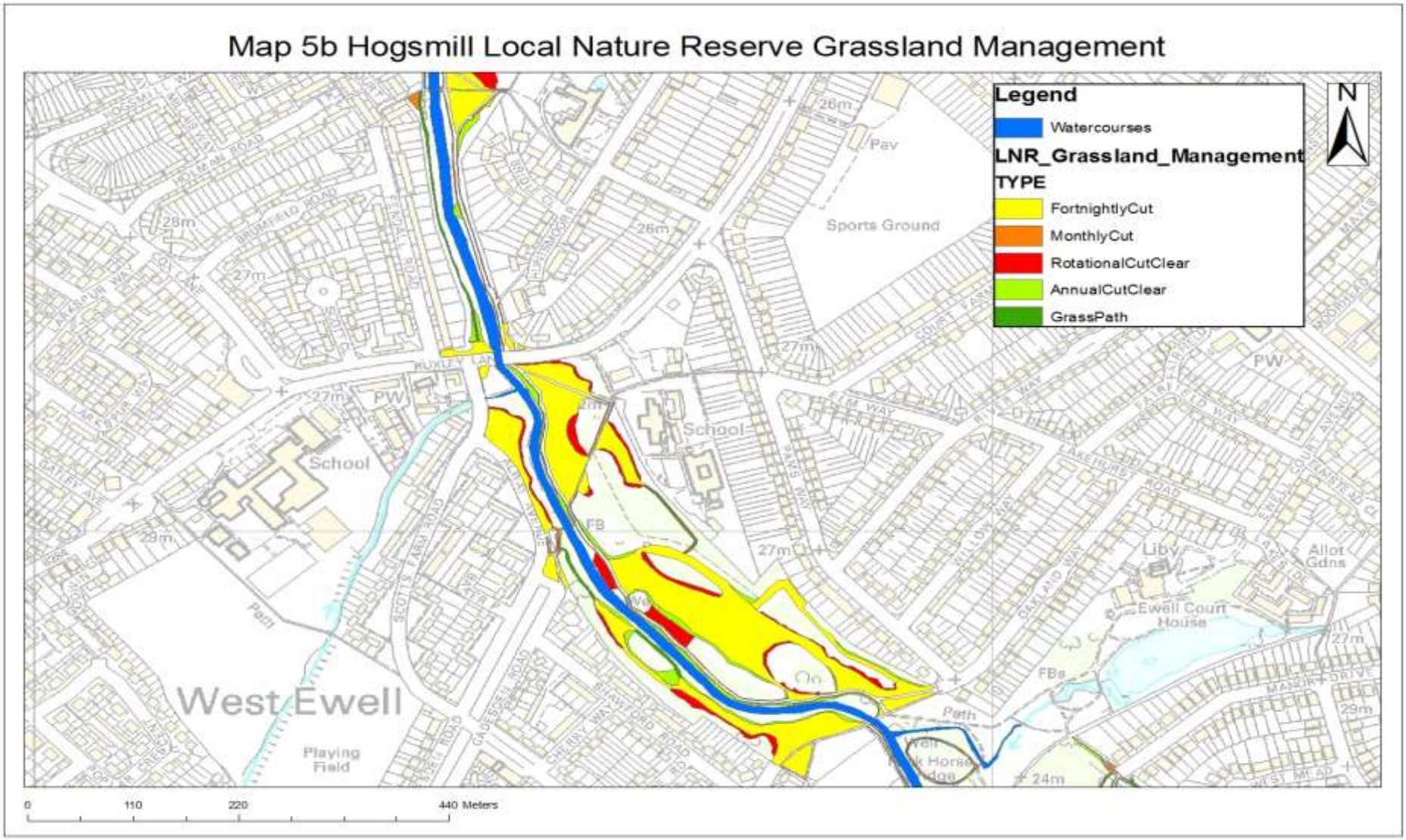
Map 4 Hogsmill Local Nature Reserve Management Compartments



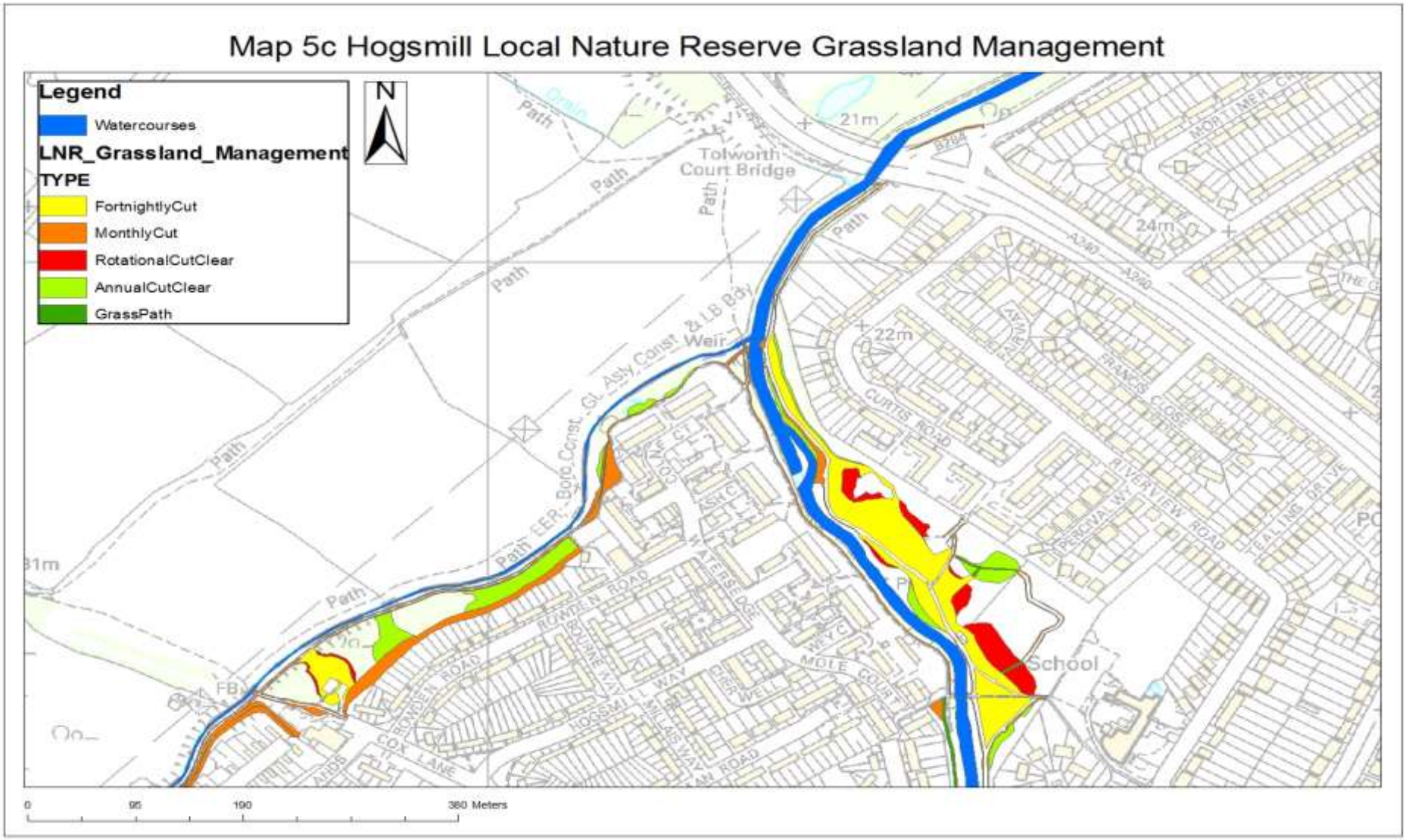
Map 5a Hogsmill Local Nature Reserve Grassland Management



