Appendix 1.2.13.

Thurrock Biodiversity Study 2006 - 2011

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INDEX

1. INTRODUCTION

1.1 General Introduction 1

1.2 Background 3

2. OVERVIEW OF THURROCK

2.1 Recent Changes 5

2.2 Other Changes, Opportunities and Issues 6

2.3 BAP Resources Within Thurrock 6

2.3.1 Habitats 7
2.3.2 Species 14
2.3.3 Other BAP Issues 18
2.3.4 Summary of BAP Action Points 19

2.4 The Role of Local Wildlife Sites 20

2.5 Discussion of Local Wildlife Sites 21

2.6 Introduction to Wildlife Corridors 22

2.6.1 Corridor Requirements 23
2.6.2 Wildlife Corridors in Thurrock 26
2.6.3 Planning for the Future 28

References and Selected Bibliography

Glossary of Abbreviations

MAP1 Primary Corridors/Barriers

Appendix 1 Development of Local Wildlife Site Selection Criteria In Essex
Appendix 2 Species Indicative of Ancient Woodland In Essex
Appendix 3 Species Indicative of Old, Unimproved Neutral/Acid Grassland and Marsh In Essex
Appendix 4 Indicative Chalk Grassland Plants
Appendix 5 Evolution of Local Nature Conservation Initiatives
Appendix 6 Local Wildlife Sites Register
Appendix 7 Tables and Maps of Potential Local Wildlife Sites
Appendix 8 A Review Of Thurrock SSSIs Within The Local Wildlife Site Framework

GREENGRID WILDLIFE STRATEGY FOR THURROCK

1. INTRODUCTION

1.1 General Introduction

Lying at the centre of the Thames Gateway, Thurrock is a key growth area that is set to undergo significant change. The next 15 years will see large numbers of additional houses plus development for employment. The protection and enhancement of those elements of the environment which give Thurrock its positive identity, including its ecological character, will be a critical aspect of the Greengrid and will influence the views of those who live and work in the area, as well as those passing through or considering investing. The East of England Plan Regional Spatial Strategy (RSS14), which was first produced in 2004, encourages local authorities to,

> **"sustain and improve the quality of life for all people who live in, work in, or visit the region, by developing a more sustainable, prosperous and outward-looking region, while respecting its diversity and enhancing its assets".**

With respect to the proper conservation of an areas natural assets, The Natural Environment and Rural Communities Act 2006 places a duty on public bodies [Section 40(1)] to consider biodiversity:

> **"Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity".**

Appendix 5 provides a more detailed summary of the evolution of UK and EU legislation and central government advice on incorporating wildlife conservation within the planning system.

In some ways, Thurrock represents a microcosm of neighbouring Essex: a sparsely populated and largely arable north, a densely populated south and north-east, and a zone of former and current grazing marshes along the southern and eastern coastal zones. This vastly differing countryside character in such a relatively small area creates a particularly demanding environment in which to balance nature conservation, sustainable development and quality of life issues for local residents.

In other ways, Thurrock is unique: it is a strange quirk of Thurrock's topography, geology and climate that a large number of the most important wildlife areas are within the urban zone, rather than the open countryside. The main exception to this is the complex of woodland and grassland either side of One Tree Hill in the Langdon Hills. It is within the urban environs of Grays, Purfleet, West Thurrock and Tilbury that one can find sites that are of at least regional if not national importance for their invertebrate populations, giving rise to significant potential for conflict with the development pressure in the Thames Gateway, being one of the Government's Growth Areas. One of the key factors in this phenomenon is the ridge of Thames Terrace sand and gravel deposits that run east-west across the southern part of the borough and then swinging north-east towards Basildon. Much of the wildlife value of these areas now lies at the fringe of previous industrial action (included within the term "brownfield land") i.e. quarrying of sand, gravel and chalk, and one is left to marvel at what the area's wildlife might have looked like before the industrial revolution.

Such areas of "waste ground" are invariably targeted for re-development in preference to siting proposals on greenfield land, and there is some justification in doing so in order to limit urban sprawl into greenbelt land. However, there is an urgent need to consider the ecology of brownfield land before decisions about a site's future are made, since this habitat supports some of the rarest species nationally and are often biodiversity "hotspots" in terms of the number of plants and animals they can support, several of which are the subject of national Biodiversity Action Plans aimed at halting their decline. The wildlife value of brownfield sites often lies in their invertebrate interest, with a very high number of animals that are not observed by the general public and often not visually appealing and as a result not always considered in ecological assessments of sites being proposed for re-development.

In order to address the potential conflicts between ecological value, development pressure and visual appearance, it is important that biodiversity is considered as an integral part of Thurrock's environment and local character. Protecting our ecological resource and ensuring that it is given proper weight in decisions regarding land-use and land management is critical. Identifying the biodiversity resource, making provision for its protection and management and providing additional biodiversity opportunities through, for example, site layout, the provision of landscape infrastructure and amenity space, building design and sustainable drainage systems should be recognised and undertaken as an integral part of the development process.

The Thurrock Biodiversity Study 2006-2011 will assist in achieving this. It is one of a series of broad environmental appraisals undertaken by Thurrock Council as part of the development of its Greengrid Strategy. This Strategy embraces the total human environment in terms of recreational opportunities, cycle and pedestrian infrastructure, urban and sub-urban landscapes and intrinsic "quality of life" factors, as well as the natural world, which is the main focus of this present report. The inter-connections between these facets are extremely complex. In an ideal world, any one piece of "green space", open land or semi-natural vegetation would help to fulfil all of these functions, but that is rarely the case. Many important wildlife sites, in Thurrock and Essex in general, are not especially attractive to the human eye, but their value to biodiversity in Thurrock and the UK should not be under-valued because of this. Conversely, many important open spaces, recreational routes and landscape features are not of significant wildlife value, although not without some local wildlife interest and of value in retaining some contact between increasingly urbanised populations and "the countryside". One of the fundamental roles of the Greengrid strategy is to recognise this fact and to strike a balance between these differing demands being placed upon the land in Thurrock. The Greengrid Wildlife Strategy presented here is a distillation of the Biodiversity Study carried out by Essex Ecology Services Ltd for Thurrock Council in 2006.

This study comprised:

- A land use survey of the whole borough;
- An appraisal of wildlife resources in terms of the draft Thurrock Biodiversity Action Plan;
- Consideration of the major implications for wildlife within Thurrock in terms of previous land management and future development plans;
- The identification of a network of Local Wildlife Sites as the critical wildlife resource of the borough.

Stanford Marshes

Langdon Hills County Park

1.2 Background

Nationally, concerns over the state of the countryside, the loss of ancient habitats and species diversity have grown primarily since the first half of the 20th Century. Mechanised farming, the demand for more economical food production and the advent of modern pesticides and herbicides began to take a heavy toll on the country's wildlife habitats. This has been compounded by urban expansion, flourishing trunk road networks and industrial expansion.

The overall trend during this period was a transition from a countryside in which wildlife still flourished in a matrix of small fields with bountiful hedgerows, flower-rich meadows and woodlands towards a situation today where wildlife is generally perceived to be surviving in a limited number of "oases", surrounded by seas of relatively inhospitable farmland or urban sprawl. Initially, the response to this perceived situation was to declare some of these wildlife oases as nature reserves. It was soon realised, however, that nature conservation was not sustainable by confining it to a limited number of key sites, important though these are. Key nature reserves still interact with the wildlife habitats around them, thus, whilst such sites are the "jewels of the crown", nevertheless one needs the more mundane metal of the crown to hold it all together. Sustainable nature conservation depends on a matrix of important wildlife sites, some of national significance, others of more local interest but vital in their support of the key sites, as well as appropriate means by which plants and animals can move between them, as a shared and mixing gene pool. Local Wildlife Sites are an important component in this matrix of sites, identified to safeguard a "reasonable" network of valuable wildlife sites which, together with the nationally designated Sites of Special Scientific Interest, might act as the fundamental building blocks for nature conservation in the area (see Appendix 1). The concept of wildlife corridors has evolved to address the means by which plants and animals can move between these important wildlife sites, although the concept of a matrix rather than of linear "corridors" is a rather better descriptor of what is needed.

This principle was recognised by English Nature (now part of Natural England) in relation to the crucial support given to statutorily protected SSSIs (Sites of Special Scientific Interest) by the Local Wildlife Site networks, stating (English Nature, 2002) that:

> **"nature conservation objectives and the maintenance of the biological and geological richness cannot be delivered through a statutory sites system alone. Although SSSIs play a key role in maintaining biodiversity …many other sites support features and populations of species, which contribute to the overall distribution, and abundance of the nature conservation resource".**

In 1992 the United Nations Conference on Environment and Development ("The Earth Summit" or "Rio Summit") paved the way for global nature conservation measures with a mechanism that could allow for its translation down to the scale of individual nations, counties and even local authorities. Within the UK, this has resulted in the formulation of Biodiversity Action Plans (BAPs), an initiative that is of fundamental importance to the future of nature conservation in the Thames Gateway.

The BAP programme now underlies the philosophy behind the selection of Local Wildlife Sites in Essex. Indeed, the instigation of biodiversity action planning at a national, regional and local level is one of the most fundamental changes to have impacted upon how we perceive nature conservation issues in the UK. Local BAPs, such as that produced by Thurrock Council and the Thurrock Biodiversity Action Group (TBAG), allow for the recognition and hopefully the conservation of local distinctiveness within the flora and fauna of an area, whilst also clarifying the framework within which local conservation initiatives

help to contribute to the achievement of regional or national BAP objectives in a far wider context.

The Rio summit generated the motto "think globally, act locally". In other words, for the world leaders attending the summit, the message was: help look after the planet by looking after your own country. This philosophy can be readily focussed down to a local scale by suggesting that each local authority can help conserve the distinctive flora and fauna of its own region by formulating plans, policies and safeguards for their own area of jurisdiction. One of the fundamental aims of this Thurrock Biodiversity Study has been to explore what is unique, intrinsically interesting or appealing and of overall nature conservation value within Thurrock and to set in place via the Local Development Framework suitable mechanisms by which such places can be conserved, enhanced and protected for future generations.

Central government advice is that BAP policies and targets, particularly relating to habitat BAPs, should be built into local planning policies and guidelines and can be used to encourage the selection of some sites for priority attention for active management, protection through the planning system and possibly identification as Local Wildlife Sites. Key Principle 9 of PPS9 (Planning Policy Statement 9) states that,

> **"Sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and Local Sites, have a fundamental role to play in meeting overall national biodiversity targets; contributing to the quality of life and the well being of the community; and in supporting research and education. Criteria-based policies should be established in local development documents against which proposals for any development on, or affecting, such sites will be judged. These policies should be distinguished from those applied to nationally important sites".**

2. OVERVIEW OF THURROCK

2.1 Recent Changes

The Essex Wildlife Trust undertook an appraisal of the Thurrock countryside in 1992 and this now allows for a review of changes in the extent and quality of key wildlife features.

Housing Development at Chafford Hundred

One of the most significant changes has clearly been the further development of the Chafford Hundred housing project. This was still in its earlier phases in the early 1990s and the extensive Mill Wood Pit was largely open ground, teeming with nationally rare and scarce invertebrates and home to a suite of chalk grassland plants that were scarce in an Essex context. This pit has been effectively lost, with only a few boundary features remaining, although these do retain some of the characteristic species previously recorded from within the pit. The Chafford Hundred development is now nearing its end and a number of residual chalk pits have been passed to the Essex Wildlife Trust as the Chafford Gorges Nature Park.

Chafford Gorges Nature Park

These sites, many of which have now been selected as Local Wildlife Sites, are important remnants of this so-called "brownfield" habitat that was formerly widespread in this part of the borough (see below for a further explanation of brownfield land). The pressures on remaining fragments outside of the nature park will increase, both in terms of development pressure and also recreational pressure resultant from the rapid growth of a large urban population.

Restoration of Landfill and Minerals Sites

Another striking feature of the land use data from the early 1990s was the extent of "waste ground" recorded then, equalling nearly 10% of the total area. This was largely the result of the very extensive and still very active landfill sites around East Tilbury, Mucking and Aveley. Today, as some of these tips near the latter stages of their working lives, the landscape is being softened by restoration and re-landscaping schemes that offer huge potential for wildlife. It is one of the interesting facets of the Thames Terrace grassland invertebrate populations that they have been able to exploit these new areas of habitat, whilst they still support a flower-rich weedy flora with areas of bare ground. Their ability to find, colonise and exploit these new brownfield locations could be cause for optimism for the conservation of these scarce invertebrates, were it not for a new pressure being brought to bear upon them: "restoration" by capping them with top soil and often re-planting with trees to form visually more pleasing but ecologically impoverished recreation areas or low-grade pasture.