Map 5b Hogsmill Local Nature Reserve Grassland Management



Map 5c Hogsmill Local Nature Reserve Grassland Management



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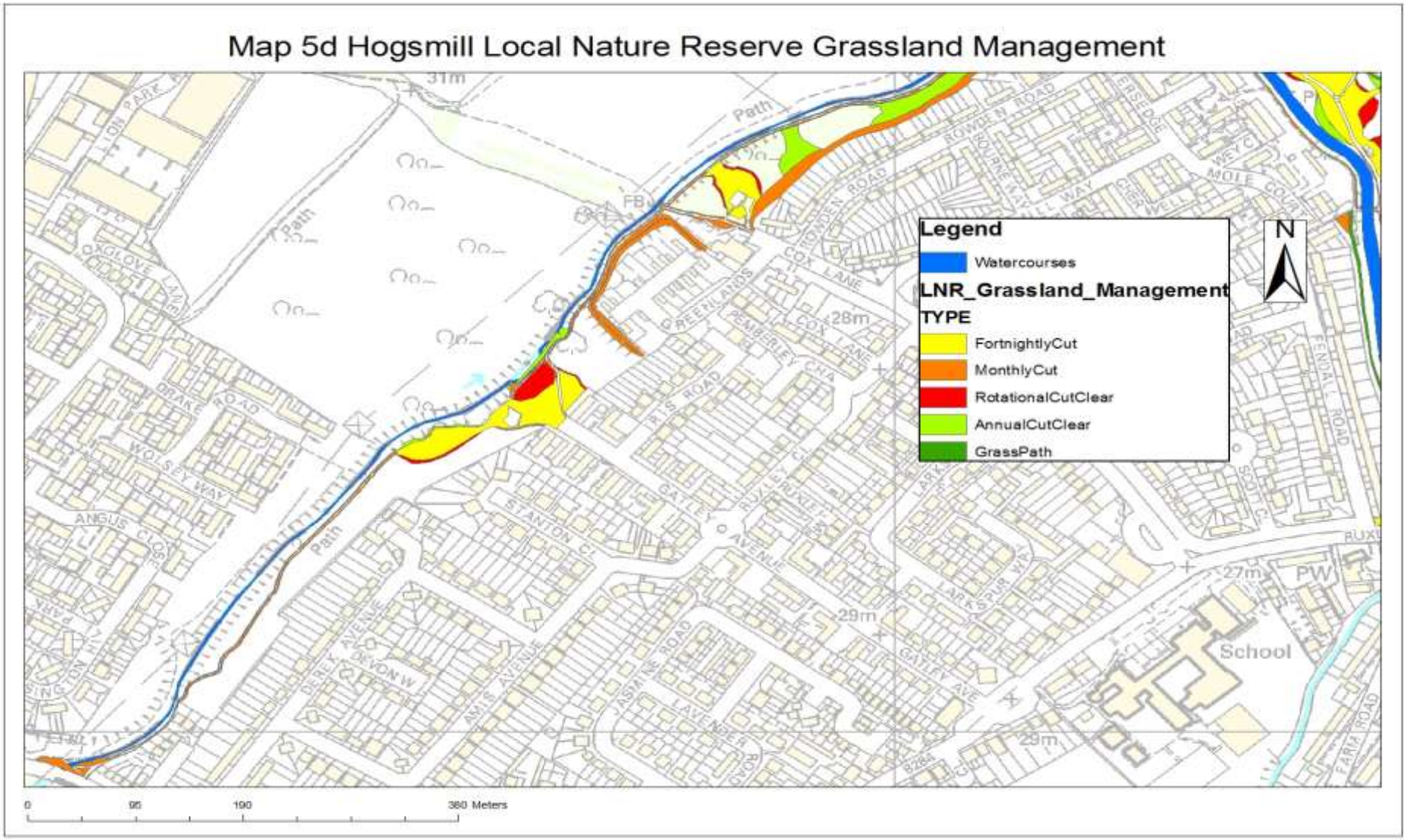
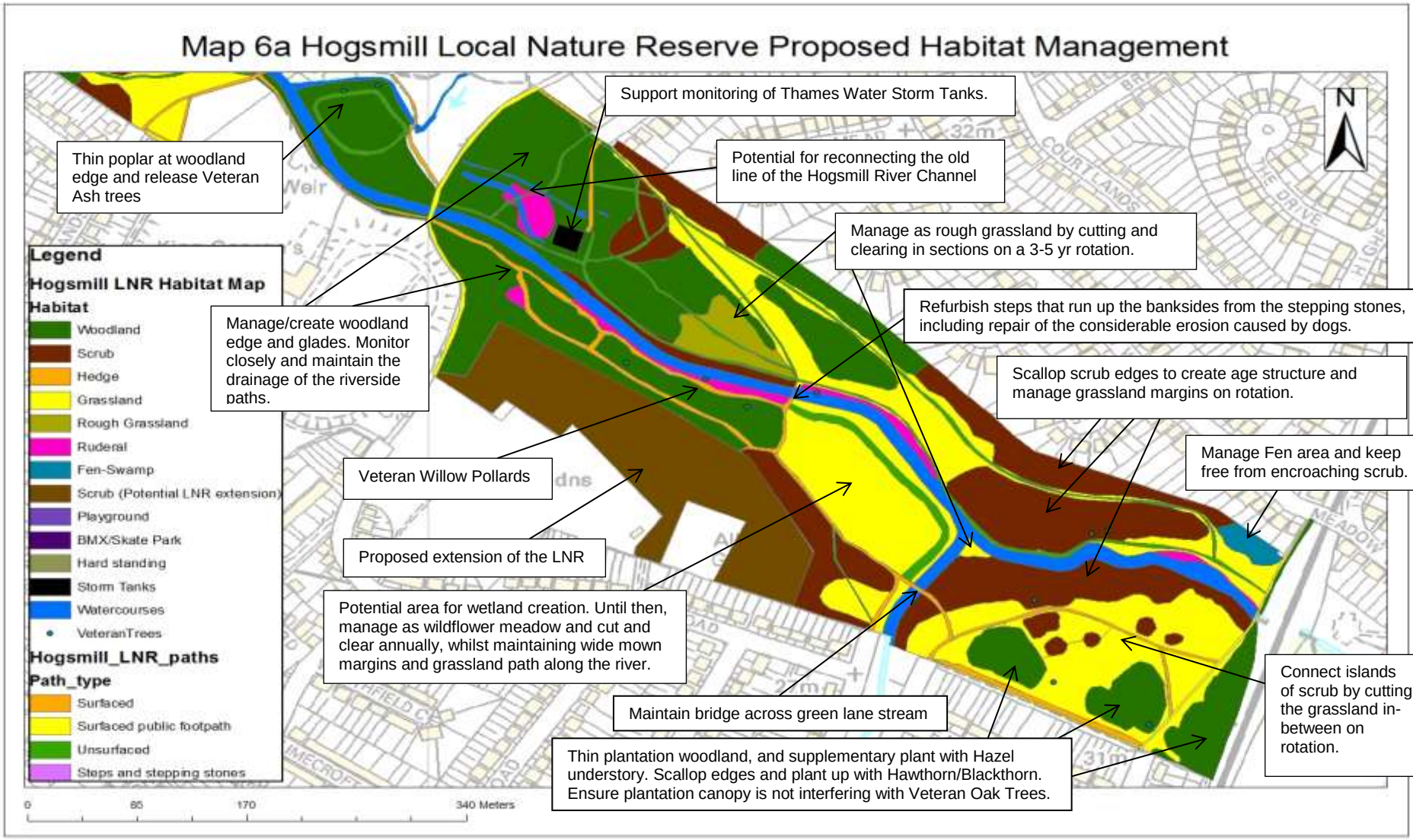
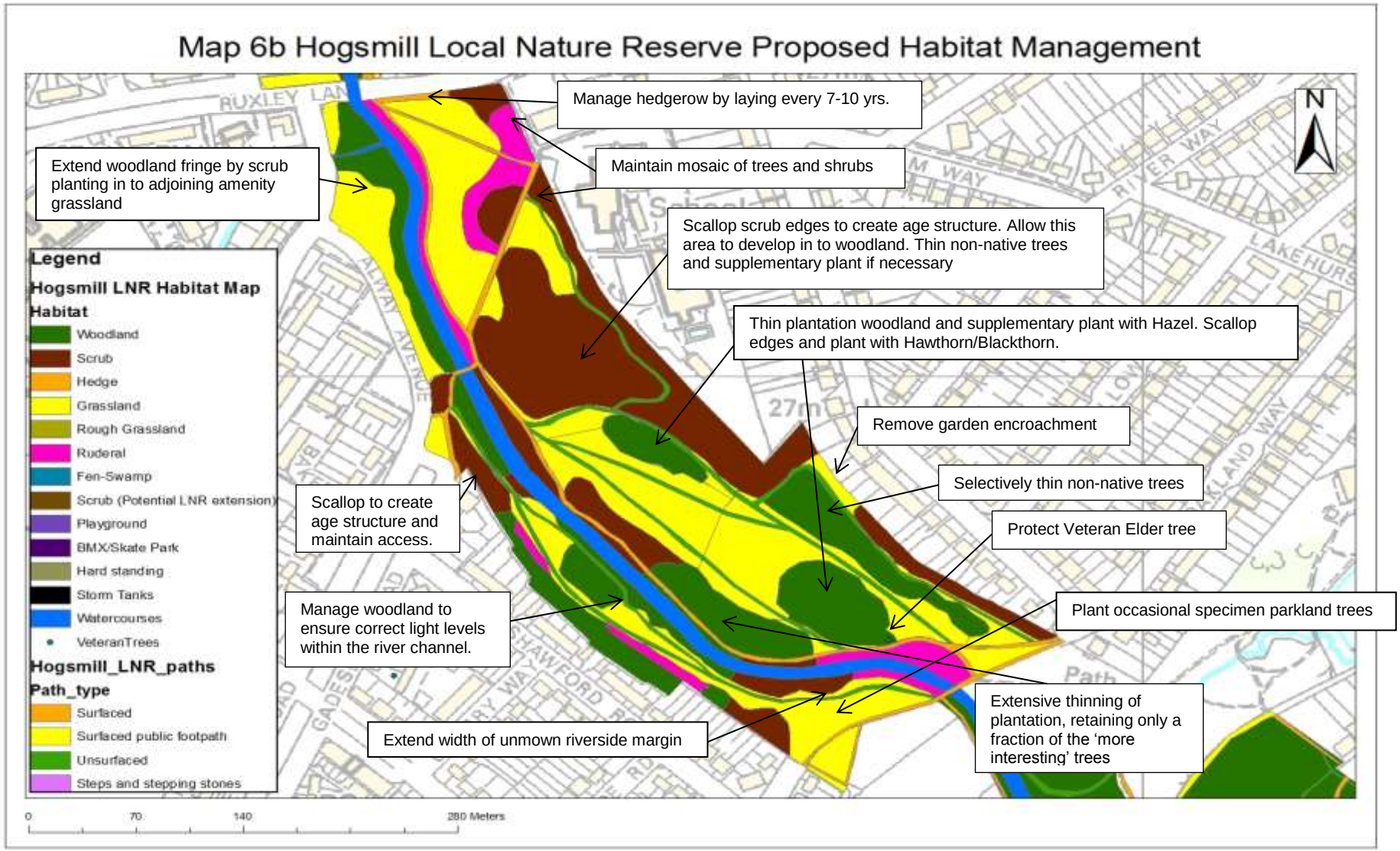
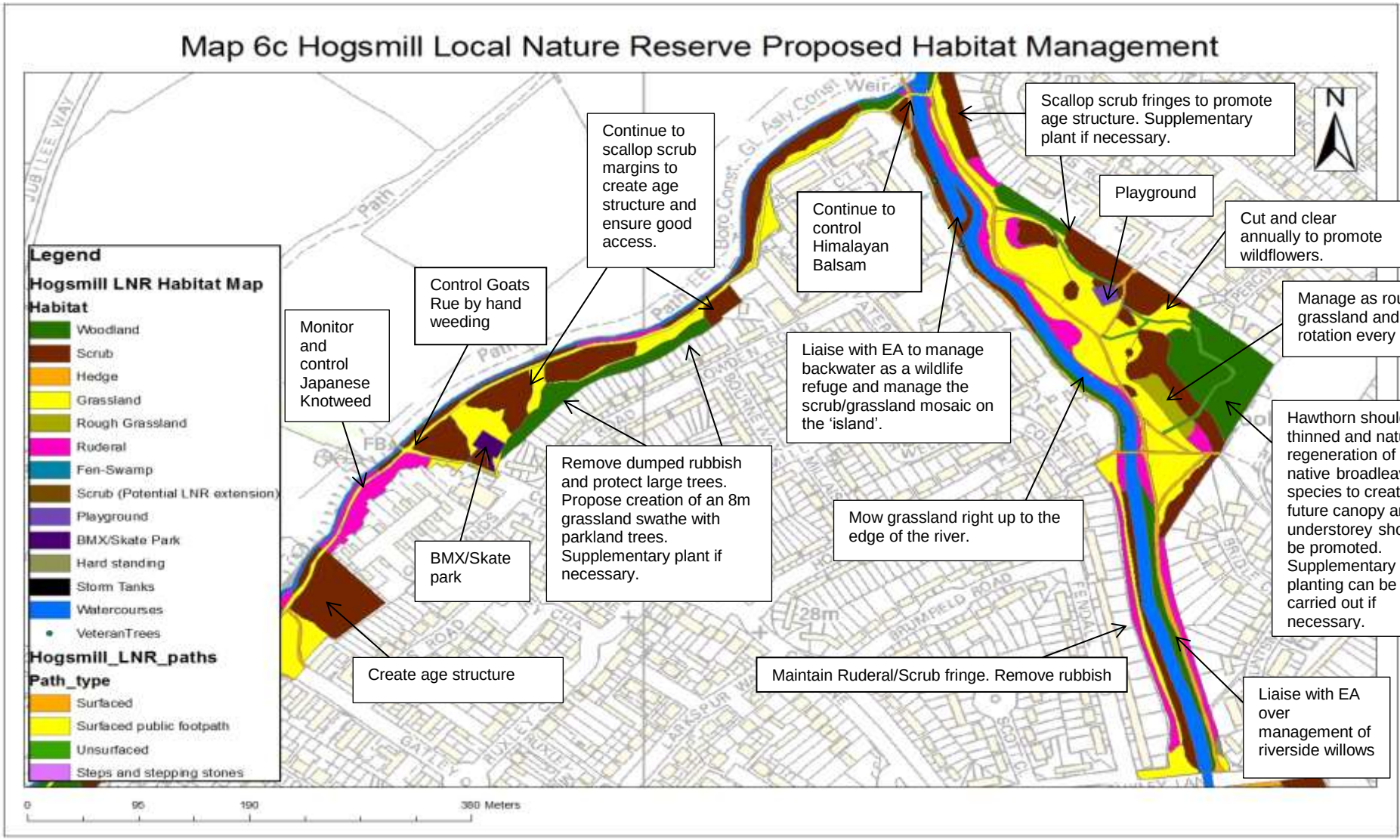


Map 6a Hogsmill Local Nature Reserve Proposed Habitat Management

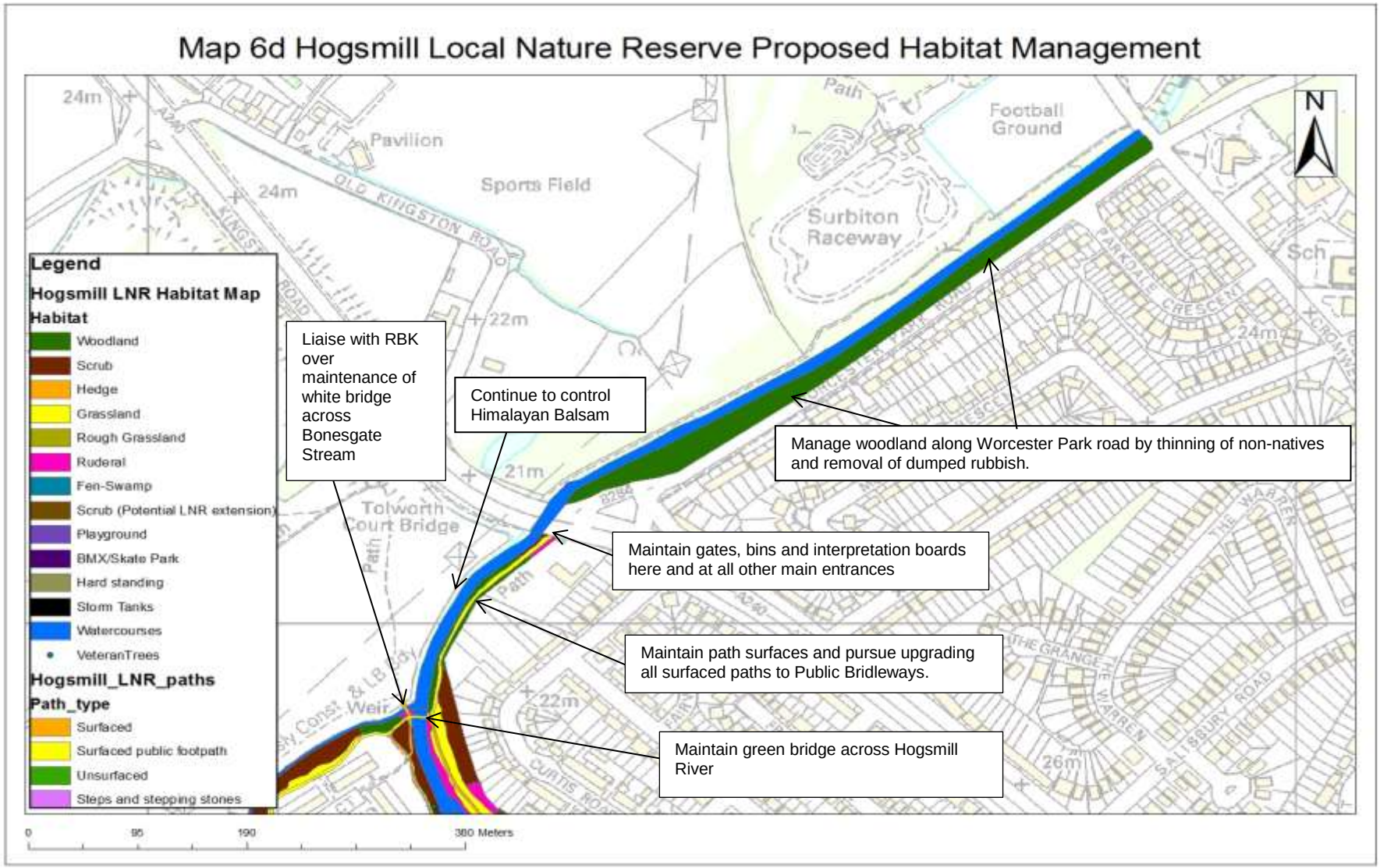


Map 6b Hogsmill Local Nature Reserve Proposed Habitat Management

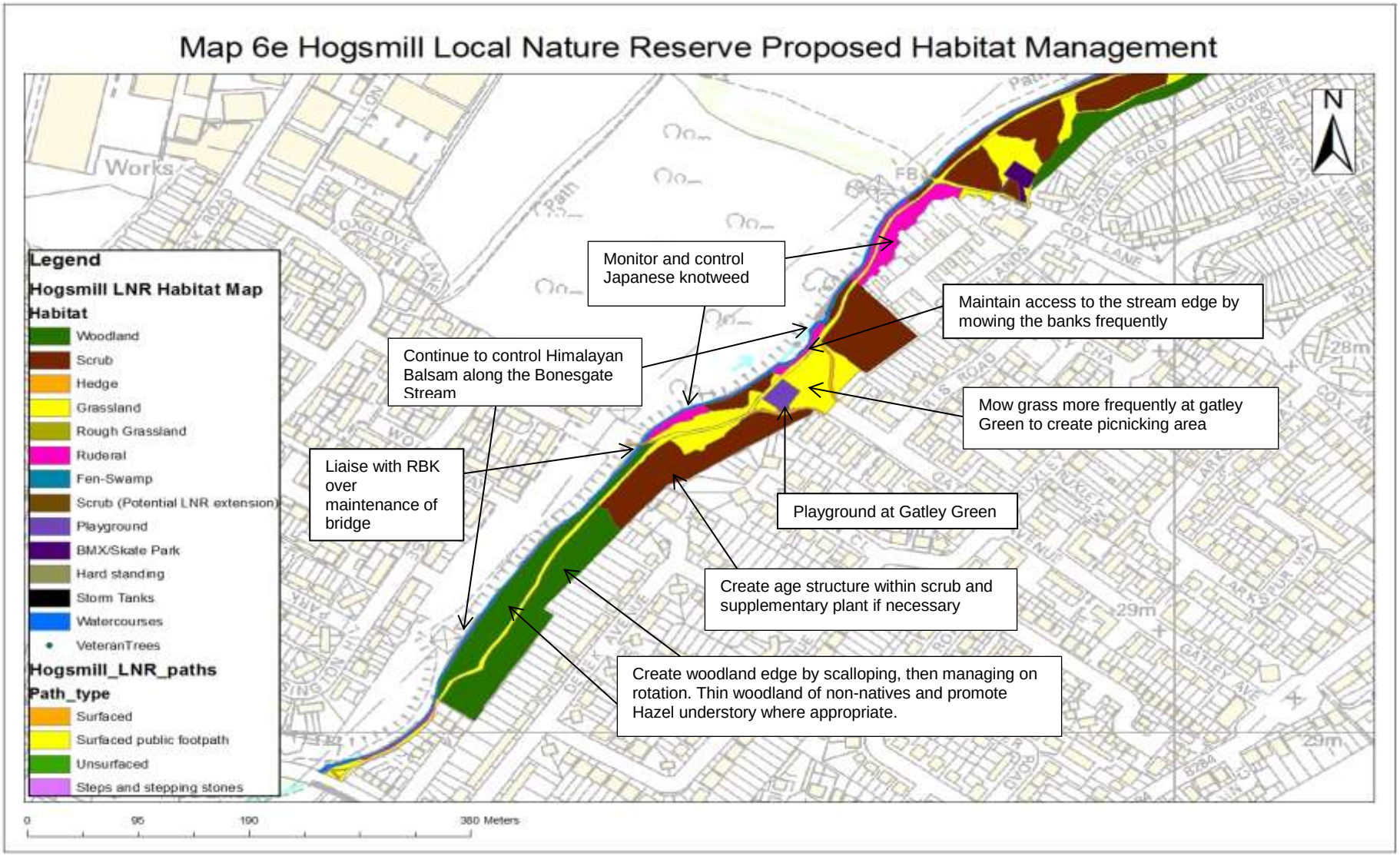



Map 6c Hogsmill Local Nature Reserve Proposed Habitat Management
Legend
Hogsmill LNR Habitat Map
Habitat
Woodland
Scrub
Hedge
Grassland
Rough Grassland
Ruderal
Fen-Swamp
Scrub (Potential LNR extension)
Playground
BMX/Skate Park
Hard standing
Storm Tanks
Watercourses
VeteranTrees
Hogsmill_LNR_paths
Path_type
Surfaced
Surfaced public footpath
Unsurfaced
Steps and stepping stones
0
95
190
380 Meters
N
Scallop scrub fringes to promote age structure. Supplementary plant if necessary.
Continue to scallop scrub margins to create age structure and ensure good access.
Continue to control Himalayan Balsam
Playground
Cut and clear annually to promote wildflowers.
Manage as rough grassland and cut on rotation every 3-5 yrs.
Control Goats Rue by hand weeding
Monitor and control Japanese Knotweed
Liaise with EA to manage backwater as a wildlife refuge and manage the scrub/grassland mosaic on the 'island'.
Hawthorn should be thinned and natural regeneration of native broadleaved species to create future canopy and understorey should be promoted. Supplementary planting can be carried out if necessary.
Remove dumped rubbish and protect large trees. Propose creation of an 8m grassland swathe with parkland trees. Supplementary plant if necessary.
BMX/Skate park
Mow grassland right up to the edge of the river.
Create age structure
Maintain Ruderal/Scrub fringe. Remove rubbish
Liaise with EA over management of riverside willows

Map 6d Hogsmill Local Nature Reserve Proposed Habitat Management



Map 6e Hogsmill Local Nature Reserve Proposed Habitat Management



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APPENDICES

Appendix I – 2013 SNCI Survey Description and map

The Hogsmill Local Nature Reserve (LNR) incorporates the former Hogsmill and Bonesgate Open Spaces. The site is linear in character and comprises a mosaic of habitats that includes woodland of varying maturity and composition, a range of grassland and a number of scrub types. Also there are a number of veteran trees found on the site including Oak and Willow.
There is open public access to the whole site. The Hogsmill River is a tributary of the River Thames. Upstream of Green Lane the water feeding in to the river originates from springs arising from the North Downs chalk aquifer, downstream from this point the water runs off clay substrates. The site lies over London Clay river alluvium and unclassified terrace gravels.

Previous reasons for selection:
Valuable part of an ecological unit joining areas of similar habitats, through the Hogsmill Corridor to Royal Borough of Kingston upon Thames upon Thames upon Thames where it becomes a site of Borough Importance in Kingston. Also the Kingston area supports water voles and there is the potential for these to move into the site.

Reasons for selection:
Veteran trees, across the site there are a number of veteran trees. Chalk stream, (chalk springs at the base of the North Downs escarpment are the source of the upper reaches of the Hogsmill River). As the river continues the inflowing tributaries run from clay areas reducing the calcareous nature of the water. Birds, the site supports Kingfishers and Little Egrets a species on the list of species of conservation concern in Surrey. They have been recorded regularly for the last 5 years. Access to nature, the site provides access to nature in an urbanised area of the borough, with few other opportunities to access nature locally.

Habitat description:
Abundance is based on the DAFOR scale and refers to the specific section of the site. The overall abundance across the site is provided in the Species List
DAFOR ratings for certain species, notably annual, can change throughout the year. The DAFOR scale uses the following key:-Dominant; Abundant; Frequent; Occasional; Rare Nomenclature follows Stace (2010) for vascular plants.

Target note 1:- Stream vegetation. Along the Hogsmill the aquatic vegetation is limited to some extent by the concrete banks and in places stream base. In other stretches aquatic vegetation has developed. This includes Watercress, Fool's Watercress, Branched bur-reed, Reed canary grass, Reed Sweet Grass, Curled Pondweed, Common water Plantain and Common Water Starwort. Also found here was the aquatic moss *Leptodictyum riparium*.

Target Note 2:- Swamp Vegetation, there is one area of this habitat, dominated by Reed Canary Grass, with frequent Meadowsweet and occasional Greater Willowherb and Bulrush.

Target note 3:- Tall ruderals. There are a number of areas dominated by Nettle, Common Reed, Greater Willowherb and Rosebay Willowherb). A number of these areas are found alongside the stream channel. In these areas alongside the stream are occasional trees such as Elder and Hawthorn. Generally the epiphytic bryophytes are poorly represented with the occasional *Orthotrichum affine* and *Frullania dilatata*.

Target note 4:- Amenity grassland, these areas are dominated by Perennial Rye-grass, with White Clover, Greater Plantain, Dandelions, Daisy, Wall Barley and Ribwort Plantain.

Target Note 5:- Amenity Grassland, this area was close mown and was composed of Perennial Rye Grass, Greater and Ribwort plantain. However around the edges were longer grasses including Meadow Barley.

Target note 6:- Mesothrophic rank grasslands, these are dominated by False Oat grass with some Cocksfoot, Common Couch and Tall fescue. They are generally species poor, with Nettle, Cleavers and Field Bindweed. Some of the areas have within them ant hills.

Target note 7:- Hawthorn dominated scrub found with occasional Elder and Elm. In some area White Bryony was found trailing through the scrub.

Target note 8:- Blackthorn dominated scrub with occasional trees including Ash, Elder and Hawthorn. Other plants in this area particularly along the path edges were Black Horehound, Cocksfoot, Common Couch, Creeping Thistle, False Oat Grass, Greater Plantain, Ground Ivy and Hogweed. In some of the areas of Blackthorn scrub, eggs of the Brown Hairstreak butterfly were found.

Target note 9:- Bramble dominated scrub often found with Common Nettle, Field Bindweed, Hedge Bindweed and Common cleavers.

Target note 10:- Broadleaved semi natural woodland composed of Ash, Pedunculate oak, Sycamore and Crack Willow. Along the path edges near the stream channel were found the mosses *Barbula convolute*, *Barbula unguiculata, Bryum dictomum* and *Hennediella macrophylla*. The latter is an alien moss (probably originally from New Zealand) not recorded in Surrey until the 1960's. Since then it has spread down the River Thames and the River Mole and has now reached the banks of the Hogsmill.

Target note 11:- Semi natural broadleaved woodland. The canopy was composed of Ash, Aspen, Pedunculate Oak, Sycamore and Wild Cherry. The shrub layer was composed of Dogwood, Hazel including by the stream some coppice stools and Hawthorn. The herb layer was patchy with areas of abundant Ivy and Cow Parsley with occasional Enchanters Nightshade and Pendulous sedge. There was also rare Giant Fescue, Wood Avens and Garlic

mustard. Along the river bank was frequent Winter Heliotrope. Found in this area were some invasive plants including bamboo and Snowberry.

Target note 12:- Plantation woodland of varying ages.

Target note 13:- Veteran trees. Along part of the old Hogsmill river channel are a number of veteran lapsed pollarded White Willows. In addition there is an avenue of old White Willows that follow the course of the river. There are a number of old Pedunculate Oaks including a group alongside the Bonesgate. The largest occurs in the south of the Hogsmill LNR and has a diameter at breast height of 1.75m

Target Note 14:- A line of White Willow, some pollarded. There was an s shrub layer dominated by Elder with occasional Hawthorn. The herb layer was dominated by Common Nettle, Ivy, with occasional Cow Parsley, Clustered Dock and White Dead Nettle. The stream here is very shaded with little vegetation other than rare Brooklime and Pendulous Sedge.

Target Note 15:- An area of tall ruderal vegetation dominated by Common Nettle and Bramble with occasional Burdock, Cocksfoot and Tall Fescue. In places by the stream were large Elders, these had few epiphytes dominated by the pollution tolerant moss, *Orthothrichum diaphanum*

Target Note 16:- The stream here is clear and fish such as Dace are regularly seen along with Kingfishers.

Target Note 17:- Mesothrophic grassland , there is abundant Perennial Rye Grass here but also a variety of other grasses including Timothy, Cocksfoot, False Oat Grass and Tall Fescue. Herbs found include Ribwort Plantain, Creeping Buttercup, Red Clover and Broadleaved Dock. The grassland also contains a number of old anthills.

Target Note 18:- Scrub, composed of abundant Blackthorn with occasional Elder and Hawthorn. In this area, still the only epiphytic bryophyte was *Orthothrichum diaphanum*. Found on the Blackthorn have been the eggs of the Brown Hairstreak butterfly

Target Note 19. Semi-natural broadleaved woodland, this is a thin strip that runs between the Hogsmill River and Worcester Park Road. The canopy is composed of Ash, Horse Chestnut and Sycamore with the occasional Pedunculate Oak. Most of the trees are young with the occasional older tree generally close the road. The scrub layer was sparse with the occasional Elder and Hawthorn, in place there was abundant Ash saplings. The herb layer was dominated by Ivy with occasional areas with dense Bramble. Other herbs included Wood Avens and Common Cleaver. The bank of the stream is steep and shady so has little vegetation, plants found include False Brome, Hogweed and the moss *Fissedens Taxifolius*. The woodland strip had large amounts of dead wood both standing and fallen.

Target Note 20:- Along the stream the bank tops are by Himalayan Balsam with occasional Meadowsweet, Nettle and rare Hemlock. The banks themselves are very steep and mostly devoid of vegetation.

Target note 21:- Broadleaved secondary woodland. The woodland in this small area is dominated by even aged young Ash with the occasional Crack Willow... The shrub layer was sparse composed of Hawthorn. The herb layer was in places dominated by Ivy, with occasional Cow Parsley and Nettle and rare Lords and Ladies and Wood Avens.

Target note 22:- Scrub. This was composed of frequent Hawthorn, occasional Elder and Dog Rose. There was also frequent bramble throughout the area. Also found along the edges of the scrub was Common Chickweed, Wood Avens, Common Couch and False Oat Grass.