Change of Land-use along the River Front

Dramatic changes in industrial use have also affected the skyline and land use of the extreme south-east, beyond Corringham, with the dismantling of several square kilometres of oil-industry related installations. Already, a characteristic brownfield flora and fauna is moving in but their stay may be short-lived as the site is being proposed as a large new container terminal.

2.2 Other Changes, Opportunities and Issues

Bulphan Fen

Away from this urban intensification to the south and new landform creation along the eastern coast, land use change has been relatively slight. The broad, low Bulphan Fen area is a surprisingly remote agricultural area despite its close proximity to the huge centre of population around Grays. It offers great opportunities for wildlife habitat creation and enhancement, with the hopeful encouragement of the new Environmental Stewardship schemes. There is, nevertheless, a balance to be struck to ensure retention of this wildlife resource and its potential, given the pressure for new development in the area.

Woodland

The far north-east of the borough is also little changed, with the rounded hills of the Langdon Hills Country Park providing a quiet haven for wildlife and humans alike. The woodlands here are generally ancient, but the extreme west of the borough has seen a huge increase in recent woodland creation as part of the Thames Chase Community Forest project. This Cely Wood project has seen a significant swing away from an arable landscape with isolated old woods, towards large tracts of semi-natural habitat with only isolated intensively managed agricultural areas. It is, however, important within such projects to ensure that the species planted and planting patterns are sympathetic to, and supportive of, the local ecology and landscape in order to maximise opportunities for biodiversity and local distinctiveness.

Belhus Country Park

Land Management

Inappropriate management continues to be as big a threat to wildlife sites as is development. Over-intensive grazing can severely limit the wildlife value of the most flower-rich site, as can grazing or cutting at the wrong time of year. With the tendency to replace grazing with mowing for "conservation management", a quite different management pressure is exerted upon the sward and the species of interest may not be able to cope with these changes. The mower cuts all, whereas occasional grazing livestock avoid certain plants, thereby maintaining a more diverse sward and habitat opportunities for grasshoppers and spiders, which are now too often removed by the tractor and flail.

2.3 BAP Resources Within Thurrock

Thurrock Council has recently produced a draft "*Thurrock Biodiversity Action Plan 2006-2012. An action plan for the conservation of priority species and habitats in Thurrock*". The following section aims to update and expand upon this draft report in the light of the 2006 habitat survey and the re-evaluation of the Local Wildlife Site network.

The Thurrock Biodiversity Action Plan Priority Habitats and Species are listed below. The letters "E" and "UK" in parentheses indicate where the species/habitat is also listed in the Essex and UK Biodiversity Action Plans, respectively:

Priority Habitats

Ancient Hedgerows (E)
Ancient woodland (E)
Calcareous Grassland (UK)
Coastal Grazing-marsh (E, UK)
Brownfield Wildlife Land
Lowland Heathland (E, UK)
Reedbeds (E, UK)
Roadside Verges
Thames Terrace Grasslands
Urban Habitats (E)

Stanford Marshes

Priority Species

Brown Hare (E, UK)
Bats (E, UK)
Hedgehog
Water Vole (E, UK)

Black Redstart
Skylark (E, UK)
Song Thrush (E, UK)

Adder
Grass Snake
Great Crested Newt (E, UK)

Glow-worm
Hornet Robberfly (E, UK)
Shrill Carder-bee (E, UK)
Stag Beetle (E, UK)

Black Poplar (E)
Broadleaved Cudweed (UK)

Water Vole

2.3.1 Habitats

Ancient and/or Species-rich Hedgerows and Green Lanes

Many ancient hedges in Thurrock are in fact quite species-poor, being linear suckering Elm clones and, conversely many relatively newly planted hedges are very species-rich. Such ancient hedges are unlikely to be evenly distributed throughout the borough. The major obstacle in quantifying the extent of this habitat is the labour-intensive survey work and document searching needed to establish the status of any one hedge. Hence, such studies tend to be reactive, when a particular hedge is threatened, rather than proactive – producing a catalogue of all such hedges.

Examination of the field boundary patterns around Orsett and Bulphan Fens shows a distinctly recti-linear pattern, where relatively recent straight drains have been carved into the former marshlands to drain them, whilst further straight, modern boundaries have been planted to divide up the spoils of this reclaimed farmland. On the coastal plains, too, hedges are a relatively recent feature (given that elsewhere hedge patterns can date back to the Iron Age), and would not have been widespread before drainage and enwalling of these former coastal wetlands. Even within "older" countryside within the borough, ancient hedgerows may be lacking. Many parts of the countryside were under "open field" cultivation for centuries, with the sub-division into discrete ownerships being a relatively modern change and again indicated by generally straight, species-poor hedges.

Whilst ancient woodlands are almost universally protected as Local Wildlife Site habitats (see Section 2.4 and Appendix 1), it would be impractical to extend this coverage to all ancient hedgerows. Here, Local Wildlife Site status is restricted to hedgerows with a more significant function as connectors between two or more woodland Sites and this has been applied with two of the green lanes within the One Tree Hill area. These lanes, partly replanted and partly of presumed ancient origin, help to link the ancient woods of Northlands Wood and Martinhole Wood with a series of smaller old and possibly ancient woodland fragments into one ecological unit.

Mapping and identifying such ancient hedgerows is a time-consuming process and use should be made of local historians and documentary evidence to assist in this process. The issue of hedgerows in our countryside touches strongly on matters concerned with landscape amenity and social history, as well as natural history, making it a multi-disciplinary topic.

Ancient Woodland

The draft BAP for Thurrock suggests that there are 14 ancient woods in the borough. This present study suggests that the total may be at least 22, as follows:

Oak Wood

Warwick Wood
White Post Wood
Watts's Wood
Brickkiln Wood
Hangman's Wood (South Ockendon)
Oak Wood
Low Well Wood
Little Dilkes Wood
Cats Mede
Terrels Heath
Rainbow Shaw
Northlands Wood
Millard's Garden/Brannetts Wood – at least in part?
Brickbarn Wood (small central section according to Ancient Woodland Inventory)
Mill Wood
Great and Little Palmer's Shaw (count as two?)
Hall/Gravelhill Woods (could be treated as two woods, although contiguous)
The Park/Coombe Wood, the latter is certainly ancient; the former may have elements
Fell-me-down Shaw
Old Hill/Great Sutton Wood – only the Great Sutton Wood part
Martinhole Wood Complex (Martinhole Wood itself and possibly also the wood adjacent to the road, which should be counted separately if it is ancient).
Hangman's Wood and Deneholes SSSI

The reason for this larger number is primarily because the Ancient Woodland Inventory only considers woods over 2 hectares in size. Several of the woods listed above are smaller than this cut-off size but are thought to be ancient by reason of their location, flora or other documentary evidence. An element of doubt exists about the true status one of these woods: Brannett's Wood. Other small ancient woodland remnants may still occur, unlabelled as such. Some of the small wood fragments to the north of the Holford Road, near to Rainbow Shaw, may well bear closer documentary scrutiny.

Reflection on these ancient woods shows them to be distributed in two main clusters: the Langdon Hills/One Tree Hill complex in the north-east, and the Aveley/South Ockendon area in the south-west. This distribution is not, however, merely down to brutal and widespread

clearance of ancient woods in the other parts of the borough (although some such clearance has doubtless occurred). Rather, other parts of the borough, namely Orsett and Bulphan fens and the coastal grazing-marsh zone would not have been conducive to the development of typical Oak woodland, as would have occurred elsewhere. In times past, the landscape of Bulphan Fen would have been very different to that of today, with large tracts of swamp, marsh and perhaps willow scrub and Alder woodland, rather than the broad-leaved woodland that is popularly believed to have covered most of lowland England prior to the rise of modern man. Similarly, the coastal zone would have been tidal saltmarsh and transitional habitats to grassland, grading into woodland beyond the highest tidal limit. Here, too, broad-leaved woodland would not have been the natural climax community.

Today, these woods are not threatened by clearance but by being over-run with Sycamore. This non-native tree produces copious quantities of seeds and over time can dominate the wood with densely shading seedlings, saplings and canopy trees, to the detriment of the native ground flora. This problem is particularly acute in the Belhus Woods Country Park woods, but also affects Low Well Wood and many of the north-eastern woods.

Calcareous Grassland

In the county context, this habitat resource is limited to Thurrock and the north-west of Uttlesford District around Saffron Walden, although modified chalk grassland vegetation can be found on some of the more calcareous chalky boulder clay grasslands that lie across much of north-west Essex.

The extent of this habitat in Thurrock is hard to quantify. There are no "classic" chalk downland remnants left in the borough and so the calcareous grassland flora is restricted to small patches of undeveloped land such as at Tank Lane, disturbed marginal ground at Brickbarn Wood and the edges of former chalk quarries. There are many other narrow strips, surviving at the tops of inaccessible cliffs throughout Grays, although the quality and extent of this flora is not known. Small surviving remnants of the Mill Wood Pit (such as the Grenville Road Grasslands Local Wildlife Site) support one of the most diverse calcareous grassland florae found during the survey, but even these are perilously thin strips of grassland threatened by encroaching Ivy, inappropriate planting of Buddleja bushes and over-zealous amenity grassland mowing. Land at Tank Lane in Purfleet provides the best potential for developing and maintaining broad, open calcareous grassland, but this site is being overcome by scrub. Calcareous grasslands, in their true sense, developed under centuries of grazing pressure to keep scrub at bay, and active management will always be necessary to maintain these few remaining fragments.

Coastal Grazing-marsh

The extent of this restricted habitat has clearly been greatly reduced in Thurrock, with much former habitat between Tilbury Fort and Corringham lost to landfill. Despite the fact that the conservation value of this habitat has long been appreciated and its dramatic decline well-documented, areas of this habitat are still being lost to development, most recently at the Ferry Fields by Tilbury Port. Areas where grazing-marsh could be re-instated are still being lost, too, as is the case with Tilbury Marshes between Tilbury and Chadwell St Mary. The remaining area of Tilbury Marsh would make an ideal location for a large-scale grassland creation scheme that could be of great value towards achieving BAP targets for Skylark, Water Vole, various BAP invertebrates (identified at local, county and national level) and Brown Hare. The ditches here are thought to retain an interesting flora and aquatic fauna – important components of the grazing-marsh ecosystem.

A small fragment of these Tilbury Marshes grasslands survives, in a rather modified form, as the Little Thurrock Marshes just to the west. This has been intruded into by the Churchill

Road/Medlar Road housing estate and much of the remainder is rather scrubby and showing signs of localised disturbance but may well still support an important flora and fauna. This land must be assumed to be under threat from future development.

Other areas that might repay closer scrutiny and better management by way of grazing are the ancient commons to the east of Tilbury. Fort Road, Hallhill, Parsonage and Walton Commons are ancient landscape features that may have been grassland for many centuries, although war-time ploughing on some parts cannot be ruled out. Nevertheless, they represent quite extensive, if rather species-poor grasslands. The two larger sections, Parsonage and Walton Commons appear to be under some form of grassland cropping regime, but long-term, unintensive grazing after this hay/silage cutting would help to produce a more diverse grassland sward.


Stanford Marshes

Parts of the marshes to the south-east of Corringham that were previously included with a Site of Importance for Nature Conservation have been ploughed up and reverted to arable land. However, re-seeding with grassland would soon recreate grasslands that are able to contribute to the overall ecology of the marshes here. For many over-wintering wildfowl and waders floristic diversity of the open sward is not so important as sward height, soil moisture and the presence of shallow water bodies. It is suggested that some areas currently in arable cultivation around Corringham/Fobbing Marsh might be used as locations for shallow scrapes and other wetland habitat that would complement the surrounding grassland. A similar "saline lagoon" at the north-eastern end of this Local Wildlife Site supports a good range of coastal birds.

Brownfield Wildlife Land and Thames Terrace Grasslands

The ecology of brownfield land areas must be viewed alongside the Thames Terrace Grasslands local BAP habitat. Brownfield sites (areas of derelict mineral extraction works, demolished industrial sites, dried out silt lagoons and the like) often have freely draining, acidic substrates that develop assemblages of drought-stressed, flower-rich plants, which mimic original Thames Terrace grasslands in some way. The chaotic topography of many of these brownfield sites adds to the habitat diversity.

Thames Terrace grasslands in their original form are now an extremely scarce habitat but would formerly have spread along the ridge of sand and gravel from Grays eastwards through Chadwell St Mary and then upwards towards the Langdon Hills. These grasslands would have supported a drought-resistant, flower-rich sward, the like of which can be gauged by looking at such sites as Broom Hill, West Tilbury Hall and Mucking Heath. As well as supporting rare Essex plants, these terrace grasslands developed a unique invertebrate fauna, taking advantage of the favourable climate and geology.

Many invertebrates have come to depend on brownfield areas as the extent of original Thames terrace grassland declines in extent and/or quality. Key qualities are that they are extensive and flower-rich (providing large areas of foraging habitat), include areas of bare or sparsely vegetated ground and are unmanaged i.e. the tall herbage is not cut down for hay or silage in the height of the summer.

Large size is an important quality for such sites, since many of the dependent insects need to forage through large quantities of vegetation to gain sufficient food resources. These are the areas most prone to re-development pressure. It is important that efforts are made to incorporate suitable habitat into new developments through creative and innovative means, including for example, the use of brown roofs. Attention also needs to be paid to the remaining matrix of rough ground left behind as broad road verges, steep banks and other awkward shapes that do not favour building development. A large network of these smaller sites in reasonably close juxtaposition and managed properly will help to assist in contributing to the maintenance of large areas of this habitat and help to mitigate against losses.

Brownfield Site: Copyright Peter Harvey

It is inevitable, however, that such brownfield Land is viewed by many people as "waste ground", especially in Thurrock where development pressure is so high. This gives rise to various problems in conserving them. Firstly, insects do not appeal to the public's imagination and secondly, the barrier of why "waste ground" is so important for wildlife needs to be overcome in the minds of developers and planning authorities. An additional factor to consider is that, unlike ancient woods, brownfield sites can, by definition, be created. Given the combination of Thurrock's climate and suitable substrate, along with the presence of reasonably close "donor" sites from which species can spread, any piece of disturbed, weedy ground has the potential to develop an interesting fauna IN TIME. It may not develop the whole suite of species that ancient Thames terrace grassland might support but some species, even quite restricted UK BAP species like the Brown-banded Carder Bee *Bombus humilis*, can quite quickly include such areas of land in their daily tour of sites to forage for food. This should not give rise to the attitude of "bulldoze a piece of land to create brownfield one day and plough the rich donor site the next day", but the very essence of many of these brownfield invertebrates is that they exist within a suite of sites as a meta-population, exploiting new areas as they become available and dying out from other areas as they decline.

Because of this dependence on a suite of sites, numerous brownfield and remaining Thames Terrace sites are included now within the Local Wildlife Site register (see Section 2.4 and Appendices 1 and 6, below). This should not promote an attitude of "there are plenty of other sites, so losing one does not matter", for the reason argued above. The very fact that brownfield sites represent early successional or pioneer vegetation means that their life can be relatively short-lived, depending on the soil characteristics and location. Such sites can become infested with scrub and young soils can develop that favour more closed rough grassland swards that may be less attractive to some species. Two of the key sites for these invertebrate assemblages in Thurrock are SSSIs: East Tilbury silt lagoon (part of the Mucking Flats and Marshes SSSI) and the southern lagoon west of West Thurrock power station (part of the West Thurrock Lagoon and Marshes SSSI). However, SSSI designation of these lagoons was in recognition of their importance to coastal wildfowl and waders when they were still active, open wetlands, not the relatively dry and well-vegetated brownfield sites they are today. As a result, these key sites are being classified as being in an unfavourable condition by Natural England, with the threat that they may be subjected to remedial management to improve their wetland condition once more. This could largely destroy the newly developed invertebrate interest.

Several areas of potential interest, currently not included within the network of Local Wildlife Sites have been identified by this survey. In North Stifford, possible old Thames Terrace grasslands can be found to the south and east of Bridge Meadow Farm, Stifford Hill. These are currently being grazed by horses, which is desirable to maintain whatever wildlife interest does occur there. To the south of these paddocks, the site of a demolished school off Guardian Avenue/Harrington Crescent provides an equivalent brownfield grassland site that would also repay closer investigation. Just to the west of here, between Pilgrims Lane and Davy Down, is an area of brownfield land that may also be of value. During previous survey work at Davy Down the rare Essex bee *Andrena proxima* (national Red Data Book listed as Rare) was recorded. This is a species most often associated with chalk grassland and this brownfield site is the most likely habitat for this species. A further, small area of potentially interesting grassland (albeit rather north facing) occurs north of Coppid Hall on the eastern side of North Stifford.

The south-facing scarp slope to the south of Chadwell St Mary supports several other sites of importance, beyond the Local Wildlife Sites at Broom Hill and West Tilbury Hall. To the north-west of Coppy Hall, off Sandy Lane, is an old sand pit that shows many of the qualities of nearby brownfield Local Wildlife Sites: a chaotic topography, areas of bare ground and steep, sandy faces, yellow daisy flowers and a southerly aspect. Just to the south of this pit, at Hob Hill, are areas of old, less disturbed Thames Terrace grassland. Just to the west of this, the grasslands of Hutts Hill may also repay closer study.

To the east of these sites, off Church Road West Tilbury is an area marked on Ordnance Survey maps as a scout camp site. This is located in a shallow pit and, lying as it does midway along a chain of similar sites (Broom Hill, West Tilbury Hall and Low Street Pit) may well support both plants and invertebrates of interest. Yet further down this chain, following the Thames Terrace formation, between Low Street and Coalhouse Fort, are further signs of old mineral workings and also war-time defence structures at Bowaters (east of a poultry farm). Although rather scrubby, making the public right of way difficult to follow, the remaining areas of grassland may also be of interest. To the north of Coalhouse Fort, the future process of capping the landfill sites to the east of East Tilbury offers huge potential to create and/or retain areas of brownfield habitat within whatever future land use is being planned. South of Fobbing is a series of south-facing grasslands, now rapidly becoming scrub woodland that probably also belong to the Thames Terrace grassland series. Urgent management is required here for these fields to retain their interest.

Along the Thames-side fringe, increasingly squeezed between urban and industrial developments and the engineered seawall, are a series of brownfield sites with great potential. Some are large, such as:

- The land immediately to the south-west of West Thurrock lagoons, adjacent to the Vopak site;
- Much of the land within the grounds of West Thurrock Power Station;
- Rough ground at Stanhope Industrial Park, Stanford-le-Hope
- The huge area of such habitat recently created by the recent demolition of oil refineries and associated infrastructure at Corringham.

These sites must be under threat of future development. In the case of the Corringham site, future container terminals are being planned. It is to be hoped that retention of areas of brownfield habitat might be designed into the layout of such a development.

Many of these brownfield sites, however, are small and not so attractive to property developers.

This latter group includes:

- A small patch of land almost directly below the Queen Elizabeth II bridge;
- A strip of grassland in front of the travelling crane at the Purfleet Thames Terminal;
- A narrow band of rough ground south of St. Clement's Church, West Thurrock (which was formerly much larger before the construction of a car park over much of the site).

In much the same way that a recent Urban Capacity Study has recently reviewed the development potential of plots of land across the borough for residential re-development, a similar study might look at these and other small sections of less desirable "waste ground" within the urban zone that could be retained and actively managed as brownfield land, to try and ensure that there remains a network of suitable sites for species that are now largely dependent on this rather artificial habitat.

Lowland Heathland

The absolute scarcity of heathland and unimproved acid grassland in the county means that even quite small areas are worth conserving and enhancing. Examples can be found within the Warren Lane Grasslands and the fringes of Brickbarn Wood. Mucking Heath (Orsett Golf Club) is the only ancient heathland left in Thurrock, but long-abandoned sand pits such as at Broom Hill, Orsett Camp Quarry and Buckingham Hill can develop similar vegetation types. Even relatively recent and heavily industrialised areas such as the former Lytag works at Tilbury power station can develop extensive areas of acid grassland.

An opportunity exists for the creation of lowland heathland through the appropriate restoration of former landfill sites with low-nutrient, freely draining sand and gravel waste and sown with Common Bent-grass and Gorse, rather than with nutrient-rich topsoil sown with Ryegrass and planted with groups of broad-leaved trees.

Reedbed

There are four principal reedbed areas in Thurrock: Little Thurrock Reedbeds, West Thurrock Reedbed, the majority of the Stanford Warren Wetland and the Fobbing Reedbeds. Beyond these important sites there are numerous other sites that have significant amounts of reed within ditches, drains and borrow dykes or in mosaics with willow scrub. Only the larger, broader sites are likely to attract significant numbers of reed-breeding bird (most notably the Bearded Reedling/Bearded Tit) but even quite narrow but long stands of reed can support assemblages of reed-dependent invertebrates. There are reed-filled ditches in the farmland to the east of High Road, Fobbing; south of Stanhope Industrial Park; West Tilbury Marshes; and Tilbury Marshes.

Purfleet and Rainham Marshes (Source:RSPB)

In Thurrock, all of the significant reedbeds are close to the coast. Sites such as Orsett and Bulphan Fens might have previously supported dense reedbeds in an area that used to be quite bleak marshland in the not so distant past. In Suffolk, the RSPB has undertaken an extremely ambitious project to recreate a huge new reedbed at Lakenheath Fen and it is suggested that the environs of Bulphan Fen would be ideally suited to a similar project. This would clearly be an extremely ambitious project, but it could benefit a number of other BAP species, such as Water Voles, Grass Snakes and other wetland wildlife as well as those species tied to reed

bed. The attraction of breeding Bitterns might be beyond such a project, but it would nevertheless make an impressive wetland.

Roadside Verges

In Thurrock, as in other parts of the county, road verges probably account for a significant part of the overall grassland resource of the borough. They tend to be a much-abused habitat, mown at the height of summer, parked and driven on, incorporated into adjacent gardens and subjected to a bombardment of silt-laden spray dosed with road-salt and other pollutants. In sub-urban and rural areas they can be a battle ground between the conservationists who want them left to grow tall and members of the public and local council members and officers who desire them to be "neat and tidy" and awash with crocuses and daffodils in the spring, rather than letting the native flora flourish.

Near Brickbarn Wood, rough verges and adjacent land support numerous plants of the legally protected Broad-leaved Cudweed – a nationally rare plant. Other verges support plants of chalk grassland, a habitat that is on the brink of being lost in the wider countryside.

Urban Habitats

As previously highlighted, Thurrock is a little unusual on that many of its most valuable Local Wildlife Sites lie in the urban zone rather than the Green Belt, as is the case for most other parts of Essex. This brings special pressures in the form of excessive recreational use, arson and other acts of vandalism, and pressures from developers to utilise the land in other ways.

As discussed below, several of the Species Action Plans for Thurrock involve animals that rely heavily on gardens for their survival, most obviously Song Thrush and Hedgehog.

Corringham Town Park

2.3.2 Species

Brown Hare

Brown Hares in Thurrock utilise both arable and grazing-marsh habitats. Whilst the latter are relatively stable, changes in EU and national farming policy have the potential to impact on Hare numbers, both positively and negatively. Hares favour a complex landscape with woods, grasslands, hedgerows and arable fields. They are not just animals of "big open fields", although this is where the general public most often sees them, especially in the spring. New Environmental Stewardship schemes have the potential to greatly improve the diversity of the farmed environment and this should help this species, especially around Bulphan Fen. The sweep of coastal grazing-marsh along the eastern side of Thurrock is clearly an important area for this species and the ongoing and future decommissioning and restoration of the numerous landfills in this area also have the potential to contribute towards the conservation of this species.

Illegal Hare coursing is more serious and difficult to control. Several recent high-profile cases have shown that some participants of this barbaric sport travel into Essex from the London area, making Thurrock potentially very prone to such events. The impacts on Hares are two-fold: direct killing of individuals and, more telling but harder to quantify, the disincentive to farmers to provide suitable Hare habitat because of the fear of attracting undesirable persons onto their farm.

Bats

Bat surveys are specialist undertakings and beyond the scope of this field survey. However, two very important bat sites are known to occur in the borough: the Hangman's Wood and Deneholes SSSI and the old chalk industry tunnels in Lion Gorge, Grays. Beyond such sites, our knowledge of bat roosts and especially over-wintering sites is rather limited. Many small summer roosts doubtless occur in the roof spaces of older residential properties, whilst few modern-built houses offer opportunities for roosting bats. One recurring issue with urban regeneration is that of the threat of knocking down old, sometimes derelict buildings that do offer the potential for roosting bats. Because of the legal protection given to all bat species in Britain, any such action must be preceded by a suitable survey of the property affected.

Hedgehog

This species in not included within the Essex BAP. It is, however, a good example of the previous statement that "achievement of BAP targets is a way of life, not just a policy." Hedgehogs are most at risk from our tendency to indiscriminately use molluscicides, pesticides and other chemicals in our gardens, within parks and also in the farmed environment. They are also notoriously at risk from the barriers we put in the way of wildlife: roads. Projects aimed at securing a better future for Hedgehogs will also help other species dependent on the garden environment, namely Song Thrush and Stag Beetle.