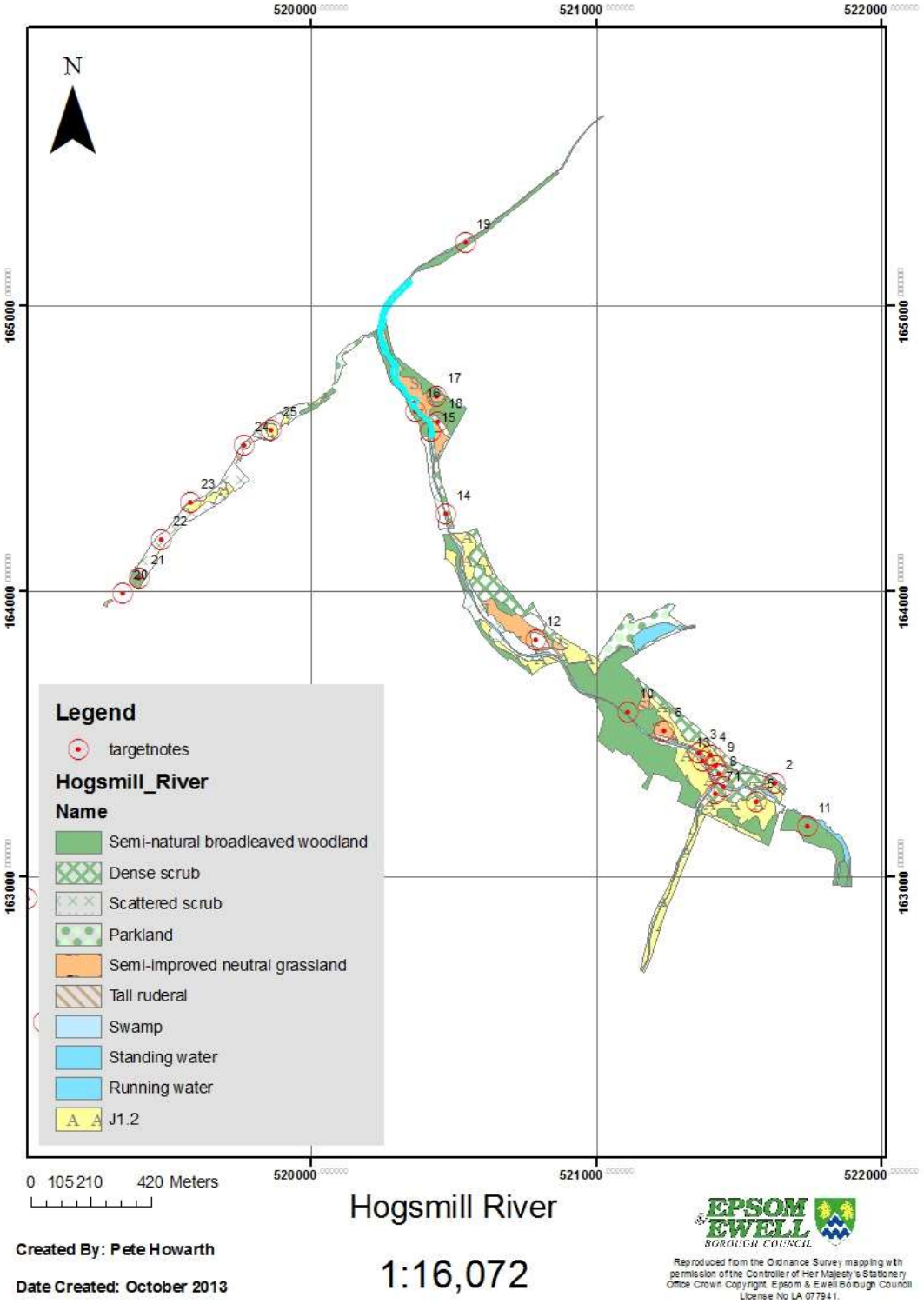
Target note 23:- A small area of Japanese Knotweed was found between the path and the stream.

Target note 24:- Ruderal area alongside stream. This area is dominated by Bramble and Nettles along with some scrub, occasional trees and grassy areas.

Target note 25:- Amenity grassland composed of abundant Perennial Rye Grass.

NVC types present

S28 Phalaris arundinacea tall herb fen community
OV 24 Urtica dioica-Galium aparine community,
OV 25 Urtica dioica-Cirsium arvense community
OV 26 Epilobium hirsutum community
OV 27 Epilobium angustifolium community
MG7 Lolium perenne leys
MG1a Arrhenatheretum eatioris grassland, Festuca rubra sub-community
W21 Crataegus monogyna-Hedera helix scrub
W22 Prunus spinosa-Rubus fructicosus scrub
W24 Rubus fructicosus-Holcus lanatus underscrub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7
2
11
Legend
targetnotes
Hogsmill_River
Name
Semi-natural broadleaved woodland
Dense scrub
Scattered scrub
Parkland
Semi-improved neutral grassland
Tall ruderal
Swamp
Standing water
Running water
J1.2
0 105 210 420 Meters
Hogsmill River
1:16,072
Created By: Pete Howarth
Date Created: October 2013
EPSOM EWELL BOROUGH COUNCIL
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Appendix II – 2004 Habitat/NVC Survey Results

Methods for habitat survey

The habitat survey was conducted over several visits during the period August to September 2004. The site was separated into 'compartments' of largely homogeneous land cover as identified on a series of orthorectified aerial photographs. Mapping was done directly onto photographs in the field and these boundaries were then transferred into GIS (MapInfo). The vegetation in each 'compartment' (GIS polygon) was assigned wherever possible into vegetation communities recognised within the National Vegetation Classification (NVC – Rodwell, 1991-2000). Very often, more than one community type was present and so the percentage of total ground cover made up by each individual community was recorded, and appropriate descriptive target notes compiled. These figures were then entered into an Excel spreadsheet, together with abbreviated notes (maximum of 250 characters). This spreadsheet was subsequently imported into the GIS database and was thus linked to the relevant polygons.

The area covered by the habitat survey excludes several areas that are now covered under this management plan. This includes the watercourses themselves, in addition to areas of land near to Ewell Court, beside the Bonesgate Stream adjacent to the Watersedge Estate and 'River View Copse', the area formerly leased to Surrey County Council. For the sake of completeness, habitats for these areas have been based upon the interpretation of aerial photography in conjunction with the relevant few brief notes made during site visits. However, the composition of these areas is not included within the following account.

Description of habitats and vegetation communities

Numbers with 'P' prefixes relate to the GIS polygon numbers

Woodlands and individual trees

Woodland communities of the Hogsmill and Bonesgate Open Space are somewhat variable and poorly-defined, and do not correlate with the NVC communities. Broadly speaking, there are three main types. At the most recent end of the spectrum are a series of woodlands that were clearly planted around 30 years ago, often upon what was originally grassland habitat. Also present is a suite of older-established and broadly 'semi-natural' woodlands, although even these tend to support a proportion of planted species. Finally, there are also discrete areas of older plantation woodland, generally occurring as small stands within the 'semi-natural' types. Many areas of woodland are disturbed, often scrub-like and patchy in their characteristics, with a generally poor representation of ground flora species.

Of the more-established, broadly 'semi-natural' woodlands, the most widespread species are Ash (*Fraxinus excelsior*), Oak (*Quercus robur*) and Sycamore (*Acer pseudoplatanus*). However, due to the variability of stand types, even these can vary in frequency from being dominant (in the case of Ash) or frequent (in the case of oak and Sycamore), but all being rare in other areas. Alder (*Alnus glutinosa*) occurs occasionally in some wet areas.

A wide range of other, often planted trees occur within the canopy, either as infrequently scattered individuals or small stands of long-established plantation. Planted (and frequently self-sown) tree species include Ornamental Cherries/Plums (*Prunus* spp.), Norway Maple (*Acer platanoides*), Narrow-leaved ash (*Fraxinus angustifolia*), Willows (*Salix* spp.), Lime (*Tilia* sp.), Horse Chestnut (*Aesculus hippocastanum*), London Plane (*Platanus* x *hispanica*), Turkey Oak (*Quercus cerris*), False-acacia (*Robinia pseudoacacia*), Poplars (*Populus* spp.), Beech (*Fagus sylvatica*) and Scots Pine (*Pinus sylvestris*).

The most common shrub species across the site are Hawthorn (*Crataegus monogyna*) and Elder (*Sambucus nigra*) (one of the plantation woodland areas contains a multi-stemmed, veteran Elder tree). Elm (*Ulmus* spp.) and Blackthorn (*Prunus spinosa*) are locally common. Widely occurring field layer associates include Bramble, Ivy (*Hedera helix*), False-brome (*Brachypodium sylvaticum*), Wood Avens (*Geum urbanum*), Cow Parsley (*Anthriscus sylvestris*), Common Nettle and Cleavers (*Galium aparine*). A number of woodland stands have been disturbed by playing children, and there are varying amounts of litter and dumped rubbish, including garden refuse.

Broadleaved woodland planted in recent times occupies significant areas within the Hogsmill Open Space and largely comprises discrete copses planted-up on what was formerly grassland habitat. Mowing of surrounding amenity grasslands has created a very abrupt edge to these woodlands. A wide range of tree species are present and include Hornbeam (*Carpinus betulus*), Ash (*Fraxinus excelsior*), Narrow-leaved Ash (*Fraxinus angustifolia*), Limes (*Tilia* spp.), Birches (*Betula* spp.), Horse Chestnut (*Aesculus hippocastanum*), Ornamental Plum/Cherry (*Prunus* spp.) and Pear (*Pyrus* sp.), plus Grey/White Poplar (*Populus canescens*/*alba*). The field layer is generally extremely sparse.

Away from woodlands, there are a number of much older, larger trees present. Notable examples include are a number of fine old Pedunculate Oak trees. The largest such specimen (T5), in the south of the Hogsmill Open Space, has a diameter at breast height (DBH) of 1.75m, whilst a second tree nearby (T2) has a DBH of 1.3m. In between these lie a further two somewhat smaller Pedunculate Oak trees (T3, T4). There are also a number of larger Oak Trees to be found within the Bonesgate Open Space (up to around 0.9m DBH); many of these oak trees were noted to support 'spangle galls'.

An area of the Hogsmill Open Space contains a total seven of veteran, lapsed pollarded White Willows (*Salix alba*) (P-70), which appear to be aligned along the course of the former river channel (one of these trees toppled during the winter of 2003-04). Two further significant features take the form of established

riverside avenues of White Willow trees beside the Hogsmill (P-72, 93). Effectively, these form a continuous canopy, but have not been mapped as woodland, as they really are narrow, linear features and lack a woodland feel to them (e.g. no woodland shrub or field layer present).

In addition to the planted woodlands described above, there are more local areas of sparsely-planted trees within grassland habitat. The most extensive example (P – 52) includes trees of Spindle (*Euonymus europaeus*), Italian Alder (*Alnus cordata*), Limes, Scots Pine and Willows.

One further individual standing tree was mapped as a 'point feature', this being a large Horse Chestnut tree on the Hogsmill (T1).

Other individual trees include Ash, Narrow-leaved Ash, Poplars, Limes, Field Maple, Hornbeam, Sycamore and Crack Willow (*Salix fragilis*). Interestingly, this last-mentioned tree is uncommon on the Hogsmill, but seems more abundant on the Bonesgate than White Willow. Hybrids are of course likely to also be present.

Scrub

Scrub of all types occupies approximately 35% of the site, although in places, it is difficult to make a clear separation between scrub and woodland habitats. Of all the habitat polygons mapped during the survey (144 in total), scrub making up more than 5% of the area within, occurred in 85 (i.e. 59%) of polygons. As with many of the other habitats, scrub tends to occur in narrow strips, reflecting the linear character of the site. The three most frequent and extensive scrub types are as follows:

W21 *Crataegus monogyna – Hedera helix* scrub

Hawthorn (*Crataegus monogyna*)-dominated scrub was found to be the second-most frequently-occurring type, being mapped at more than 5% in a total of 41 polygons (28%). Other species present include Elder (*Sambucus nigra*) and Elm (*Ulmus* spp.) in particular, plus Roses (*Rosa* spp.), occasionally with a scattering of mature trees, especially of Oak and Ash, so the composition can be locally quite varied. Scattered Hawthorn scrub as a component of other habitats has also been included within this category (and in such cases, therefore, represents only a small proportion of the habitat within these polygons).

W22 *Prunus spinosa – Rubus fruticosus* scrub

This type of scrub was the third most frequent, occurring at more than 5% cover in 13 polygons (9%). It tends to be overwhelmingly dominated by dense thickets of Blackthorn, with other species poorly-represented. This scrub is much less extensive than the W21 type and stands generally tend to be small. However, there is one large area of scrub beside the Hogsmill where Blackthorn is the predominant species (P – 80).

W24 *Rubus fruticosus – Holcus lanatus* underscrub

Bramble-dominated scrub represents the most frequent and extensive type of scrub present, being recorded at more than 5% cover in a total of 61 polygons (42%). Frequent associates include Common Nettle, Field Bindweed, Hedge Bindweed and Cleavers.

Non-referable scrub types

A number of stands of scrub could not easily be assigned to the NVC. Although some Hawthorn and Blackthorn were often present, neither was sufficiently constant to suggest either the **W21** or **W22** communities. A range of separate mapping categories have been provided to denote scrub types dominated individually by either Elms, Ornamental Plum/Cherry, Field Maple (*Acer campestre*) and Goat Willow (*Salix caprea*). Of these, the most frequently-encountered were Elm-dominated stands (5 polygons in total), with just three examples of Field Maple, plus one each of Ornamental Plum/Cherry and Goat Willow.