Water Vole

The current state of our knowledge suggests that in Thurrock, Water Voles are largely restricted to the coastal grazing-marshes and lower reaches of the Mar Dyke. One of the key potential functions of the upper reaches of the Mar Dyke catchment is to help as a wildlife corridor to permit biodiversity improvements of the north of the borough, which is at present an impoverished area for wildlife. Water Vole is one of the species that ought to benefit from such management and, indeed, some of the upper sections of the Dyke look to be eminently suitable for this species. However, the issue of feral Mink is still a big problem that limits expansion of this species. Interestingly, recent research has suggested that Mink are being ousted from river systems where Otter numbers are increasing, not by direct predation – Otters are fish-eaters - but by physical intimidation. Mink tend to move out of areas where Otters are established. Thus, to increase Water Vole numbers in the Mar Dyke, a feat that might not seem too difficult, it might actually require the more challenging task of creating suitable habitat for Otters. The upper reaches of the Mar Dyke may be a difficult place to achieve this however: although relatively undisturbed the network of smaller water channels may not be ideal Otter habitat. Otters are thinly widespread across much of Essex and are not known to occur in this catchment or anywhere near to it from whence they might migrate naturally.

Black Redstart

This bird, one of the rarer British breeding species, is something of a conservation anomaly: it favours derelict buildings, large industrial complexes (such as oil refineries, power stations and the like) and brownfield land as nesting sites. Thus, it exploits on the one hand developments that may have destroyed important habitat for other species and, on the other hand, also uses brownfield sites that are of great importance for a variety of rare insects and plants. Such areas are generally regarded as "waste ground" and seen as perfect for re-development.

It would be advantageous for BAP initiatives for this species to dovetail with other brownfield specialists. The Thames-side developments in Thurrock are important nesting grounds for this bird in Essex, along with other species, such as Peregrine Falcon.

Skylark

Skylarks are prone to inappropriate grassland management, with early hay-cropping or "conservation"-aimed forage harvesting destroying nests or young. Maintenance of areas of tall, unmanaged grassland should favour nesting Skylarks and could also benefit a number of key insect species that are also severely impeded by grassland cutting. Areas such as the Blackshots Nature Area north of Grays ought to be ideal places for dual conservation efforts aimed at both Skylark and invertebrate populations.

Song Thrush

Much of what was said about Hedgehogs can be repeated for Song Thrush: they are susceptible to modern gardening and agricultural practices. As indicated above, this is not a species that can be conserved by identifying Local Wildlife Sites. It is a change in behaviour from all land managers from individual gardeners right up to large farm estates that is required.

Adder and Grass Snake

The much-maligned Adder has some good populations in Thurrock. Across Essex, grassed seawalls and the coastal marshes behind them are strongholds of this species, and the same would appear to be true in Thurrock. Therefore, there is much potential in the restoration projects being planned for the landfill sites around East Tilbury and Mucking to aid this species.

Recent survey work has identified high densities at Vange Depot and the former Lytag site at Tilbury Power station. In urban areas they may prone to unlawful killing to protect children, and this is likely to be an issue around the Chafford Gorges nature reserve, where good Adder numbers coincide with a very high human population density.

They are another species that can benefit from brownfield land, especially where there are large piles of building rubble for shelter and complex habitat structure that will support sufficient prey items (usually small mammals).

Grass Snakes may well catch some of the back-lash from the public aimed at Adders i.e. it is a snake and therefore to be feared and driven away or killed. Ironically, Grass Snakes may well be partial to eating smaller Great Crested Newts as well as their stated diet of frogs, so that conservation measures aimed at improving habitat for amphibians may well also aid the Grass Snake.

Great Crested Newt

There are curiously few records for Great Crested Newt in Thurrock, given the relative abundance of records from Basildon. This is likely to be due to the lack of appropriate surveys rather than a real lack of this species in Thurrock. Further survey work is urgently needed to gain a better understanding of the distribution of this highly protected species, especially in the light of future development pressure. It is recommended that all development applications should be supported by appropriate surveys of all water bodies in or closely adjacent to the proposal site. This is as much a legal requirement as it is a means of better understanding the ecology of Great Crested Newts.

Glow-worm

This is not an Essex BAP species, but it is one that is well suited for attention in a local BAP. The dependence of the larvae on a diet of snails means that they are strongly associated with areas of chalk, limestone or other base-rich geological formations, making south Thurrock a key location for this beetle in Essex. It is a creature that requires specific survey work and was only encountered once by chance during this field survey, at Rainbow Shaw. However, previous EECOS surveys have come across two other populations. Huge numbers were encountered on Chafford Hundred building plot LP63 (to the east of Lion Gorge) during an exercise to catch and translocate reptiles to the Warren Gorge prior to housing development. Where possible, the Glow-worms were caught up and moved along with the reptiles. The subsequent fate of the Glow-worms (or the reptiles for that matter) is not known, but could form the focus of a survey event organised by the Essex Wildlife Trust via its visitor centre at the Gorge. Glow-worms were also encountered in large numbers during reptile survey work at Vange Depot. This highlights the usefulness of the squares of roofing felt laid out to attract reptiles in also attracting the larval glow-worms for survey purposes.

There are numerous places where Glow-worm surveys could be targeted. Within the Local Wildlife Site network, sites such as at Tank Lane, Purfleet Pit, Brickbarn Wood, Grenville Road Grasslands, Warren Gorge, (as indicated above), Lion Gorge, Clockhouse Cliff and the environs of Grays Thurrock Chalk Pit SSSI would all be worth a closer look. Beyond these, there are numerous narrow and sometimes precarious strips of calcareous grassland associated with the clifftops of the old chalk quarries around Grays and Purfleet. Many of these are at best inaccessible if not distinctly hazardous, but could be worthy of exploratory surveys. For these sites, using binoculars to look for the night-time glowing of adult females may be safer.

Hornet Robberfly

This species has a UK and Essex BAP aimed at its conservation, and Thurrock has an especial responsibility as far as the county is concerned. Adult Hornet Robberflies need large tracts of flower-rich grassland in which to hunt their prey, making for a combined habitat requirement that is in short supply in Essex. Hornet Robberfly has been recorded from some of the Local Wildlife Sites, notably Goshems Farm, Low Street Pit and Broom Hill. Previous survey work by EECOS also recorded this species from the seawall east of Coalhouse Fort. Its dependence on animal dung not treated with persistent parasite treatments (such as Ivermectins) means that it may have a curious reliance on less intensively managed livestock such as that frequently pastured on rough ground by travellers. Elsewhere, other livestock owners need to be convinced to use alternative treatments that are less harmful to the numerous insects that attempt to exploit the dung voided by their animals. The notion of a special "conservation herd" of livestock on a large coastal site, such as the Essex Wildlife Trust's Fobbing Marsh reserve would be worth exploring. Hornet Robberfly culture would be compatible with organic beef production.

Shrill Carder Bee (*Bombus sylvarum*)

The Thurrock draft BAP notes three key locations for this UK BAP species: Broom Hill, East Tilbury silt lagoons and Orsett Camp Quarry. To this list can be added a population somewhere in the vicinity of Vange Depot in the north-east of the borough. This rare bee was recorded at this site during 2006, although only a small area of suitable forage plants occurs here. This bumblebee must be using a much larger area in total, perhaps including the various horse paddocks to the south of the depot as well as land in the adjacent Basildon District. Given the plight of this species, the Thames-side district/boroughs of Thurrock,

Basildon and Castle Point have a national responsibility for the conservation of the Shrill Carder-bee.

Stag Beetle

Little is known about the distribution of this species in Thurrock. It is another species, alongside Song Thrush and Hedgehog, for which the action of gardeners is an important factor for its well-being. Another traditional habitat for this beetle is old orchards, an almost non-existent resource in Thurrock.

Broad-leaved Cudweed

As indicated in the draft Thurrock BAP, the borough supports the largest population of this legally protected plant in Britain. Both sites have been included within Local Wildlife Sites. One of these, along the road side margin of Brickbarn Wood must be considered under threat from any future road widening schemes. The use of Arena Essex as a motor sports site is not necessarily incompatible with the conservation of Broad-leaved Cudweed here, since it favours disturbed ground for seedling establishment.

Native Black Poplar

No specimens of this tree were noted during the habitat survey, but specimens may be awaiting discovery in the Mar Dyke Catchment. The lower reaches of the Mar Dyke, within the Local Wildlife Site, would be an appropriate location for a re-introduction of this tree. A small number of trees (probably planted) occur at Davy Down.

2.3.3 Other BAP Issues

There are a few Essex and national BAP species not covered by the Thurrock BAP that are worthy of brief mention. Scrutiny of the Local Wildlife Site descriptions (Appendix 6) will show that several of these sites support a number of national BAP invertebrates, notably the Brown Carder-bee *Bombus humilis*, the digger wasp *Cerceris quinquefasciata* and the fly *Dorycera graminum*. Other BAP species are known to occur in the borough, such as the Buttoned Snout moth at a site in Purfleet and possibly elsewhere. In reality several other national BAP species may well occur in Thurrock, but our knowledge about their distribution and level of threat is currently insufficient to confidently assign Local Wildlife Sites to aid their conservation. The first three insects listed above should be considered alongside the Shrill Carder-bee, brownfield sites and Thames Terrace grasslands and action to conserve these Thurrock BAP targets ought to help these other national BAP species as well.

An Essex BAP species that might be worth considering in Thurrock is the Dormouse. Several of the ancient woods in Thurrock have a habitat structure that ought to be attractive to Dormice. Traditionally, Dormice are said to favour Oak-Hazel woods in which Honeysuckle is frequent, the bark of which is used to construct nests. However, its recent discovery in a conifer plantation near Hanningfield Reservoir suggests that the Dormouse may be more adaptable than is generally perceived. Woods such as Hall/Gravelhill, Northlands Wood and the ancient woods of Belhus Woods Country Park have suitable looking habitat and may be worth a specific Dormouse survey, if this has not already been undertaken.

2.3.4

Summary of BAP Action Points

The following points provide a summary of the preceding discussion on biodiversity matters within Thurrock:

1) Compile draft "ancient hedgerow maps" using documentary evidence (largely available at the Essex Records Office, Chelmsford) as a basic for future "ground truthing" surveys;
2) Undertake documentary research (Essex Records Office) to try and clarify the status of potential ancient woodlands;
3) Explore the possibility of recreating grazing marsh on current arable land at Tilbury Marshes;
4) Stabilise the extent of grazing marsh at Corringham, by reinstating areas recently ploughed up for arable cultivation. This might include the creation of scrapes or lagoons;
5) Endeavour to carry out preliminary surveys of all brownfield land identified as Potential Wildlife Sites or ensure that an appropriate assessment is carried out prior to any planning decisions are made concerning any such site;
6) Promote the final landscaping schemes for landfill sites as areas for lowland heathland/acid grassland creation, rather than nutrient-rich amenity swards;
7) Promote the creation of Reedbeds within the Bulphan/Orsett Fen area;
8) Work with the local police to reduce if not eliminate illegal Hare coursing. Encourage a diverse rural landscape that will benefit Hares;
9) Seek to restore the upper sections of the Mar Dyke catchment as habitat suitable for Water Voles. This is likely to require control of feral Mink as well as habitat improvement work;
10) Promote reptile-friendly habitats within coastal landfill restoration schemes;
11) Encourage the surveying of ponds within Thurrock to identify Great Crested Newt populations;
12) Encourage the search for Glow-worm populations, especially within the industrialised former chalk quarries of Grays and Purfleet;
13) Educate livestock owners and agricultural vet practices about the plight of the Hornet Robberfly and promote the use of non-persistent parasite treatments;
14) Promote wildlife-friendly gardening practice with all households, to support Song Thrush, Hedgehog and Stag Beetle populations. This wildlife-friendly approach should be extended to parks, road roundabouts and amenity plantings under Council control;
15) Encourage the planting of Native Black Poplars in appropriate locations within the Mar Dyke river valley;
16) Encourage the surveying for signs of Dormouse activity in woodlands in and around Belhus Woods Country Park and also the Langdon Hills complex.

2.4 The Role of Local Wildlife Sites

Nature conservation has two extremes: only protecting nationally important SSSIs and National Nature Reserves on the one hand and restoring the whole of the British countryside to the rich wildlife haven its is perceived to have been before agricultural intensification, on the other. Reality lies somewhere between these two points, with the fundamental need to conserve, manage and enhance a network of sites as the minimum wildlife resource which can sustain current levels of biodiversity. This concept has acquired the economic jargon of being "critical natural capital". There is, of course, a higher desire to enhance and enrich the biodiversity of an area, if possible and where appropriate, above such a minimum threshold.

Warren Lane

In recent years this has lead to the identification of "second tier" (i.e. non-statutory) sites within local authority planning systems. The value of allowing flora and fauna to move freely between these sites is discussed under wildlife corridors, below. A network of Sites of Importance for Nature Conservation (SINC) was identified for Thurrock in 1992 and has just been reviewed in 2006. Site selection criteria (detailed in Appendix 1) have been used to re-assess the original suite of SINCs and also to evaluate other sites not previously selected, to generate a revised register of Local Wildlife Sites for Thurrock. Appendix 6 is the register of these Local Wildlife Sites in Thurrock, with boundary maps and summary descriptions for each site, along with the criteria codes under which each site has been selected. A few key aspects concerning future ideal management are also included. The New Local Wildlife Sites are also tabulated with reference, where applicable, to the old SINC site number. Whilst SSSIs were included within the old SINC system, they are now held to be outside the Local Wildlife Site network. Appendix 8 provides a summary of these SSSIs with an appraisal of their habitats in terms of the Local Wildlife Site criteria.

In addition to the those sites selected here as Local Wildlife Sites, there are a number of other site which have been highlighted has having potential for inclusion within the Local Wildlife Site network at a later date. These are detailed in Appendix 7. The potential of these sites falls into two basic categories:

a) The site features/habitats and/or historical data available suggests that the site would qualify for inclusion but there is currently a lack of detailed modern data to support its inclusion within the current selection process;
b) The site is in need of some form of restorative management in order to improve the quality of habitats present.

An awareness of these sites will allow Thurrock Council to encourage the relevant landowners to enhance the nature conservation value of the land, where appropriate, so that they might realise their potential and become listed as Local Wildlife Sites. There will also be an expectation that any proposal to develop all or part of such a site will be accompanied by an appropriately detailed ecological appraisal which will cover, as a minimum, those features that have been identified in Appendix 7 as being of potential importance. It should be considered a matter of good practice that any such ecological appraisal should also consider

all species/habitats identified in local or regional Biodiversity Action Plans, regardless of whether or not they are listed in Appendix 7.

Deletions

In instances where, upon the implementation of a review of Local Wildlife Sites, a site is considered to no longer be of sufficient quality to be retained on the register of Local Wildlife Sites, there is a presumption that the site will be added to the list of Appendix 7 "potential" sites. In such cases, the Council and, where appropriate the Essex Wildlife Trust, shall encourage the implementation of positive management to improve the wildlife value of the site in question, so that it might be considered for re-selection in the future. In a very small number of cases, the selection criteria might be amended in the future in such a way that a site is unlikely to meet the new, more stringent criteria, even with positive management. In this instance, listing as a Potential Site may not be appropriate.

2.5 Discussion of Local Wildlife Sites

Scrutiny of the Sites listed within Appendices 6 (and also the Potential Sites in Appendix 7) will show that they support a very wide range of habitats, including ancient woodland, more recent woodland and scrub, wet willow woodland, hedgerows and green lanes, remnants of old, largely unimproved meadows, newer flower-rich meadows, river flood plain grassland, acid grassland, chalk grassland, reedbed, coastal grazing-marsh and post-industrial brownfield sites. The suite of Sites protects nationally rare populations of plants and insects, within more regionally or locally significant populations of plants, breeding birds, bat roosts, reptiles, butterflies, flies, bees and wasps and other invertebrates.

It can thus be seen that Thurrock still supports a very diverse habitat assemblage, although the tenure of some, such as chalk grassland, is precarious, to say the least. It can be argued that the local authority has a national responsibility to conserve important populations of Broad-leaved Cudweed and numerous nationally rare invertebrates, despite the sites supporting them only here receiving "local designation".

It is, perhaps, a small note of encouragement that there are only two site deletions on the grounds that their wildlife value is in doubt. Several other sites have had their boundaries revised to remove areas of reduced or now sub-standard land. Many of the new sites, and indeed some extensions to existing sites, are now included due to more diverse and far-reaching selection criteria. Many of these new areas quite probably had their current wildlife value in 1992, but neither the state of our knowledge about those sites nor the selection criteria were sufficient to appreciate them. It would therefore be dangerous to deduce from the increased number of Local Wildlife Sites that the wildlife attractiveness of the Thurrock countryside has dramatically improved over the last 14 years.

One measure of the success of the SINC/Local Wildlife site system is to consider how many sites have been lost or damaged as a result of development pressure, either by the planning process ignoring the site's status when determining a planning application or by the implementation of a previously determined planning consent. The most important loss to the borough was already taking place during the 1992 review: a site that was not actually identified as a SINC but clearly would have been had our knowledge been more advanced. This was the Mill Wood Pit, now lost to part of the Chafford Hundred housing development. The only loss of SINC habitat to development was, regrettably, another site of exceptional invertebrate interest, this being the Ferry Fields part of the former Tilbury Marsh site.

Planning consent was granted for industrial development, despite fierce lobbying from the nature conservation sector.

However, a few sites now identified as Local Wildlife Sites are felt to be under threat of development over all or part of their extent. Those particularly threatened are: Th5 Purfleet Pit, Th18 West Thurrock Lagoon, Th23 Anchor Field, Th26 Warren Lane Grasslands, Th39 Lytag Brownfield (note: in 2006 an outline planning application affecting this site was withdrawn during the compilation of this report), Th44 Orsett Camp Quarry, Th67 Vange Depot, Th69 Corringham/Fobbing Marsh (with respect to re-development of former industrial areas and potential expansion of existing refinery/storage installations).

It should also be remembered that a lack of management or, conversely, over-zealous management can both pose a far bigger threat to the integrity of important Local Wildlife Sites than the more immediate impacts of development threat. Brief notes concerning management issues are included with each Site description provided in Appendix 6.

Tilbury, Lytag: Copyright Peter Harvey

2.6 Introduction to Wildlife Corridors

As has already been referred to, the protection of our wildlife resource cannot be achieved by protecting the most valuable sites alone. The surrounding context is important in enabling interaction and the movement of species. Wildlife corridors have been previously promoted as a means of achieving a wider, more integrated approach to wildlife conservation.

However, for most species of flora and fauna, the term "corridor" is a misleading one. In human terms, a corridor is merely a conduit by which one gets from A to B, with the conscious decision to get to B having left A. The journey may take only a few seconds, minutes or at the most hours if one considers roads as human corridors. Furthermore, it does not necessarily matter if the human corridor passes through "inhospitable" or "useful" territory: it is, as said a means of "getting from A to B".

Within the realm of countryside planning and management it is invariably the case that it is us humans that have decided that the species concerned living at point A would be better off if it were also living at point B: wildlife merely takes advantage of living wherever it can. Thus, for B to be colonised by the species, it may well have to "live down" the corridor to reach our desired end-point. In other words, the corridor must be of sufficient habitat quality to support

the species, albeit temporarily, whilst it spreads through the habitat hopefully ending up at point B, where there is sufficient habitat for permanent populations to become established. For the successful movement of Brown Hares, this corridor will need to be of a landscape scale, whilst for reptiles it may only be a few tens of metres wide.

There is also the issue of the time-scales in which such corridors may operate. If one is exceptionally lucky, Dormice might spread from one wood to another using an artificial rope-bridge slung over a road in a few weeks or months, but such dispersal, if it happens at all, is much more likely to take years to work. Dormice are not capable of thinking "we can use this bridge to get to the other side now" – it will just happen as part of random exploration of their surroundings. A newly planted hedge to encourage the dispersal of bats may take many years before it is big enough to attract bats to use it for foraging behaviour. It is therefore of fundamental importance that for the dispersal of wildlife through the countryside, not only should potential habitat point B be capable of supporting the species, but the land designated to allow it to spread to that point must also be suitable habitat. It would be for the good of the species in terms of mixing gene pools for the return journey from B to A to be possible at any time, along with mixing with individuals at points C, D etc. so the concept of a matrix rather than a corridor is a better one, and one that has parallels with the Greengrid concept being developed to integrate both wildlife and human needs within Thurrock.

For all this, there is one fundamental problem in designing and implementing wildlife corridor schemes: there are virtually no scientific papers that empirically show that such corridors work at the landscape scale. It can be demonstrated that Badgers and migrating frogs and toads use underpasses under roads, and some studies have looked at insect dispersal along road verges (e.g. Munguira and Thomas, 1992), but such insights into how and why animals move through the countryside are very few and far between and usually focus on small-scale site mitigation rather than landscape planning. As such, all that can be done is to strive towards a far-reaching matrix of what we perceive to be good quality habitat for the species or groups of species concerned and hope that their population and distribution are improved as a result.

2.6.1 Corridor Requirements

The requirements of a few selected groups of animals can be used to illustrate some of the key features that need to be considered when attempting to plan the spread of species around the countryside. This will reinforce the fact that it is impossible to have a "one size fits all" wildlife corridor. Rather, one is likely to be dealing with " a bat corridor" or "a Water Vole" corridor, with little prospect of dual use, although some shared usage may be possible e.g., bats with Dormouse, reptiles and amphibians with ground-dwelling invertebrates. Naturally, the more "corridors" one has the better, with intersections that might start to develop more of a matrix of such habitats that will greatly assist the re-colonisation of lost former territory or the establishment of new population ranges within Thurrock.

Bats

Bats are obviously very mobile species, but they have some requirements to use an area regularly. Habitually, they tend to spread from their roost sites along hedgerows, tree belts or similar features, feeding as they go, before arriving at a main feeding area. As such, these hedgerows come some way towards the human concept of a route to get somewhere, but nevertheless the hedge must be able to provide foraging habitat itself or it is less likely to be used much, if at all. Most bat species will not cross large open areas whilst on nightly foraging activity. That said, bats are clearly capable of moving large distances on a seasonal basis when they travel to and from winter hibernation sites and the overall presence or absence of bats in an area is probably more down to the presence or absence of suitable

summer roost sites and good quality habitat capable of supporting the colonies when there. In summary, if the habitat is good enough, bats will probably find it (sooner or later). The speed at which it is found may depend on the quality of the matrix of hedgerows, woods and similar features which favour foraging activity.

Amphibians and Reptiles

Newts, toads and frogs have a tendency to return to the pond of their origin, dispersing into the surrounding countryside away from the breeding season. However, if new ponds are encountered during that dispersal, colonisation can occur. The likelihood of that colonisation taking place depends on how tempted the species is to disperse in that direction e.g. down strips of habitat that satisfy their needs at that time of year. Consider two ponds, one in a field hedgerow and the other in the middle of an arable field nearby (see Figure 1, below).

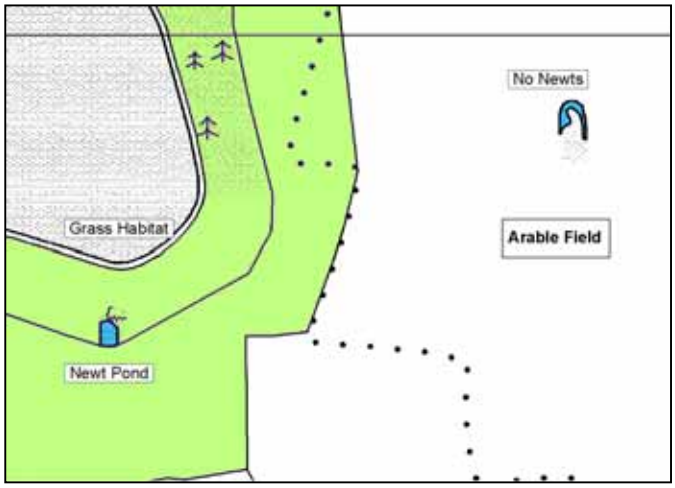


Figure 1. Landscape with isolated pond

The isolated pond within the arable field may provide suitable habitat for breeding newts, but they are unlikely to disperse in that direction, unless a short corridor of suitable terrestrial habitat is created (Fig. 2.)

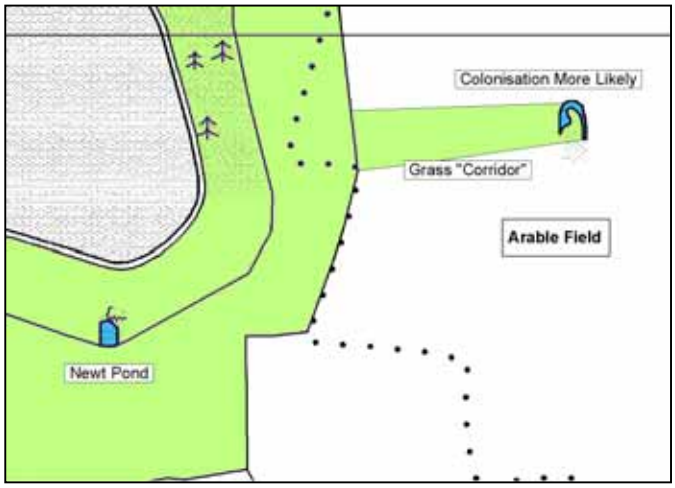


Figure 2. Corridor in place

In a landscape with a high density of ponds, a better concept is again one of a matrix rather than single corridors, since this will allow good mixing of the gene pool. This type of corridor would also assist the dispersal of reptile species.