Beyond these non-referable scrub-types with an obvious dominant species, there are further examples with no clear dominant (6 polygons). In addition to Hawthorn and Blackthorn, other shrub (and tree) constituents include Willows, Elder, Blackthorn, Elm, Roses, Sycamore, Hazel, Oak, Ash and Birch. The largest area assigned to this category is to be found in the western section of the Bonesgate (P – 140). A further mapping category was used to denote scattered bushes of Elder that occurred within other habitats (being mapped on only two occasions).

Mature trees, especially of Oak and Ash, are occasionally present throughout scrub-dominated habitats, enhancing structural diversity. As with woodlands, scrub can be quite disturbed as a result of trampling by children and the dumping of litter and other rubbish, including garden refuse along the site margins.

Hedgerow Features

Only a single section of hedgerow was noted, on a verge beside the B284. This comprises a short, free-standing and recently planted ‘feature’, presumably placed here for ‘demonstration’ purposes. Trees noted were Hazel, Hawthorn, Plum/Cherry, Field Maple, Norway Maple (*Acer platanoides*) and Crab Apple (*Malus sylvestris*). There were signs of this having being carefully ‘pruned’ at some point.

Grasslands

Grasslands as a whole form one of the most extensive and frequently-occurring habitat types within the site, much of this taking the form of the regularly-mown amenity grassland areas that typify the Open Space, along the Hogsmill in particular. Of all mapped polygons, grassland comprising more than 5% of the area, occurs in 75, or 52% of the total, making grassland the second-most frequently mapped habitat type (after scrub). The main grassland types are as follows:

MG1 – *Arrhenatherum elatius* grassland

Coarse, rank, un-mown grassland characterised by grasses such as False Oat-grass (*Arrhenatherum elatius*) and Common Couch (*Elytrigia repens*) tends to occur in narrow, marginal strips around the fringes of the main areas of mown amenity grassland (see below). The major part is consistent with the **MG1a *Festuca rubra* sub-community**. Often this vegetation is very species-poor, with false oat-grass overwhelmingly dominant. Other common and frequent associates include Cock's-foot (*Dactylis glomerata*), Field Bindweed (*Convolvulus arvensis*), Cleavers (*Galium aparine*), Creeping Thistle (*Cirsium vulgare*) and Tall Fescue (*Festuca arundinacea*). In smaller areas, where such vegetation is accompanied by frequent Common Nettle (*Urtica dioica*) and occasionally, Hogweed (*Heracleum sphondylium*), this represents areas of the **MG1b *Urtica dioica* sub-community**.

MG6 *Lolium perenne – Cynosurus cristatus* grassland

Vegetation attributable to this category was noted in only a handful of situations. In some respects, it fits within a 'middle ground' between the frequently managed and species-poor amenity grassland swards dominated by Perennial Rye-grass (MG7 – see below) and the rank MG1-type swards. Apart from the dominant grass species, the main difference lies in the higher relative species diversity. Thus, the dominant grass tends to be Creeping Bent (*Agrostis stolonifera*), with varying frequency of Perennial Rye-grass (*Lolium perenne*). Other common grasses include Red Fescue (*Festuca rubra*), Timothy (*Phleum pratense*), Yorkshire Fog (*Holcus lanatus*), Meadow Barley (*Hordeum secalinum*) and Cock's-foot (*Dactylis glomerata*). Other frequent associates include Red Clover (*Trifolium pratense*) Greater Plantain (*Plantago major*), Trailing Tormentil (*Potentilla reptans*), Autumn Hawkbit (*Leontodon autumnalis*), Yarrow (*Achillea millefolium*) and Dandelion (*Taraxacum officinale* agg.).

All three observed stands occur in somewhat different situations. The first instance (P-42) relates to part of a grassland area within the Hogsmill that has been planted-up with trees (the predominant grassland type here is MG1a). Occasional ant-hills were also noted within the sward. The second instance (P-71 also within the Hogsmill) relates to a fairly large area of un-mown grassland (apart from occasional marginal paths). Hairy Sedge (*Carex hirta*), Creeping Buttercup (*Ranunculus repens*) and Creeping Thistle (*Cirsium arvense*) were also present here. Unusually, the final area occurs within a mown amenity grassland area within the Bonesgate (P-133). However, grasslands along this section appear to be less-frequently mown than along the Hogsmill. Species of

note from here include Ox-eye Daisy (*Leucanthemum vulgare*) and Cranesbills – including Dove's-foot Cranesbill (*Geranium molle*) and possibly also Small-flowered Cranesbill (*Geranium pusillum*).

Within the Hogsmill, there were several rather localised areas within the main mown amenity grassland swards (see MG7 below), where there were indications of an MG6-type sward. This occurs within Polygon 104, where several more marginal areas of the sward were seen to support species such as Bird's-foot Trefoil (*Lotus corniculatus*) along with Common Knapweed (*Centaurea nigra*), Common Sorrel (*Rumex acetosa*) and Tall Fescue (*Festuca arundinacea*).

MG7 Lolium Perenne leys and related grasslands

Grassland of this type is indicated by the often almost complete dominance of Perennial Rye-grass within a generally species-poor sward. This is the most extensive grassland type, occupying large areas, especially along the Hogsmill, comprising regularly-mown amenity grassland swards. In addition to mowing, the development of such vegetation is also due to the effects of eutrophication from dogs. Common associates include White Clover (*Trifolium repens*), Dandelions, Greater Plantain, Ribwort Plantain (*Plantago lanceolata*), Daisy (*Bellis perennis*) and Wall Barley (*Hordeum murinum*). A variant of this vegetation has been identified, representing areas where Tall Fescue also occurs as a component of the sward along the Hogsmill (P – 1, 8, 22).

Very locally, there are indications of a somewhat more diverse sward with, in particular, the presence of Common Knapweed (*Centaurea nigra*) (P-120). This represents one of a suite of grasslands occupying the 'open space' of the Bonesgate, that appear to be less-frequently-mown than those of the Hogsmill. Owing to the general dominance of Perennial Rye-grass, these have been predominantly been placed within the MG7 category (note P-133 above), although they are somewhat longer and less clearly-defined than those along the Hogsmill. In places (P-134), the sward appears quite rank and weedy, supporting species such as Chickweed (*Stellaria media*), Creeping buttercup, Smooth Hawk's-beard (*Crepis capillaris*), Dandelion, Cow Parsley (*Anthriscus sylvestris*), White Dead-nettle (*Lamium album*), Broad-leaved Dock (*Rumex obtusifolius*) and Hogweed (*Heracleum sphondylium*).

Weed and ruderal Communities

The NVC recognises a suite of communities associated with weedy/ruderal/open/disturbed habitats. Extensive stands occur within the site, with a total of 62 (i.e. 43%) of mapped polygons supporting 5% or more cover of weed/ruderal-dominated vegetation of some kind.

OV24/25 *Urtica dioica – Galium aparine* community and *Urtica dioica – Cirsium arvense* community

There is considerable overlap between the characteristic forms of these two communities and they have therefore been grouped together. Both in effect, are Common Nettle-dominated vegetation. O**V24** has Common Nettle as the overwhelming dominant in a species-poor sward, where Cleavers (*Galium aparine*) is the only constant associate. O**V25** has a more patchy, open cover of Nettles and is thus more diverse, with other associates present, including Thistles (*Cirsium* spp.) in particular. Other common associates of these two communities include Hedge Bindweed (*Calystegia sepium*), Field Bindweed, Hogweed and Bramble (*Rubus fruticosus* agg.). Noted occasionally were Black Horehound (*Ballota nigra*), Russian Comfrey (*Symphytum* x *uplandicum*), Burdock (*Arctium* sp.), Greater Willowherb (*Epilobium hirsutum*) and White Dead-nettle (*Lamium album*).

Extensive stands of these communities occur especially along the unmanaged fringes of the site, including beside the two watercourses. One further, frequent and locally abundant associate, beside the Bonesgate Stream within stands of Common Nettle, is Himalayan Balsam (*Impatiens glandulifera*). The plant also occurs along the Hogsmill River downstream of where it is joined by the Bonesgate Stream, but is not present on the Hogsmill upstream of this point.

Of the 62 polygons supporting weed/ruderal vegetation at more than 5% cover, all but one contain either **OV24** or **OV25**, thus making Common Nettle-dominated vegetation by far the most frequently-occurring weed/ruderal community within the site.

OV26 *Epilobium hirsutum* community

Whilst Greater Willowherb was found as a component of the **OV24/25** stands, in several small areas (in just 3 polygons) it was found to occur as discrete stands, representing the **OV26** *Epilobium hirsutum* community.

OV27 *Epilobium angustifolium* community

Just one small stand of Rose-bay Willow-herb (*Chamerion angustifolium*) was recorded.

Non-referable weed/ruderal communities

Some stands of weed-dominated vegetation could not be assigned to NVC types. One of the main examples was found on the banks of the Hogsmill river, where there had been recent ground disturbance as a result of reconstructing the road bridge over the B284 (P – 3, 15, 93, 143). A further example is located along recently-constructed earth bunds beside a gravelled path crossing the Bonesgate (P – 127) This vegetation is characterised by an abundance of Oraches (*Atriplex* spp.) and Goosefoots (*Chenopodium* spp.). Other associates noted (not necessarily at both locations) include, Mugwort (*Artemisia vulgaris*), Scentless Mayweed (*Tripleurospermum inodorum*), Smooth Sow-thistle (*Sonchus oleraceus*), Knotgrass (*Polygonum aviculare*), Burdocks, Creeping Thistle, Nipplewort (*Lapsana communis*), Poppies (*Papaver* sp.), Prickly Lettuce (*Lactuca serriola*), Bristly Ox-tongue (*Picris echioides*), Russian

Comfrey, and Shepherd's Purse (*Capsella bursa-pastoris*). Noted specifically in the Bonesgate example were Goat's Rue (Galega *officinalis*) and Hoary Mustard (*Hirschfeldia incana*).

The final example of vegetation under this heading relates to several small stands of Japanese Knotweed (*Fallopia japonica*) found beside the Bonesgate Stream (2 polygons, i.e. P – 128, 135).

Swamp Communities

Examples of this type of vegetation are of extremely limited occurrence.

S28 *Phalaris arundinacea* tall-herb fen

A single small area of this vegetation, overwhelmingly dominated by Reed Canary-grass (*Phalaris arundinacea*) was found at the margin of the Hogsmill Open Space (P – 63). Other associates include locally frequent Meadowsweet (*Filipendula ulmaria*) and Hairy Sedge (*Carex hirta*), occasional/frequent Greater Willowherb, locally occasional Creeping Thistle, plus rare Water Figwort (*Scrophularia auriculata*) and Pendulous Sedge (*Carex pendula*). A wet area within this vegetation also includes Bulrush (*Typha latifolia*) and Watercress (*Rorippa nasturtium-aquaticum*).

A further small area of swamp/marginal aquatic vegetation was found along a short section of the original course of the Hogsmill River (P – 50). Dense marginal vegetation growth made this feature largely impossible to examine. However, those sections that could be viewed were found to support locally abundant (*Glyceria maxima*), with Common Duckweed (*Lemna minor*) and Fool's Watercress (*Apium nodiflorum*) also being noted. At the time of field surveys, it was understood that all other watercourses did not form part of the site and they were therefore excluded.

Appendix III – Hogsmill Local Nature Reserve Species Lists

The following lists have been extracted from various sources, including species recorded during summer 2004 by Karl Crowther, the SNCI surveys from 1998 and 2003. An old botanical record from the Hogsmill (see below) has been made available by A. Sankey, the BSBI Vice County recorder for Surrey. A record for one additional species has also been provided by the Environmental Report of the Hogsmill River Rehabilitation Project (Anon, 2005). Several records have been derived from a survey done by Alison Fure (shown as AF) as part of Culvert Strengthening on the Moor Lane Bridge over the Bonesgate Stream (Fure, 2004). Part of the area covered by this survey lies outside the EEBC Bonesgate Open Space. Records have been taken from the 2016 fisheries survey carried out by the EA. Over the lifetime of the 2006-16 management plan, further bat surveys and botanical surveys have taken place all of which are included in the list below.

These lists are intended to bring together all known information sources. They do not represent a full inventory of all taxa occurring at the Local Nature Reserve (indeed, such an undertaking would be impossible for any site). Therefore, these lists should be viewed as incomplete, but representing the fullest information about the site at the present time.