Water Voles

In Britain, Water Voles are strictly tied to living close to water bodies, usually rivers and streams but sometimes ponds and lakes. It is interesting to note that this does not apply in continental Europe where, as the scientific name *Arvicola terrestris* implies, it is a terrestrial species found well away from water. Water Voles are capable of dispersing some distance down rivers and their immediate banks and could colonise suitable sections of river bank where stands of emergent vegetation provide cover and food supply and steep banks permit burrowing. However, the biggest block to such corridor use is the presence of Mink in the river catchment. Feral Mink are very significant predators of Water Voles and are thought to be largely responsible for the drastic decline in Water Vole numbers across Britain. Thus, there is an instance here of "empty corridors" – many suitable river sections are likely to remain devoid of Water Voles if Mink are present, with the complication that the Mink will be largely using the same corridor for dispersal, although they are less strictly tied to such routes.

Mardyke Valley

Flying Insects

This category clearly encompasses a huge variety of organisms, each of which has strengths and weaknesses in terms of dispersal. Many such insects are highly mobile and are capable of chancing upon suitable nesting habitat and "living space" whilst out foraging for food. These colonisation events can be leaps across relatively unattractive habitat in the case of some bees and wasps, so the concept of "stepping stones" rather than corridors is a more appropriate analogy. That said, the speed and likelihood of colonisation would probably depend on how far apart the "stones" are placed. Many such insects survive as meta-populations, that is, clusters of semi-independent colonies within which some exchange of individuals takes place. In this way, re-colonisation can take place following a localised extinction and new habitats can be exploited as existing sites become less suitable e.g. by succession to scrub from an open grassland.

A more significant factor affecting the dispersal of such species over larger distances is the existence of barriers. A clear example of this is a multi-lane dual carriageway, which represents a formidable barrier to many low-flying insects. Many species will be prone to being killed by speeding traffic or will not cross such a bleak tract of land due to behavioural constraints. It should be borne in mind that, to a limited extent, such barriers might be partial corridors in themselves, in that the verges may act as grassland or hedgerow corridors along the route of the road. This duality is discussed in Munguira and Thomas (1992). This theme is returned to later.

Other species, however, are very poor colonisers of new habitat, despite being winged. Many butterflies are quite poor fliers and do not have the inclination to fly long distances. These tend to be habitat specialists that are, by and large, the rarer species in today's countryside. For these species the concept of permanent linked habitat along which they can slowly spread, living many years along the corridor, is still a valid one.

Ground-dwelling Invertebrates
The problems faced by these animals are largely parallel to those faced by reptiles and amphibians, although their willingness or otherwise to cross even minor paved roads makes the problem of road corridors as barriers rather than as means of dispersal is even more extreme (see e.g., Mader et al. 1990; Oggier, 1995).

Plants
Plants similarly display a range of abilities, from weed species that have seeds which can travel in the wind many miles or even tens or hundreds of miles, through to species that only spread a few inches a year in patch-like growth. This latter group includes several so-called "ancient woodland indicators" (see Appendix 2), with the premise being that if they are found in a wood, it is likely to be ancient and possibly a modified relic of the original wildwood that once covered the land. This is because these plants are such poor dispersers that they are incapable of colonising new areas of woodland. In reality, even the poorest of such dispersers is theoretically capable of spreading into newer mature woodland if it is immediately adjacent to the ancient wood, but even then the rate of spread will be very slow. For these species the corridor needs to be effectively permanent and the rate of spread will be measured in decades or centuries for any significant movement.

2.6.2 Wildlife Corridors in Thurrock

Opportunities for dispersal through the countryside can be considered as two distinct forms: via relatively or absolutely inflexible infrastructure features and also through general land use patterns and alignments. The first factor can be split into artificial and natural features, as illustrated in Map 1.

Artificial Infrastructure Corridors/Barriers
These are essentially major road verges and railway lines. Map 1 differentiates between those features that will represent a major physical barrier to species attempting, or being driven, to cross the corridor, rather than move along it (solid red line), and those where they form less of a significant barrier (broken red line). As indicated above, our scientific knowledge of what makes a proven successful wildlife corridor at the landscape scale is almost nonexistent. However, our appreciation of what makes an identifiable barrier to movement is slightly better developed and it is suggested that any "green grid" would bear more fruit in terms of wildlife dispersal by addressing these issues rather than by attempting large-scale land use manipulation, at least in the first instance.

The significant barriers in Thurrock are the A13 (Map 1, red 3) and M25 (red 2) corridors, although it should be appreciated that even minor county roads can represent physical barriers for some species (Mader, 1984; Mader, 1988). Some of the cuttings and embankments of the M25 in particular represent significant areas of grassland that have obviously been colonised by a range of insects, birds and mammals. The frequent site of Kestrels hovering over such roads bears testament to the small mammal populations that have colonised and doubtless spread along these areas of rough grassland. However, the mortality of mammals, birds and insects caught trying to cross such features is not so often seen, unless it is the size of a Badger or deer.

A comparison of the distribution of the identified Local Wildlife Sites in Thurrock (see Section 2.4, above) will show that the majority of them lie to the south of the A13, with virtually none to the north, other than around Langdon Hills Country Park. It would be wrong to jump to the conclusion that the A13 is responsible for this phenomenon, because the real reason lies in differences in geology and historical land use: much of the wildlife interest in Thurrock is associated with chalk exposures and Thames Terrace gravel deposits and these

just happen to lie mainly to the south of the A13. However, it would be true to say that the landscape of the Bulphan Fen basin is impoverished in terms of wildlife and any habitat creation scheme trying to re-dress this balance will need to look at the "bigger picture" of how the target species will be able to move into the area when such barriers exist.

Map 1 also identifies what are likely to be rather more "permeable" artificial corridors, mainly railway lines, although even then these features may inhibit dispersal (see Yanes et al. 1995). The Upminster to Basildon railway line (Map 1, red 1) lies just outside the borough boundary, but it is a significant feature in an otherwise largely agricultural setting. Its function as a woodland corridor for birds, mammals and other wildlife remains conjectural, but is likely to be real and locally significant. The channel tunnel rail link (red 4) is a very new feature that may well have created habitat opportunities in its many cuttings through chalk and sand, mirroring the rather more mature line between Ockendon and Grays (red 5). The significance of such habitat is illustrated here with the inclusion of part of the railway cutting within the Grenville Road Grasslands Local Wildlife Site. The west-facing cutting supports an interesting sparse grassland flora and doubtless is home to the Mottled Grasshopper, which also lives within the narrow strip of grassland on the public side of the boundary fence. The ability of the Mottled Grasshopper, a rare Essex insect, to spread to other sites along this corridor would be worthy of closer study. Indeed this spread may well have already taken place.

The other "semi-permeable" corridors in this category are the Purfleet-Grays-East Tilbury railway line (red 6) and the A1089 from the A13 to Tilbury Docks (red 7, although its position here rather than as a significant barrier to movement is a debatable one). The Purfleet-Grays-East Tilbury railway line runs through many post-industrial/brownfield sites in Purfleet and West Thurrock, giving it the potential to link these sites ecologically, especially for reptiles, small mammals and perhaps some invertebrates. The numerous small cuttings also provide interesting habitat where it cuts into the chalk and any over-lying sand. In the east of the borough it passes through a largely open arable landscape either side of East Tilbury, where some role as a piece of linear scrub woodland/grassland strip is likely.

Natural Infrastructure Corridors/Barriers

This term is taken to mean more or less natural physical features over which we have little overall control on their whereabouts. This includes two major watercourses and the coastal fringe. The most significant of these is the Mar Dyke (solid green, line 1, Map 1). It is an obvious corridor feature, but it is effectively immovable. It clearly has the ability to allow aquatic species to migrate along its length, but it could also act as a grassland corridor, subject to the state of bank-side vegetation. However, it must be accepted that the river is, to some species, just as much of a barrier to lateral movement as are the major trunk roads. This will have its greatest effect on ground-dwelling invertebrates, reptiles (that can swim under duress but may not habitually do so, other than Grass Snake) and small mammals. A similar state of affairs exists on a smaller scale with regard to the Hassenbrook at Stanford-le-Hope (solid green, line 4).

The second type of corridor in this category is perhaps not so obvious, it being the seawall/coastal strip along most of the borough's estuary frontage (Map 1, green broken lines 2 and 3). Although the coastal zone has been hugely modified over most of its length, there now exists to a greater or lesser extent, a chain of small patches of grassland, brownfield land and waste ground, linked by longer stretches of rough grassland along most of this coastline. In the east this widens out into broader swathes of rough grassland developing on former landfill sites.

With regard to the western half of this corridor, any insect alighting in this section is almost forced to move laterally, given the inhospitable prospect of urbanised Grays and West Thurrock inland.

Natural Habitat Chains

Map 1 also identifies (in blue) a number of more obvious chains of semi-natural habitat, including several Local Wildlife Sites, where the dispersal of species is likely to occur more freely than in other parts of the borough. These chains are:

1. A narrow "green belt" between the M25 and South Ockendon, permitting north-south movement from the Mar Dyke valley to open countryside north of South Ockendon.
2. The cluster of woods and tree belts associated with Belhus Woods Country Park.
3. A small cluster of important brown field invertebrate habitats in Purfleet. Such clusters are essential to the survival of insect "meta-populations".
4. A similar cluster of invertebrate sites associated with the old chalk quarries of Grays.
5. Coastal grazing marsh and ecologically linked areas of grazed restored land around Tilbury Fort.
6. The chain of Thames Terrace grassland sites between Chadwell St Mary and Coalhouse Fort.
7. A ring of important invertebrate sites, based on acid grassland and old mineral workings. As with chain 3, the concept of each site helping to support the others in a meta-population is an important one.
8. A developing band of restored landfill plots, now assuming a weedy rough grassland flora that will be highly attractive to invertebrates, some breeding birds and potentially reptiles.
9. The broad band of old coastal grazing marsh south of Corringham.
10. A chain of small paddocks and other grassland plots leading up Fobbing Hill towards Vange Depot. This area epitomises the value of blocks of "small-holdings" when viewed as a whole. Whilst none of the sites is, as far as is known, especially rich, the mosaic of numerous such plots, large gardens and thick hedgerows makes for a useful wildlife resource.
11. The woods and lanes of One Tree Hill.

2.6.3 Planning for the Future

From the above discussion it should be apparent that planning for wildlife dispersal through corridors or matrices of attractive wildlife habitats is at an embryonic stage in ecological knowledge. It could be argued that corridors should be unnecessary: the whole of the countryside should be open for movement in any direction a species cares to disperse. This is, albeit an admirable vision, a long-term project to say the least. For now, corridors or clusters of sites may be desirable to help conserve species that have either died out of a formerly populated area, or would have a far more stable population status if it were more widespread.

As previously mentioned, one cannot reasonably design a corridor that will suit all species. Rather, specific prescriptions can be designed for species projects. For example, one might have a project to encourage the spread of Water Voles along the length of the Mar Dyke. The specific features that suitable river and its bank should possess can then be identified and, where practicable, put in place. A similar project might look to increase the number of Great Crested Newt ponds, the number of meadowland butterflies in an area and so on.

That said, a number of broad principles can be identified to assist in the general maintenance of biodiversity in Thurrock.

1. Maintain urban "pockets" for wildlife

The present study has highlighted a number of extremely important brownfield sites within the urban development of Grays, Purfleet and Tilbury. The complex quarried topography of the area means that there will always be some small strips and patches of land that cannot be developed and the wildlife value of these needs to be maximised, especially given the increasing pressure on larger blocks of land to provide for an ever-increasing housing requirement. Even relatively uninteresting pieces of scrub or woodland assume a greater interest and value when placed in this context and maintaining a scatter of green areas within the matrix of urban development will be essential for wildlife and, many would argue, good for the human souls living there. In recent years the concept of "green roofs" has gained popularity and, whilst their ecological value will depend on the potential for colonisation, green is better than grey or black: a living roof is more appealing to wildlife than tarmac or a flat surfaced roof.

2. Encourage field grass margins and the re-establishment of hedgerows

Parts of the borough, notably Bulphan Fen, are impoverished in terms of even "commonplace" wildlife species, so even modest habitat creation schemes have the potential to reap great rewards. The concept of grass margins around every arable field epitomises the idea of a matrix, rather than corridor, based approach to nature conservation.

3. Where possible, design "green bridges" over major trunk roads and other barriers likely to be impermeable to the lateral movement of wildlife

As previously discussed, it is easier to identify where and how the passage of wildlife through the countryside is being blocked than it is to design and implement routes for large-scale dispersal. Impediments to the dispersal of wildlife come in three main forms: urban growth, with no places of shelter designed into or left within them; featureless arable landscapes; and roads. The idea of green bridges is an appealing one from the perspective of the nature conservationist, but extremely expensive to implement. They have been used with great success in countries with less pressure on the land and more wildlife to contend with, such as Canada, where the pressures to keep Black Bears and Moose out of the way of speeding traffic on new cross-country routes is rather different to the pressures faced in this country. Green "butterfly" bridges were lobbied for in the UK when the M3 was driven through a huge cutting through Twyford Down in south Hampshire, but this was declined on grounds of cost.

Not withstanding this, the need to reduce the number of obstacles in the countryside is an important consideration. There are many small-scale solutions known to work, including underpasses for Badgers, Otters and amphibians under roads, rope bridges connecting two woods either side of a road for Dormice and planting tree belts for bats.

REFERENCES and SELECTED BIBLIOGRAPHY

Defra, 2002, *Working with the grain of nature – a biodiversity strategy for England*'

DoE, 1994, *Planning Policy Guidance: Nature Conservation.* PPG9, October 1994.

English Nature, 2002, *Draft Position on Local Sites,* unpublished report.

Mader, H.J. (1984) *Animal habitat isolation by roads and agricultural fields.* Biological Conservation 29. pp. 81- 96.

Mader, H.J. (1988) *The significance of paved agricultural roads as barriers to ground dwelling arthropods.* IN: Schreiber, K.F. (ed) "Connectivity in landscape ecology". Proceedings of the 2nd international seminar of the International Association for Landscape Ecology. Munstersche Geographische Arbeiten, Munster. 29 pp. 97-100.

Mader, H.J. et al. (1990) *Linear barriers to arthropod movements in the landscape*. Biological Conservation 54. pp. 209-222.

Munguira, M.L. and Thomas, J.A. (1992*) Use of road verges by butterfly and burnet populations, and the effect of roads on adult dispersal and mortality*. Journal of Applied Ecology 29. pp. 316-329.

ODPM, 2004, *Consultation on Planning Policy Statement 9: Biodiversity and Geological Conservation,* Office of the Deputy Prime Minister

ODPM, 2005, *Planning Policy Statement 9: Biodiversity and Geological Conservation,* Office of the Deputy Prime Minister

Oggier, P. (1995*) Roads as barriers to the dispersal of the endangered land snail Helicella itala*. Paper presented at the International Conference on Habitat Fragmentation, Infrastructure and the role of Ecological Engineering, MECC, Maastricht, 18-21 September, 1995.

Plant, C. W & Harvey, P. 1997. *Biodiversity Action Plan. Invertebrates of the South Essex Thames Terrace Gravels - Phase 1: Characterisation of the existing resource*. Report number BS/055/96 for English Nature, Colchester.

Rackham, O., 1980, *Ancient Woodland: its history, vegetation and uses in England,* Edward Arnold

Rackham, O., 1986, *The Woods of South-east Essex,* Rochford District Council

Ratcliffe, D.A. (ed), 1977, *A Nature Conservation Review,* NERC/NCC

Rodwell, J.S. (ed), 1991, *British Plant Communities Volume 1: Woodlands and scrub,* Cambridge University Press

Rodwell, J.S. (ed), 1992, *British Plant Communities Volume 3: Grasslands and montane communities,* Cambridge University Press

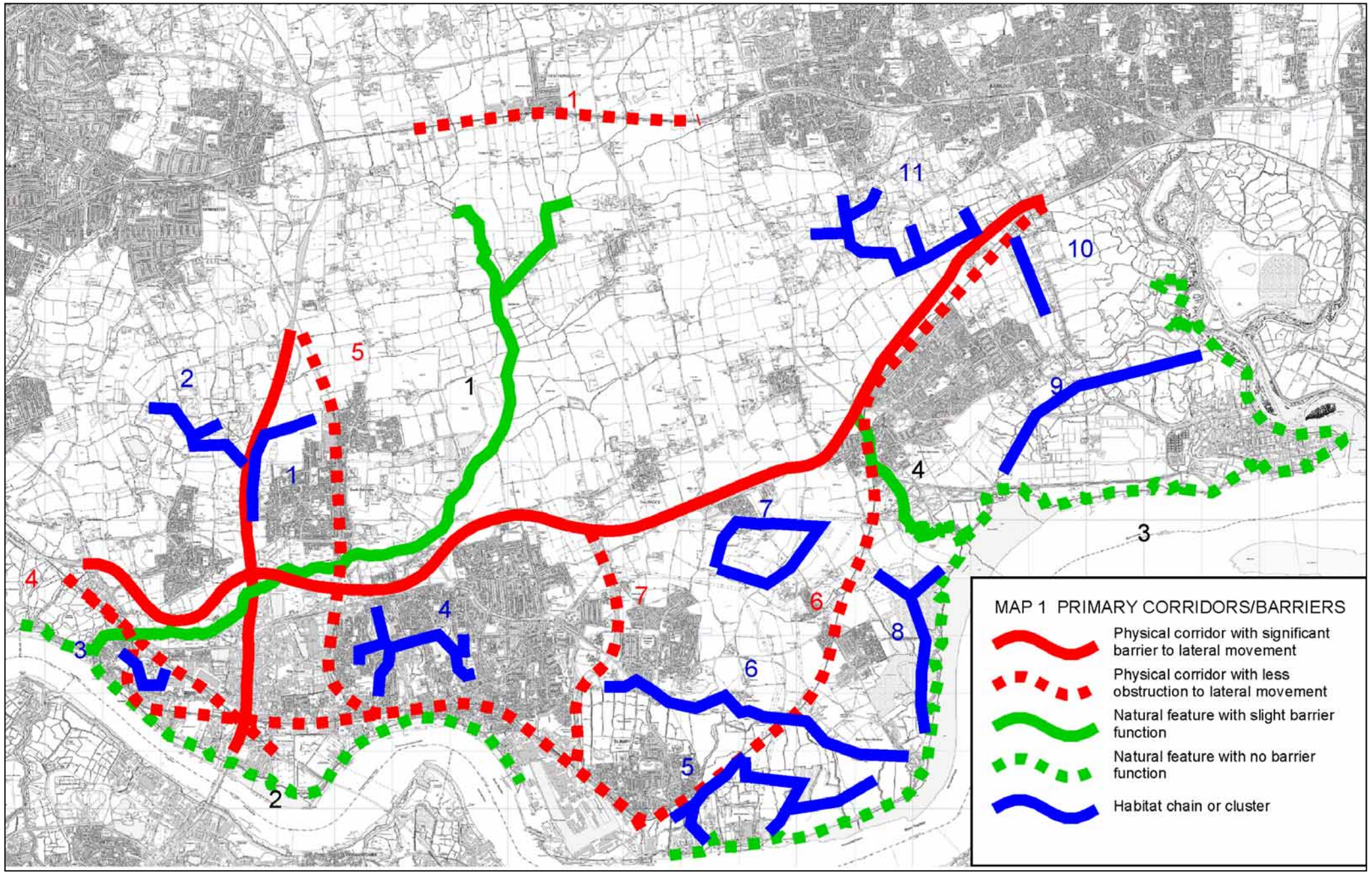
Thompson, G. and McClean, B., 1999, *Essex Biodiversity Action Plan,* Essex County Council/ Essex Wildlife Trust

Wildlife Trusts, 1997, *The Wildlife Sites Handbook, Version 2.*

Yanes, M., Velasco, J.M. and Suarez, F. (1995) *Permeability of roads and railways to vertebrates: the importance of culverts.* Biological Conservation 71. pp. 217-222.

Glossary of Abbreviations

BAP	Biodiversity Action Plan
DCLG	Department for Communities and Local Government
Defra	Department for the Environment, Food and Rural Affairs
ERDL	Essex Red Data List
NCC	Nature Conservancy Council
ODPM	Office of the Deputy Prime Minister
PPG	Planning Policy Guidance
PPS	Planning Policy Statement
RDB	Red Data Book
RSNC	Royal Society for Nature Conservation
SINC	Site of Importance for Nature Conservation
SSSI	Site of Special Scientific Interest
WSS	Wildlife Site Statement


MAP 1 PRIMARY CORRIDORS/BARRIERS
Physical corridor with significant barrier to lateral movement
Physical corridor with less obstruction to lateral movement
Natural feature with slight barrier function
Natural feature with no barrier function
Habitat chain or cluster

APPENDIX 1

DEVELOPMENT OF LOCAL WILDLIFE SITE SELECTION CRITERIA IN ESSEX

Introduction

During 1998 and 1999 a group of interested parties (hereafter referred to as the Essex Review Panel), including representatives from the Essex Wildlife Trust, English Nature, Essex County Council and other key organisations, held a series of meetings to seek a means of strengthening, modernising and improving the selection process for what were then called SINCs (Sites of Importance for Nature Conservation) but are known referred to as Local Wildlife Sites. The deliberations of this Review Panel and subsequent work by Essex Ecology Services Ltd (the survey and advisory company of the Essex Wildlife Trust) have updated the Essex non-statutory site selection process. This included examining the role of SSSIs within the system (they were included as SINCs but are now deemed to be outside the system of Local Wildlife Sites), incorporating Biodiversity Action Plan objectives as a core part of the process and a broadening and strengthening of the selection criteria. Due consideration was also given to guidance being issued by central government through Planning Policy Guidance (PPG) notes, Planning Policy Statement (PPS) notes (which have replaced PPGs) and dialogue between Defra and English Nature over the role of such systems in nature conservation.

Development of Revised Selection Criteria for Essex

The Wildlife Trusts (1997) stated that Local Wildlife Sites, together with statutory sites, should be treated as the minimum wildlife resource of an area. Below this minimum level or threshold wildlife cannot recover to a sustainable level, so that this ultimately defines what Local Wildlife Sites should be. This concept of sustainability underpins the whole Biodiversity Action Plan process – it is trying to ensure that populations of declining species of flora and fauna are held at levels where their population dynamics are hopefully capable of returning to and thereafter maintaining long-term stability and to ensure that scarce or fragmented habitats are managed in an appropriate way to ensure they become or are maintained as viable ecological units, large enough to support the ecological requirements of its constituent species.

There is, however, one fundamental flaw in this position: our current knowledge of ecosystems is not sufficient to be able to determine what these threshold values are for any given species or habitat. Thus, we are unable to judge if a species or habitat has already dropped below the minimum threshold. In order to counter this problem it is therefore imperative that we stay on the "positive" side of the current ecological budget, to not let any species or habitat slip further into danger of crossing this unknown divide. This "Precautionary Principle" was embodied by the Bergen Declaration on Sustainable Development in the UNECE Region, May 1990:

> "Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."

This would lead one to conclude that ALL semi-natural habitat should be protected, since it is not known whether or not the smallest, most species-poor piece of land is still fundamentally important for the survival of a particular species, were we but to understand its ecology. In practical terms, however, such a stance is unworkable, so that one needs to derive a process

for safeguarding a "reasonable" network of valuable wildlife sites, which might act as the fundamental basis for nature conservation efforts in any given area. This therefore requires a process to determine what is valuable enough to be recorded as a Local Wildlife Site.

In 1999, the Essex Review Panel suggested that the new Essex system for selecting and adopting Local Wildlife Sites should ensure that the Site series achieves a number of key targets. Whilst some of these targets are no longer felt to be applicable, they have been used as the basis for developing a number of fundamental Wildlife Site Statements (WSS) to act as a guide for the development of site selection criteria. The rationale behind the development of these Statements and consequent selection criteria is discussed more fully in the Technical Survey report.

The guiding Wildlife Site Statements are:

WILDLIFE SITE STATEMENT 1 – The Local Wildlife Site network of Essex will not include land identified as a Site of Special Scientific Interest (SSSI) on biological grounds at the time of the relevant Local Wildlife Site review. It must be realised, however, that the Local Wildlife Site network is critical to the support of such SSSIs (and vice versa) and that the identification of a site as a Local Wildlife Sites rather than as an SSSI does not mean that the site is necessarily of inferior quality to a similar site that has been given SSSI status.

WILDLIFE SITE STATEMENT 2 – If part of all of an SSSI is de-notified, then it should be immediately assessed as a candidate Local Wildlife Site and, if appropriate, added to the relevant register of Sites.

WILDLIFE SITE STATEMENT 3 – All SSSIs will be separately identified within a local authority Local Wildlife Site Handbook, along with an evaluation of those features of wildlife interest that do not form part of the reasons for notification as an SSSI. These features may support the eventual identification of the site as a Local Wildlife Site should all or part of it be de-notified as an SSSI.

WILDLIFE SITE STATEMENT 4 – Local Nature Reserves will be subjected to the standard species/habitat selection criteria rather than receive automatic selection.

WILDLIFE SITE STATEMENT 5 – ALL sites that meet the standards set by a Habitat Selection Criterion will be identified as Wildlife Sites.

WILDLIFE SITE STATEMENT 6 – The presence of Essex Red Data List species within a Site selected through other criteria shall be used to support the designation of that Site.

WILDLIFE SITE STATEMENT 7 – The Local Wildlife Site Review programme shall attempt to identify all ERDL species that do not have significant populations protected by SSSIs or other Local Wildlife Sites. Priority should be given to those species thought to be especially threatened or in decline, in Essex or nationally. Habitats of significant populations of these species should be considered as Local Wildlife Sites within each of the local authorities where it is known to occur. This does not mean to say that all such populations must be thus protected.