Vascular Plants, Bryophytes and Lichens

Latin Name	Common Name	Type
Equisetum arvense L.	Field Horsetail	horsetail
Cedrus Trew	Cedrus	conifer
Pinus L.	Pine	conifer
Pinus sylvestris L.	Scots Pine	conifer
Taxus baccata L.	Yew	conifer
Arum maculatum L.	Lords-and-Ladies	flowering plant
Lemna minor L.	Common Duckweed	flowering plant
Potamogeton crispus L.	Curled Pondweed	flowering plant
Dioscorea communis (L.) Caddick & Wilkin	Black Bryony	flowering plant
Iris foetidissima L.	Stinking Iris	flowering plant
Iris pseudacorus L.	Yellow Iris	flowering plant
Sparganium erectum L.	Branched Bur-reed	flowering plant
Typha latifolia L.	Bulrush	flowering plant
Juncus effusus L.	Soft-rush	flowering plant
Juncus inflexus L.	Hard Rush	flowering plant
Carex hirta L.	Hairy Sedge	flowering plant
Carex pendula Huds.	Pendulous Sedge	flowering plant
Carex sylvatica Huds.	Wood-sedge	flowering plant
Lolium perenne L.	Perennial Rye-grass	flowering plant
Festuca arundinacea Schreb.	Tall Fescue	flowering plant

Festuca gigantea (L.) Vill.	Giant Fescue	flowering plant
Festuca rubra L.	Red Fescue	flowering plant
Cynosurus cristatus L.	Crested Dog's-tail	flowering plant
Poa annua L.	Annual Meadow-grass	flowering plant
Poa pratensis L.	Smooth Meadow-grass	flowering plant
Poa trivialis L.	Rough Meadow-grass	flowering plant
Dactylis glomerata L.	Cock's-foot	flowering plant
Arrhenatherum elatius (L.) P. Beauv. ex J. Presl & C. Presl	False Oat-grass	flowering plant
Holcus lanatus L.	Yorkshire-fog	flowering plant
Holcus mollis L.	Creeping Soft-grass	flowering plant
Phalaris arundinacea L.	Reed Canary-grass	flowering plant
Agrostis capillaris L.	Common Bent	flowering plant
Agrostis stolonifera L.	Creeping Bent	flowering plant
Alopecurus pratensis L.	Meadow Foxtail	flowering plant
Phleum bertolonii DC.	Smaller Cat's-tail	flowering plant
Phleum pratense L.	Timothy	flowering plant
Glyceria fluitans (L.) R. Br.	Floating Sweet-grass	flowering plant
Glyceria maxima (Hartm.) Holmb.	Reed Sweet-grass	flowering plant
Bromus hordeaceus L.	Lesser Soft-Brome	flowering plant
Bromopsis ramosa (Huds.) Holub	Hairy-brome	flowering plant
Brachypodium sylvaticum (Huds.) P. Beauv.	False-brome	flowering plant
Elymus caninus (L.) L.	Bearded Couch	flowering plant
Elytrigia repens (L.) Desv. ex Nevski	Common Couch	flowering plant
Hordeum murinum L.	Wall Barley	flowering plant
Hordeum secalinum Schreb.	Meadow Barley	flowering plant
Triticum L.	Triticum	flowering plant
Phragmites australis (Cav.) Trin. ex Steud.	Common Reed	flowering plant
Papaver L.	Poppy	flowering plant
Clematis vitalba L.	Traveller's-joy	flowering plant
Ranunculus acris L.	Meadow Buttercup	flowering plant
Ranunculus bulbosus L.	Bulbous Buttercup	flowering plant
Ranunculus ficaria L.	Lesser Celandine	flowering plant
Ranunculus repens L.	Creeping Buttercup	flowering plant
Ranunculus reptans L.	Creeping Spearwort	flowering plant

Ranunculus sceleratus L.	Celery-leaved Buttercup	flowering plant
Platanus occidentalis x orientalis = P. x hispanica Mill. ex Münchh.	London Plane	flowering plant
Paeonia officinalis L.	Garden Peony	flowering plant
Galega officinalis L.	Goat's-rue	flowering plant
Lotus corniculatus L.	Common Bird's-foot-trefoil	flowering plant
Vicia sativa L.	Common Vetch	flowering plant
Vicia sepium L.	Bush Vetch	flowering plant
Lathyrus pratensis L.	Meadow Vetchling	flowering plant
Medicago lupulina L.	Black Medick	flowering plant
Trifolium campestre Schreb.	Hop Trefoil	flowering plant
Trifolium pratense L.	Red Clover	flowering plant
Trifolium repens L.	White Clover	flowering plant
Prunus L.	Planted Cherry	flowering plant
Prunus avium (L.) L.	Wild Cherry	flowering plant
Prunus laurocerasus L.	Cherry Laurel	flowering plant
Prunus spinosa L.	Blackthorn	flowering plant
Pyrus L.	Pyrus Species	flowering plant
Malus Mill.	Apple	flowering plant
Malus sylvestris (L.) Mill.	Crab Apple	flowering plant
Sorbus aucuparia L.	Rowan	flowering plant
Crataegus L.	Crataegus	flowering plant
Crataegus monogyna Jacq.	Hawthorn	flowering plant
Filipendula ulmaria (L.) Maxim.	Meadowsweet	flowering plant
Rubus L.	Bramble	flowering plant
Rubus fruticosus agg.	Bramble	flowering plant
Potentilla anserina L.	Silverweed	flowering plant
Potentilla reptans L.	Creeping Cinquefoil	flowering plant
Geum urbanum L.	Wood Avens	flowering plant
Agrimonia eupatoria L.	Agrimony	flowering plant
Rosa L.	Rose	flowering plant
Rosa arvensis Huds.	Field-rose	flowering plant
Rosa canina L.	Dog-rose	flowering plant
Ulmus L.	Elm	flowering plant
Ulmus glabra Huds.	Wych Elm	flowering plant
Ulmus procera Salisb.	English Elm	flowering plant
Humulus lupulus L.	Hop	flowering plant
Urtica dioica L.	Common Nettle	flowering plant
Fagus sylvatica L.	Beech	flowering plant
Castanea sativa Mill.	Sweet Chestnut	flowering plant

Quercus cerris L.	Turkey Oak	flowering plant
Quercus ilex L.	Evergreen Oak	flowering plant
Quercus robur L.	Pedunculate Oak	flowering plant
Quercus rubra L.	Red Oak	flowering plant
Juglans regia L.	Walnut	flowering plant
Betula pendula Roth	Silver Birch	flowering plant
Betula pubescens Ehrh.	Downy Birch	flowering plant
Alnus cordata (Loisel.) Duby	Italian Alder	flowering plant
Alnus glutinosa (L.) Gaertn.	Alder	flowering plant
Alnus incana (L.) Moench	Grey Alder	flowering plant
Carpinus betulus L.	Hornbeam	flowering plant
Corylus avellana L.	Hazel	flowering plant
Euphorbia peplus L.	Petty Spurge	flowering plant
Populus L.	Poplar	flowering plant
Populus alba L.	White Poplar	flowering plant
Populus alba x tremula = P. x canescens (Aiton) Sm.	Grey Poplar	flowering plant
Populus nigra x deltoides = P. x canadensis Moench	Hybrid Black-poplar	flowering plant
Populus tremula L.	Aspen	flowering plant
Salix alba L.	White Willow	flowering plant
Salix alba x babylonica = S. x sepulcralis Simonk.	Weeping Willow	flowering plant
Salix caprea L.	Goat Willow	flowering plant
Salix cinerea L.	Common Sallow	flowering plant
Salix fragilis L.	Crack-willow	flowering plant
Viola L.	Violet	flowering plant
Hypericum perforatum L.	Perforate St John's-wort	flowering plant
Geranium L.	Crane's-Bill	flowering plant
Geranium dissectum L.	Cut-leaved Crane's-bill	flowering plant
Geranium molle L.	Dove's-foot Crane's-bill	flowering plant
Geranium pyrenaicum Burm. f.	Hedgerow Crane's-bill	flowering plant
Geranium robertianum L.	Herb-Robert	flowering plant
Epilobium hirsutum L.	Great Willowherb	flowering plant
Chamerion angustifolium (L.) Holub	Rosebay Willowherb	flowering plant
Circaea lutetiana L.	Enchanter's-nightshade	flowering plant
Rhus typhina L.	Stag's-horn Sumach	flowering plant
Aesculus hippocastanum L.	Horse-chestnut	flowering plant

Acer campestre L.	Field Maple	flowering plant
Acer platanoides L.	Norway Maple	flowering plant
Acer pseudoplatanus L.	Sycamore	flowering plant
Malva sylvestris L.	Common Mallow	flowering plant
Tilia L.	Lime	flowering plant
Tilia platyphyllos x cordata = T. x europaea L.	Lime	flowering plant
Capsella bursa-pastoris (L.) Medik.	Shepherd's-purse	flowering plant
Rorippa nasturtium-aquaticum (L.) Hayek	Water-cress	flowering plant
Armoracia rusticana P. Gaertn., B. Mey. & Scherb.	Horse-radish	flowering plant
Cardamine hirsuta L.	Hairy Bitter-cress	flowering plant
Cardamine pratensis L.	Cuckooflower	flowering plant
Lunaria annua L.	Honesty	flowering plant
Sisymbrium officinale (L.) Scop.	Hedge Mustard	flowering plant
Alliaria petiolata (M. Bieb.) Cavara & Grande	Garlic Mustard	flowering plant
Persicaria amphibia (L.) Delarbre	Amphibious Bistort	flowering plant
Persicaria maculosa Gray	Redshank	flowering plant
Polygonum aviculare L.	Knotgrass	flowering plant
Fallopia baldschuanica (Regel) Holub	Russian-vine	flowering plant
Fallopia convolvulus (L.) Á. Löve	Black-bindweed	flowering plant
Fallopia japonica (Houtt.) Ronse Decr.	Japanese Knotweed	flowering plant
Rumex acetosa L.	Common Sorrel	flowering plant
Rumex conglomeratus Murray	Clustered Dock	flowering plant
Rumex crispus L.	Curled Dock	flowering plant
Rumex obtusifolius L.	Broad-leaved Dock	flowering plant
Rumex sanguineus L.	Wood Dock	flowering plant
Stellaria holostea L.	Greater Stitchwort	flowering plant
Stellaria media (L.) Vill.	Common Chickweed	flowering plant
Cerastium fontanum Baumg.	Common Mouse-ear	flowering plant
Silene dioica (L.) Clairv.	Red Campion	flowering plant
Silene latifolia Poir.	White Campion	flowering plant
Chenopodium album L.	Fat-hen	flowering plant

Chenopodium polyspermum L.	Many-seeded Goosefoot	flowering plant
Atriplex L.	Orache	flowering plant
Atriplex prostrata Boucher ex DC.	Spear-leaved Orache	flowering plant
Cornus sanguinea L.	Dogwood	flowering plant
Impatiens glandulifera Royle	Indian Balsam	flowering plant
Galium aparine L.	Cleavers	flowering plant
Galium mollugo L.	Hedge Bedstraw	flowering plant
Convolvulus arvensis L.	Field Bindweed	flowering plant
Calystegia sepium (L.) R. Br.	Hedge Bindweed	flowering plant
Calystegia silvatica (Kit.) Griseb.	Large Bindweed	flowering plant
Solanum dulcamara L.	Bittersweet	flowering plant
Fraxinus excelsior L.	Ash	flowering plant
Ligustrum ovalifolium Hassk.	Garden Privet	flowering plant
Ligustrum vulgare L.	Wild Privet	flowering plant
Veronica anagallis-aquatica L.	Blue Water-Speedwell	flowering plant
Veronica beccabunga L.	Brooklime	flowering plant
Veronica chamaedrys L.	Germander Speedwell	flowering plant
Veronica montana L.	Wood Speedwell	flowering plant
Cymbalaria muralis P. Gaertn., B. Mey. & Scherb.	Ivy-leaved Toadflax	flowering plant
Linaria vulgaris Mill.	Common Toadflax	flowering plant
Plantago lanceolata L.	Ribwort Plantain	flowering plant
Plantago major L.	Greater Plantain	flowering plant
Hippuris vulgaris L.	Mare's-tail	flowering plant
Callitriche L.	Water-Starwort	flowering plant
Scrophularia auriculata L.	Water Figwort	flowering plant
Scrophularia nodosa L.	Common Figwort	flowering plant
Buddleja davidii Franch.	Butterfly-bush	flowering plant
Stachys palustris L.	Marsh Woundwort	flowering plant
Stachys sylvatica L.	Hedge Woundwort	flowering plant
Ballota nigra L.	Black Horehound	flowering plant
Lamium album L.	White Dead-nettle	flowering plant
Lamium purpureum L.	Red Dead-nettle	flowering plant
Ajuga reptans L.	Bugle	flowering plant
Glechoma hederacea L.	Ground-ivy	flowering plant
Odontites vernus (Bellardi) Dumort.	Red Bartsia	flowering plant

Ilex aquifolium L.	Holly	flowering plant
Arctium L.	Burdock	flowering plant
Arctium lappa L.	Greater Burdock	flowering plant
Arctium minus (Hill) Bernh.	Lesser Burdock	flowering plant
Cirsium arvense (L.) Scop.	Creeping Thistle	flowering plant
Cirsium palustre (L.) Scop.	Marsh Thistle	flowering plant
Cirsium vulgare (Savi) Ten.	Spear Thistle	flowering plant
Centaurea nigra L.	Common Knapweed	flowering plant
Lapsana communis L.	Nipplewort	flowering plant
Hypochaeris radicata L.	Cat's-ear	flowering plant
Leontodon autumnalis L.	Autumn Hawkbit	flowering plant
Leontodon hispidus L.	Rough Hawkbit	flowering plant
Picris echioides L.	Bristly Oxtongue	flowering plant
Sonchus arvensis L.	Perennial Sow-thistle	flowering plant
Sonchus asper (L.) Hill	Prickly Sow-thistle	flowering plant
Sonchus oleraceus L.	Smooth Sow-thistle	flowering plant
Lactuca serriola L.	Prickly Lettuce	flowering plant
Mycelis muralis (L.) Dumort.	Wall Lettuce	flowering plant
Taraxacum F.H. Wigg.	Dandelion Agg.	flowering plant
Taraxacum officinale agg.	Dandelion	flowering plant
Crepis capillaris (L.) Wallr.	Smooth Hawk's-beard	flowering plant
Aster novi-belgii L.	Confused Michaelmas-daisy	flowering plant
Bellis perennis L.	Daisy	flowering plant
Tanacetum vulgare L.	Tansy	flowering plant
Artemisia vulgaris L.	Mugwort	flowering plant
Achillea millefolium L.	Yarrow	flowering plant
Leucanthemum vulgare Lam.	Oxeye Daisy	flowering plant
Matricaria discoidea DC.	Pineappleweed	flowering plant
Tripleurospermum inodorum (L.) Sch. Bip.	Scentless Mayweed	flowering plant
Senecio erucifolius L.	Hoary Ragwort	flowering plant
Senecio jacobaea L.	Common Ragwort	flowering plant
Petasites hybridus (L.) P. Gaertn., B. Mey. & Scherb.	Butterbur	flowering plant
Sambucus nigra L.	Elder	flowering plant
Symphoricarpos albus (L.) S.F. Blake	Snowberry	flowering plant

Lonicera periclymenum L.	Honeysuckle	flowering plant
Hedera helix L.	Ivy	flowering plant
Anthriscus sylvestris (L.) Hoffm.	Cow Parsley	flowering plant
Aegopodium podagraria L.	Ground-elder	flowering plant
Oenanthe crocata L.	Hemlock Water-dropwort	flowering plant
Conium maculatum L.	Hemlock	flowering plant
Apium nodiflorum (L.) Lag.	Fool's-water-cress	flowering plant
Heracleum sphondylium L.	Hogweed	flowering plant
Torilis japonica (Houtt.) DC.	Upright Hedge-parsley	flowering plant
Daucus carota L.	Carrot	flowering plant
Symphytum officinale x asperum = S. x uplandicum Nyman	Russian Comfrey	flowering plant
Pentaglottis sempervirens (L.) Tausch ex L.H. Bailey	Green Alkanet	flowering plant
Myosotis scorpioides L.	Water Forget-me-not	flowering plant
Metzgeria furcata (L.) Dumort.	Forked Veilwort	liverwort
Schistidium crassipilum H.H.Blom	Thickpoint Grimmia	moss
Grimmia pulvinata (Hedw.) Sm.	Grey-cushioned Grimmia	moss
Fissidens taxifolius Hedw.	Common Pocket-moss	moss
Barbula convoluta Hedw.	Lesser Bird's-claw Beard-moss	moss
Barbula unguiculata Hedw.	Bird's-claw Beard-moss	moss
Didymodon nicholsonii Culm.	Nicholson's Beard-moss	moss
Tortula marginata (Bruch & Schimp.) Spruce	Bordered Screw-moss	moss
Tortula muralis Hedw.	Wall Screw-moss	moss
Tortula truncata (Hedw.) Mitt.	Common Pottia	moss
Hennediella stanfordensis (Steere) Blockeel	Stanford Screw-moss	moss
Syntrichia intermedia Brid.	Intermediate Screw-moss	moss

Zygodon viridissimus (Dicks.) Brid.	Green Yoke-moss	moss
Orthotrichum affine Brid.	Wood Bristle-moss	moss
Orthotrichum diaphanum Brid.	White-tipped Bristle-moss	moss
Bryum argenteum Hedw.	Silver-moss	moss
Bryum capillare Hedw.	Capillary Thread-moss	moss
Amblystegium serpens (Hedw.) Bruch, Schimp. & W.Guembel	Creeping Feather-moss	moss
Amblystegium varium (Hedw.) Lindb.	Willow Feather-moss	moss
Leptodictyum riparium (Hedw.) Warnst.	Kneiff's Feather-moss	moss
Eurhynchium praelongum (Hedw.) Bruch, Schimp. & W.Guembel	Common Feather-moss	moss
Rhynchostegium confertum (Dicks.) Bruch, Schimp. & W.Guembel	Clustered Feather-moss	moss
Rhynchostegiella tenella (Dicks.) Limpr.	Tender Feather-moss	moss
Oxyrrhynchium hians (Hedw.) Loeske	Swartz's Feather-moss	moss
Brachythecium albicans (Hedw.) Bruch, Schimp. & W.Guembel	Whitish Feather-moss	moss
Brachythecium rutabulum (Hedw.) Bruch, Schimp. & W.Guembel	Rough-stalked Feather-moss	moss
Calliergonella cuspidata (Hedw.) Loeske	Pointed Spear-moss	moss
Hypnum cupressiforme Hedw.	Cypress-leaved Plait-moss	moss

Notes:

*1 A planted specimen of Black Poplar (*Populus nigra*) beside the Watersedge Estate adjacent to the Bonesgate Stream, may belong to the 'native' subspecies '*betulifolia'*. However, this area of land was not examined in any detail, as it was added to the area to be covered by the management plan after field surveys has been completed. This therefore requires confirmation.

*2 In the same area of land as the above, a planted tree of what appears to be the '*fastigiata'* variety of *Quercus robur* was noted ('Cypress Oak' in Mitchell, 1978).

Fauna

Vertebrates

Birds

The list of birds has been compiled from sightings by Karl Crowther (KAC) during 2004 whilst undertaking the habitat survey, together with information supplied by Paul Brayshaw (PB) outlining birds noted by him along the Hogsmill during October 2004. A few additional records have been obtained from the Surrey Wildlife Trust (SWT) survey of the Hogsmill during July of 1998. A single additional record (for "Redshank") has been gleaned from the Environmental Report of the Hogsmill River Rehabilitation Project (Anon, 2005), which includes some land outside the Local Nature Reserve boundary, and so could relate to this area instead. Records from Timothy Tompkins since 2007 have been added to the list. Some records just relate to birds flying over the reserve and aren't necessarily breeding residents or common visitors.

Latin name	**Common Name**
Cygnus olor	Mute Swan
Anser anser (Linnaeus, 1758)	Greylag Goose
Branta canadensis (Linnaeus, 1758)	Canada Goose
Branta bernicla (Linnaeus, 1758)	Brent Goose
Aix galericulata (Linnaeus, 1758)	Mandarin Duck
Anas penelope Linnaeus, 1758	Wigeon
Anas crecca Linnaeus, 1758	Teal
Anas platyrhynchos Linnaeus, 1758	Mallard
Aythya ferina (Linnaeus, 1758)	Pochard
Aythya fuligula (Linnaeus, 1758)	Tufted Duck
Oxyura jamaicensis (Gmelin, 1789)	Ruddy Duck
Ardea cinerea Linnaeus, 1758	Grey Heron
Egretta garzetta (Linnaeus, 1766)	Little Egret
Phasianus colchicus Linnaeus, 1758	Pheasant
Tachybaptus ruficollis (Pallas, 1764)	Little Grebe
Phalacrocorax carbo (Linnaeus, 1758)	Cormorant
Accipiter nisus (Linnaeus, 1758)	Sparrowhawk
Buteo buteo (Linnaeus, 1758)	Buzzard
Falco tinnunculus Linnaeus, 1758	Kestrel
Falco columbarius Linnaeus, 1758	Merlin
Falco subbuteo Linnaeus, 1758	Hobby
Falco peregrinus Tunstall, 1771	Peregrine
Rallus aquaticus (Linnaeus, 1758)	Water Rail
Gallinula chloropus (Linnaeus, 1758)	Moorhen
Fulica atra Linnaeus, 1758	Coot
Pluvialis apricaria (Linnaeus, 1758)	Golden Plover
Vanellus vanellus (Linnaeus, 1758)	Lapwing

Calidris alpina (Linnaeus, 1758)	Dunlin
Gallinago gallinago (Linnaeus, 1758)	Snipe
Scolopax rusticola Linnaeus, 1758	Woodcock
Numenius phaeopus (Linnaeus, 1758)	Whimbrel
Numenius arquata (Linnaeus, 1758)	Curlew
Tringa totanus (Linnaeus, 1758)	Redshank
Tringa nebularia (Gunnerus, 1767)	Greenshank
Tringa ochropus Linnaeus, 1758	Green Sandpiper
Larus melanocephalus Temminck, 1820	Mediterranean Gull
Larus canus Linnaeus, 1758	Common Gull
Larus argentatus Pontoppidan, 1763	Herring Gull
Rissa tridactyla (Linnaeus, 1758)	Kittiwake
Sterna hirundo Linnaeus, 1758	Common Tern
Columba oenas Linnaeus, 1758	Stock Dove
Columba palumbus Linnaeus, 1758	Woodpigeon
Streptopelia decaocto (Frivaldszky, 1838)	Collared Dove
Streptopelia turtur (Linnaeus, 1758)	Turtle Dove
Cuculus canorus Linnaeus, 1758	Cuckoo
Athene noctua (Scopoli, 1769)	Little Owl
Strix aluco Linnaeus, 1758	Tawny Owl
Apus apus (Linnaeus, 1758)	Swift
Alcedo atthis (Linnaeus, 1758)	Kingfisher
Picus viridis Linnaeus, 1758	Green Woodpecker
Dendrocopos major (Linnaeus, 1758)	Great Spotted Woodpecker
Dendrocopos minor (Linnaeus, 1758)	Lesser Spotted Woodpecker
Acrocephalus schoenobaenus (Linnaeus, 1758)	Sedge Warbler
Acrocephalus scirpaceus (Hermann, 1804)	Reed Warbler
Phylloscopus collybita (Vieillot, 1817)	Chiffchaff
Phylloscopus trochilus (Linnaeus, 1758)	Willow Warbler
Alauda arvensis Linnaeus, 1758	Skylark
Riparia riparia (Linnaeus, 1758)	Sand Martin
Hirundo rustica Linnaeus, 1758	Swallow
Delichon urbicum (Linnaeus, 1758)	House Martin
Anthus pratensis (Linnaeus, 1758)	Meadow Pipit
Motacilla flava Linnaeus, 1758	Yellow Wagtail
Motacilla cinerea Tunstall, 1771	Grey Wagtail
Motacilla alba subsp. alba Linnaeus, 1758	White Wagtail

Motacilla alba subsp. yarrellii Gould, 1837	Pied Wagtail
Troglodytes troglodytes (Linnaeus, 1758)	Wren
Erithacus rubecula (Linnaeus, 1758)	Robin
Turdus merula Linnaeus, 1758	Blackbird
Turdus pilaris Linnaeus, 1758	Fieldfare
Turdus philomelos Brehm, 1831	Song Thrush
Turdus iliacus Linnaeus, 1766	Redwing
Turdus viscivorus Linnaeus, 1758	Mistle Thrush
Muscicapa striata (Pallas, 1764)	Spotted Flycatcher
Sylvia atricapilla (Linnaeus, 1758)	Blackcap
Sylvia borin (Boddaert, 1783)	Garden Warbler
Sylvia curruca (Linnaeus, 1758)	Lesser Whitethroat
Sylvia communis Latham, 1787	Whitethroat
Regulus regulus (Linnaeus, 1758)	Goldcrest
Regulus ignicapilla (Temminck, 1820)	Firecrest
Aegithalos caudatus (Linnaeus, 1758)	Long-tailed Tit
Cyanistes caeruleus (Linnaeus, 1758)	Blue Tit
Parus major Linnaeus, 1758	Great Tit
Periparus ater (Linnaeus, 1758)	Coal Tit
Sitta europaea Linnaeus, 1758	Nuthatch
Certhia familiaris Linnaeus, 1758	Treecreeper
Garrulus glandarius (Linnaeus, 1758)	Jay
Pica pica (Linnaeus, 1758)	Magpie
Corvus monedula Linnaeus, 1758	Jackdaw
Corvus frugilegus Linnaeus, 1758	Rook
Corvus corone Linnaeus, 1758	Carrion Crow
Sturnus vulgaris Linnaeus, 1758	Starling
Passer domesticus (Linnaeus, 1758)	House Sparrow
Acanthis flammea (Linnaeus, 1758)	Common (Mealy) Redpoll
Linaria cannabina (Linnaeus, 1758)	Linnet
Spinus spinus (Linnaeus, 1758)	Siskin
Fringilla coelebs Linnaeus, 1758	Chaffinch
Carduelis chloris (Linnaeus, 1758)	Greenfinch
Carduelis carduelis (Linnaeus, 1758)	Goldfinch
Loxia curvirostra Linnaeus, 1758	Common Crossbill
Pyrrhula pyrrhula (Linnaeus, 1758)	Bullfinch
Emberiza schoeniclus (Linnaeus, 1758)	Reed Bunting

Note: The record for Redshank* may have originated through confusion with the vascular plant *Persicaria maculosa* with the same vernacular name within records held on Surrey Wildlife Trust's Recorder database.

Mammals
Records from KAC, 2004; Watersedge Bat Survey (Steve Bailey, 2005); Dave Williams (pers. comm.) Peter Howarth and Stewart Cocker survey 2015.

Key to status:
WCA Schedule 5 = Species listed on Schedule 5 of the Wildlife and Countryside Act, 1981
ECHD (IV) = Species listed on Annex IV of the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive')

Common name	**Latin name**	**Conservation status**	**Comments**
Brown Rat	*Rattus norvegicus*		(HM) (DW)
Fox	*Vulpes vulpes*		Seen occasionally (KAC) after heavy rain (few people about) (HM)
Grey Squirrel	*Sciurus carolinensis*		Fairly common (both sites) (KAC)
Badger	*Meles meles*	Protection of Badgers Act, 1992, and the Wildlife and Countryside Act, 1981	
Common Pipistrelle	*Pipistrellus pipistrellus*	WCA Schedule 5; ECHD (IV)	Frequent foraging activity at Watersedge (SB)
Noctule	*Nyctalus noctula*	WCA Schedule 5; ECHD (IV)	Site represents part of regularly-used flight line (SB)
Soprano Pipistrelle	*Pipistrellus pygmaeus*	WCA Schedule 5; ECHD (IV)	Foraging activity at Watersedge (SB)
Non-determined myotid bat*[1]	*Myotis* sp.	Not known (but all bats are WCA Schedule 5 and ECHD (IV)	Possible record of single bat in transit at Watersedge (SB)

Notes:
*[1] This is considered most likely to be Daubenton's (*Myotis daubentonii*)

Fish

Records extracted from Environmental Report of Hogsmill River Rehabilitation Project (Anon, 2005) and EA fisheries survey at Chamber Mead, Oakland Way and Worcester Park Road (2016).

Key to status:

ECHD (II) = Listed on an Annex II to the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive').

Common name	**Latin name**
Bullhead	*Cottus gobio*
European Eel	*Anguilla anguilla*
3-spined Stickleback	*Gasterosteus aculeatus*
Minnow	*Phoxinus phoxinus*
Chub	*Squalius cephalus*
Rudd	*Scardinius erythrophthalmus*
Dace	*Leuciscus leuciscus*
Gudgeon	*Gobio gobio*
Roach	*Rutilus rutilus*

Herptiles

No records known (this undoubtedly reflects a lack of records rather than an absence of herptiles).

Invertebrates

Records come mainly from the Surrey Wildlife Trust (SWT) SNCI survey of 1998, with a few from Stewart Cocker (SC) and Karl Crowther (KAC) during 2004. In addition, a small number of records from 2005 from Martin Skipper (MS) and Ian Menzies (ISM). The butterfly transect has been walked since 2011 by volunteers including Bob and Carole Guille, Pam Harwood, Pat Lowe and Robb Reeves.

Key to Status:

RDB = Nationally rare species, recorded in 1-15 national hectads (RDB1 = endangered; RDB2 = vulnerable; RDB3 = rare).

Odonata (Dragonflies and Damselflies)	
Latin Name	**Common Name**
Calopteryx splendens (Harris, 1782)	Banded Demoiselle
Calopteryx virgo (Linnaeus, 1758)	Beautiful Demoiselle
Coenagrion puella (Linnaeus, 1758)	Azure Damselfly
Enallagma cyathigerum (Charpentier, 1840)	Common Blue Damselfly
Sympetrum striolatum	Common Darter
Pyrrhosoma nymphula	Large Red Damselfly
Coleoptera (Beetles)	
Lucanus cervus (Linnaeus, 1758)	Stag Beetle
Clitosthetus arcuatus	A ladybird
Coccinella 7-punctuta	7-spot Ladybird
Lepidoptera (Butterflies and moths)	
Gonepteryx rhamni (Linnaeus, 1758)	Brimstone
Anthocharis cardamines subsp. britannica Verity, 1908	Orange-tip
Thecla betulae (Linnaeus, 1758)	Brown Hairstreak
Satyrium w-album (Knoch, 1782)	White-letter Hairstreak
Lycaena phlaeas (Linnaeus, 1761)	Small Copper
Polyommatus icarus (Rottemburg, 1775)	Common Blue
Celastrina argiolus subsp. britanna (Verity, 1919)	Holly Blue
Vanessa atalanta (Linnaeus, 1758)	Red Admiral
Aglais urticae (Linnaeus, 1758)	Small Tortoiseshell
Polygonia c-album (Linnaeus, 1758)	Comma
Pararge aegeria subsp. oblita Harrison, 1949	Speckled Wood

Maniola jurtina (Linnaeus, 1758)	Meadow Brown
Aphantopus hyperantus (Linnaeus, 1758)	Ringlet
Polygonia c-album	Comma
Pieris napi	Green-veined white
Thymelicus sylvestris	Small Skipper
Ochlodes sylvanus	Large Skipper
Thymelicus lineola	Essex Skipper
Pieris rapae	Small White
Pieris brassicae	Large White
Argynnis paphia	Silver Washed Fritillary
Limenitis camilla	White Admiral
Coenonympha pamphilus	Small Heath
Melanargia galathea	Marbled White
Aglais io	Peacock
Pyronia tithonus	Gatekeeper
Hemiptera (Bugs)	
Velia caprai	Water Cricket
Hymenoptera (Ants, Bees, Wasps)	
Vespula vulgaris	Common wasp
Crustaceans	
Gammarus pulex	Freshwater Shrimp
Annelids	
Dina lineata	A leech

Appendix IV – Byelaws

The following byelaws are for Alexandra Recreation Ground, Auriol Recreation Ground Court Recreation Ground, Ewell Court Recreation Ground (Poole Road), Gibraltar Recreation Ground, Rosebery Park, Shadbolt Park, and the Hogsmill Open Space.

With respect to **pleasure grounds and open spaces** made under Section 164 of the Public Health Act, 1875, and Section 15 of the Open Spaces Act, 1906, by the Mayor Aldermen and Burgesses of the Borough of Epsom and Ewell acting by the Council with respect to the PLEASURE GROUNDS AND OPEN SPACES.

1. Throughout these Byelaws the expression "the Council" means the Mayor, Aldermen and Burgesses of the Borough of Epsom and Ewell acting by the Council and the expression "The pleasure ground" means except where inconsistent with the context, each of the pleasure grounds and open spaces known as Alexandra Road, Auriol, Court, Ewell Court, and Gibraltar Recreation Grounds, Rosebery Park, Shadbolt Park and Hogsmill Open Space.

2. An act necessary to the proper execution of his duty in the pleasure ground by an officer of the Council or by any person employed by the Council shall not be deemed an offence against these Byelaws.

3. A person shall not in the pleasure ground
(a) carelessly or negligently deface, injure or destroy any wall or fence in or enclosing the pleasure ground, or any building, barrier, railing, post or seat or any erection or ornament;
(b) climb any wall or fence in or enclosing the pleasure ground, or any tree, or any barrier, railing, post, or other erection;
(c) wilfully, carelessly, or negligently remove or displace any barrier, railing, post or seat, or any part of any erection or ornament, or any implement, provided for use in the laying out or maintenance of the pleasure ground.

4. A person shall not bring or cause to be brought into the pleasure ground any cattle, sheep, goats, or pigs, or any beast of draught or burden, unless, in pursuance of an agreement with the Council, or otherwise in the exercise of any lawful right or privilege, he is authorised to do so.

5.
(a) A person shall not ride any bicycle or horse in the pleasure ground.
(b) A person shall not bring or cause or be brought into the pleasure ground any barrow, truck, machine, or vehicle, unless intended for the conveyance of a child or children or an invalid.
Provided that, where the Council set apart a space in the pleasure ground for the use of vehicles, this Byelaw shall not be deemed to prohibit the driving or wheeling in or to that space of vehicles of the class for which it is set apart.

Provided also that this Byelaw shall not be deemed to prohibit the wheeling of any bicycle or other similar machine on any footpath in the pleasure ground.

6. A person who brings a machine or vehicle into the pleasure ground shall not wheel or station it over or upon
(i) any flower bed, shrub, or plant, or any ground in course of preparation as a flower bed, or for the growth of any tree, shrub, or plant;
(ii) any part of the pleasure ground where the Council by a notice board affixed or set up in some conspicuous position in the pleasure ground prohibit its being wheeled or stationed.

7. A person shall not in the pleasure ground walk, run, stand, sit, or lie upon
(i) any grass, turf, or other place where adequate notice to keep off such grass, turf, or other place shall be placed.
Provided that such notice shall not apply to more than one-sixth of the area of the pleasure ground.
(ii) any flower bed, shrub, or plant, or any ground in course of preparation as a flower bed, or for the growth of any tree, shrub or plant.

8. A person shall not in the pleasure ground
(i) remove, cut, or displace any soil, turf, or plant;
(ii) pluck any bud, blossom, flower, or leaf of any tree, shrub, or plant.

9. A person shall not in the pleasure grounds known as Ewell Court Recreation Ground, Rosebery Park, and Shadbolt Park
(i) bathe, or wash, in the ornamental lake, or other water;
(ii) wilfully, carelessly, or negligently foul or pollute any such water;
(iii) take, injure, or destroy, or attempt to take, injure, or destroy any fish in any such water, or wilfully disturb or worry any waterfowl; provided that this Byelaw shall not be deemed to apply in any case where a person has obtained the permission of the Council to fish in the lake in the pleasure ground known as Ewell Court Recreation Ground.

10. A person shall not cause or suffer any dog belonging to him or in his charge to enter or remain in the pleasure ground, unless such dog be and continue to be under proper control, and be effectually restrained from causing annoyance to any person, and from worrying or disturbing any animal or waterfowl, and from entering any ornamental water.

11. Where the Council set apart any such part of the pleasure ground as may be fixed by the Council, and described in a notice board affixed or set up in some conspicuous position in the pleasure ground, for the purpose of any game specified in the notice board, which by reason of the rules or manner of playing, or for the prevention of damage, danger, or discomfort to any person in the pleasure ground may necessitate, at any time during the continuance of the game, the exclusive use by the player or players of any space in such part of the pleasure ground - a person shall not in any space elsewhere in the pleasure ground play or take part in any game so specified in such a manner as to exclude persons not playing or taking part in the game from the use of such space.

12. A person resorting to the pleasure ground and playing or taking part in any game for which the exclusive use of any space in the pleasure ground has been set apart shall
(i) not play on the space any game other than the game for which it is set apart;
(ii) in preparing for playing and in playing, use reasonable care to prevent undue interference with the proper use of the pleasure ground by other persons;
(iii) when the space is already occupied by other players not begin to play thereon without their permission;
(Iv) where the exclusive use of the space has been granted by the Council for the playing of a match, not play on that space later than a quarter of an hour before the time fixed for the beginning of the match unless he is taking part therein;
(v) except where the exclusive use of the space has been granted by the Council for the playing of a match in which he is taking part, not use the space for a longer time than two hours continuously, if any other player or players make known to him a wish to use the space.

13. A person shall not in any part of the pleasure ground which may have been set apart by the Council for any game play or take part in any game when the state of the ground or other cause makes it unfit for use and a notice is set up in some conspicuous position prohibiting play in that part of the pleasure ground.

14. A person shall not in the pleasure ground
(i) except as hereinafter provided erect any post, rail, fence, pole, tent, booth, stand, building, or other structure.
Provided that this prohibition shall not apply where upon an application to the Council they grant permission to erect any post, rail, fence, pole, tent, booth, stand, building, or other structure, upon such occasion and for such purposes as are specified in the application;
(ii) beat, shake, sweep, brush, or cleanse any carpet, drugget, rug, or mat, or any other fabric retaining dust or dirt;
(iii) hang, spread, or deposit any linen or other fabric for drying or bleaching.

15. A person shall not in the pleasure ground wilfully obstruct, disturb, interrupt, or annoy any other person in the proper use of the pleasure ground, or wilfully obstruct, disturb, or interrupt any officer of the Council in the proper execution of his duty, or any person or servant of any person employed by the Council in the proper execution of any work in connection with the laying out or maintenance of the pleasure ground.

16. Every person who shall offend against any of these Byelaws shall be liable on summary conviction to a fine not exceeding two pounds.

17. Every person who shall infringe any Byelaw for the regulation of the pleasure ground may be removed therefrom by any officer of the Council, or by any constable, in any one of the several cases hereinafter specified: that is to say -
(i) Where the infraction of the Byelaw is committed within the view of such officer or constable, and the name and residence of the person infringing the

Byelaws are unknown and cannot be readily ascertained by such officer or constable;
(ii) where the infraction of the Byelaw is committed within the view of such officer or constable, and, from the nature of such infraction, or from any other fact of which such officer or constable may have knowledge, or of which he may be credibly informed there may be reasonable ground for belief that the continuance in the pleasure ground of the person infringing the Byelaw may result in another infraction of a Byelaw, or that the removal of such person from the pleasure ground is otherwise necessary as a security for the proper use and regulation thereof.

The Common Seal of the Mayor Aldermen and Burgesses of the Borough of Epsom and Ewell was here-unto affixed in pursuance of a resolution passed at a meeting of the Council duly convened and held on the 26th day of July, 1949, in the presence of

F. TOMLIN,
Mayor.

EDWARD MOORE,
Town Clerk.

I hereby confirm the foregoing byelaws and fix the date upon which they are to come into operation as the 1st November, 1949.

J. CHUTER EDE,
One of His Majesty's
Principal Secretaries of State.
Whitehall, 1st October, 1949

BYELAWS

Made under Section 164 of the Public Health Act 1875 Section 15 of the Open Spaces Act 1906 and Section 92 and Schedule 3 of the Criminal Justice Act 1967, by the Mayor Aldermen and Burgesses of the Borough of Epsom and Ewell acting by the Council with respect to the PLEASURE GROUNDS AND OPEN SPACES.

1. In these Byelaws 'the Byelaws of 1949' means the series of Byelaws made by the Council of the Borough of Epsom and Ewell on the 26th day of July, 1949, and confirmed by the Home Secretary on the 1st day of October, 1949.

2. From and after the date upon which these Byelaws come into operation for the words 'two pounds' contained in Byelaw 16 of the Byelaws of 1949 there shall be substituted the words **'twenty pounds'.**

3. These Byelaws shall be read and construed as one with the Byelaws of 1949. THE COMMON SEAL of the Mayor Aldermen and Burgesses of the Borough of Epsom and Ewell was hereunto affixed in pursuance of A resolution passed

at a meeting of the Council duly convened and held on the 12th day of December, 1968 in the presence of

T. G. HOILAND
Mayor.

EDWARD MOORE
Town Clerk.

The Secretary of State this day confirmed the foregoing byelaws and fixed the date on which they are come into operation as 1st June 1969.

N. CAIRNCROSS
An Assistant Under Secretary of State
Home Office
Whitehall
29th April, 1969