WILDLIFE SITE STATEMENT 8 – A Local Wildlife Site identified on species grounds should contain the habitat requirements at the correct scale for the species concerned, with the limited exception of those species that range widely over the general countryside or coast as part of their normal foraging behaviour.

WILDLIFE SITE STATEMENT 9 – Habitats can be identified as Local Wildlife Sites if their identification as such contributes to the fulfilment of national or local Biodiversity Action Plan prescriptions, targets or policies. This does not mean to say that all such habitats must be identified e.g. the identification of ALL ancient or species-rich hedgerows is not deemed appropriate.

WILDLIFE SITE STATEMENT 10 – Other sites, not covered by criteria stemming from the previous Statements, can be identified as Local Wildlife Sites on the basis of their unique ecological characteristics. These habitat selection criteria shall give due consideration to the values and principles embodied in the "Ratcliffe Criteria", especially Rarity, Naturalness, Typicalness, Fragility, Size, Diversity and Position in an Ecological Unit. Potential Value might also be considered, especially for degraded BAP habitats.

WILDLIFE SITE STATEMENT 11 – Before acceptance, each candidate Local Wildlife Site must be ratified by a Wildlife Sites Forum. These should be locally based, to include local natural history societies, Essex Wildlife Trust Local Group representatives, district/borough/unitary authority officers and the various natural history museums, but with county-based representations from the County Council, Essex Wildlife Trust, Natural England and the Essex Field Club, as well as the RSPB, Woodland Trust and other conservation organisations as appropriate, in order to maintain a comparability of standards across the system.

WILDLIFE SITE STATEMENT 12 – domestic gardens will not ordinarily be considered for selection. The only exception to this might be where the garden provides the very best or only site of an Essex Red Data List species.

WILDLIFE SITE STATEMENT 13 – Local Authorities should include a policy within their Local Plan to allow for the occasional addition or deletion of Local Wildlife Sites from their register within the lifetime of that Plan.

Selection Criteria

These broad Statements were used to generate Habitat Selection Criteria (HCr) and Species Selection Criteria (SCr). The following criteria are phrased such that sites that satisfy the statement shall be "considered" for selection, noting the role in a Wildlife Sites Forum to ratify the Sites and also allowing for expert judgement to rule out sites. Where a criterion relates directly to one or more of the Statements identified above that Statement shall be identified in parentheses at the end of the criterion (e.g. WSS6 = Wildlife Site Statement 6).

Habitat Selection Criteria

Woodland

HCr1 - All sites identified in the Essex Ancient Woodland Inventory compiled by English Nature HCr1(a), plus any other site considered to be ancient by reason of its indicative ground flora, documentary evidence or physical and/or geomorphological qualities shall be considered for selection HCr1(b) (WSS 9).

HCr2 - An area of non-ancient woodland (other than wet woodland) shall be considered for selection if it fulfils at least one of the following categories:

a) It lies immediately adjacent to an ancient woodland and has a diversity of age and/or species structure leading to a complex stratification of the tree and shrub canopies (WSS 9, 10: size, diversity, position in ecological unit).

b) The wood has a diverse age and species structure (including a limited extent of coniferous plantation) and preferably includes the presence of grassy rides, ponds or other open areas, as habitat diversification. The minimum allowable size class will have consideration for the relative abundance of wood in the surrounding countryside (WSS 10).

c) The wood forms part of a mosaic of good quality wildlife habitat in association with at least two other habitats (from: scrub, open water, heath, acid grassland, neutral grassland, calcareous grassland, marsh and swamp). The minimum allowable size class will have consideration for the relative abundance of semi-natural habitat in the surrounding countryside (WSS 10).

d) The wood is identifiable as a "priority" or "characteristic" National Vegetation Classification (NVC) community type for the Natural Area in which the site is located. Greater emphasis shall be given to "priority" woodland types (WSS 9, 10).

For Essex, these woodland types are (priority types are in bold type):

London Basin:

W5 *Alnus glutinosa – Carex paniculata* woodland
W7 *Alnus glutinosa – Fraxinus excelsior – Lysimachia nemorum* woodland
W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland
W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland
W14 *Fagus sylvatica – Rubus fruticosus* woodland
W15 *Fagus sylvatica – Deschampsia flexuosa* woodland
W16 *Quercus* spp. - *Betula* spp. - *Deschampsia flexuosa* woodland

East Anglian Plain:

W2 *Salix cinerea – Betula pubescens – Phragmites australis* woodland
W6 *Alnus glutinosa – Urtica dioica* woodland
W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland
W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland

East Anglian Chalk:

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

Suffolk Coast and Heaths:

W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland

(see Rodwell, 1991 for explanations of these community types).

HCr3 - Areas of ancient parkland, preferably with veteran trees, and a semi-natural grassland ground flora should be considered for selection (WSS 10 and possibly 9).

HCr4 - Veteran parkland trees known to support significant dead wood or other invertebrate assemblages or epiphytic bryophytes or lichens may be selected even in the absence of other parkland features, such as a grassland ground cover. The stand should include a sufficient number of trees to give reasonable habitat conditions in the long term for the species of interest that are associated with the trees (WSS 7, 8, 10).

HCr5 – All significant stands of Willow scrub woodland should be considered for selection. Selection should take into consideration the distribution of this woodland type in the county, size, associated fauna and the characteristic nature of the ground flora. Its place within a mosaic of vegetation types is also an important consideration (WSS 9).

Scrub Communities

HCr6 – Large areas of scrub shall be considered for selection if they fulfil at least one of the following categories:

a) Large areas of scrub known to support significant breeding populations of scrub-dependent birds, provide significant shelter or foraging habitat for migrant passerines (WSS 8, 10: size, naturalness, typicalness).

b) Scrub that forms part of a mosaic of good quality wildlife habitat in association with at least two other habitats (from: woodland, open water, heath, acid grassland, neutral grassland, calcareous grassland, marsh and swamp). The minimum allowable size class will have consideration for the relative abundance of semi-natural habitat in the surrounding countryside and also the species diversity within the scrub block, with smaller blocks being permitted if they are species-rich (WSS 10).

c) Plotland scrub habitat in which the alien garden flora contributes positively to the wildlife value of the scrub, although the semi-natural component should be the dominant feature. Such scrub should include grassy rides and glades or form part of a mosaic with at least two other habitats (from: woodland, open water, heath, acid grassland, neutral grassland, calcareous grassland) (WSS 10: typicalness, diversity).

d) The scrub is identifiable as a “priority” community type for the Natural Area in which the site is located (WSS 10).

These scrub types are:

London Basin: Elm scrub
Greater Thames Estuary: Mediterranean-type Shrubby Seablite/Broom scrub

Orchards

HCr7 - Orchards will be considered for selection if they contain large, old trees with good lichen cover and/or include unusual varieties of tree and/or support populations of associated BAP/ERDL species and/or have a ground flora that would satisfy selection as a grassland site. Size is also an important consideration, as is location within the county (WSS 9, possibly 7 and 10).

HCr8 - Large orchards shall be considered for selection if they regularly support significant over-wintering populations of Fieldfares, Redwings, Song and Mistle Thrushes or other

migratory birds, or breeding populations of species such as Bullfinch (WSS 7, 10: rarity, size).

Ancient and Species-rich Hedgerows and Green Lanes

HCr9 - A hedgerow or green lane shall be considered for selection if it fulfils one of the following categories:

a) It provides an appropriate corridor or habitat connectivity between or close to two or more other woodland or scrub Local Wildlife Sites (WSS 9, 10: position in an ecological unit).
b) It provides a significant extent of scrub or mosaic habitat in a part of the county otherwise deficient in such habitat (WSS 10: rarity).
c) It constitutes part of the "ghost" outline of a former ancient wood and retains some of the characteristic flora and/or fauna of an ancient wood (WSS 9, 10).

Grasslands

HCr10 - All old, largely unimproved grassland shall be considered for selection. Evidence for antiquity shall be taken from the presence of indicator plants, land-form or documentary indications. Reference should also be made to the "priority" National Vegetation classification (NVC) community type for the Natural Area in which the site is located, as well as size, location within the county, species diversity and fragility (WSS 9, 10).

The "priority" grassland types for each Natural Area are as follows:

London Basin:

MG4 *Alopecurus pratensis – Sanguisorba officinalis* grassland
MG5a *Cynosurus cristatus – Centaurea nigra* grassland *Lathyrus pratensis* sub-community
MG5c *Cynosurus cristatus – Centaurea nigra* grassland *Danthonia decumbens* sub-community
East Anglian Plain:

MG4 *Alopecurus pratensis – Sanguisorba officinalis* grassland
MG5a *Cynosurus cristatus – Centaurea nigra* grassland *Lathyrus pratensis* sub-community
MG5b *Cynosurus cristatus – Centaurea nigra* grassland *Galium verum* sub-community
MG5c *Cynosurus cristatus – Centaurea nigra* grassland *Danthonia decumbens* sub-community
MG8 *Cynosurus cristatus – Caltha palustris* grassland

(see Rodwell, 1992 for explanations of these community types).

HCr11 - Old, unimproved or semi-improved pastures or meadows that do not clearly fit criterion HCr10 (e.g. by reason of size or location) shall be considered for selection if they support a rich flora or a significant population of an ERDL species (flora or fauna) (WSS 7, 9, 10: rarity, fragility).

HCr12 - Semi-improved or improved grasslands shall be considered for selection if they significantly increase the key habitat for a site selected on species grounds, such that the grassland is deemed to be part of the essential foraging habitat of that species (WSS 8).

HCr13 – Floristically less interesting pieces of grassland shall be considered for selection if they form an integral part of a mosaic of good quality wildlife habitat in association with at least two other habitats (from: woodland, scrub, open water, heath, other grassland types, marsh or swamp). The minimum allowable size class for the mosaic will have consideration for the relative abundance of semi-natural habitat in the surrounding countryside (WSS 9, 10).

HCr14 - Significant areas of river flood-plain grassland should be considered for selection, especially those areas still subject to seasonal inundation. The role of such grasslands as wildlife corridors should also be considered (WSS8, 9, 10).

HCr15 – All areas of grassland supporting assemblages of species included in Appendix 4 should be considered for selection (WSS 9: national broad habitat, 10: rarity, fragility).

Coastal Grazing Marsh

HCr16 - All fragments of former coastal grazing marsh shall be considered for selection. Final selection should have consideration for size, diversity, the presence of anthills, low-ways and periodically inundated creeks, Essex Red Data List species and the degree of isolation from the associated estuary. The presence of a characteristic flora is desirable but is not essential, especially where the main focus of importance is over-wintering wildfowl and waders (WSS 9, 10).

HCr17 - All sites exhibiting an unrestricted upper saltmarsh to grassland transition should be considered for selection (WSS 9, 10: naturalness, rarity).

Lowland Heathland

HCr18 – All heathland sites listed on the English Nature/RSPB Lowland Heathland Inventory for Essex should be considered for selection (WSS 9).

HCr19 - Any other site supporting characteristic heathland or acid grassland species and with the potential for restoration shall be considered for selection (WSS 9, 10).

Brownfield Sites

HCr20 – Brown Field sites will be considered for selection if they are known to support Essex Red Data List species and have the habitat qualities necessary to support those species. The site may include sections of land that might not otherwise qualify for selection, if they provide one or more of the ecological requirements of the notable species (WSS 8, 9 (potentially), 10).

Reedbeds

HCr21 - All significant stands of Reed (*Phragmites australis)* will be considered for selection (WSS 9), either in their own right or as part of a larger mosaic of habitats. Selection should take into account overall size, the dimensions of the bed, with wider stands being better, and also the degree of human disturbance.

HCr22 – Smaller or thinner stands of reedbed shall be considered if they form part of a mosaic of other habitats, including open water, wet woodland, marsh and other swamp communities (WSS 10).

Swamp and Tall-herb Fen

HCr23 - Areas of species-rich swamp or fen, or such habitats supporting rare species or NVC community types shall be considered for selection. Usually such sites will include the associated water body or source of groundwater, if applicable.

Freshwater Habitats

HCr24 - Where a section of river, stream, canal or borrow dyke is designated via Species Selection Criteria, a minimum 500 metre section of that water course shall be designated (250 metres upstream and downstream of a positive sample site) or 250 metres upstream and downstream of the end points of a cluster of records from the same population (WSS8). The Local Wildlife Site shall be deemed to extend at least 2 metres away from the top of the bank into the adjacent habitat.

HCr25 - Where two designated sections of watercourse are separated by no more than 1000 metres of undesignated water, the intervening section may be included within one large Site, if it is deemed that the central section has the potential to be restored to good condition or realistically colonised by the species concerned (WSS 8, 10: potential value).

HCr26 - Where sections of lakes or ponds hold species or vegetation stands of interest, the whole water body shall be designated (WSS 8, 10).

HCr27 – Sections of river that support a suite of natural features, leading to a complex riverine habitat structure should be considered for selection. Such features should include a good diversity of emergent vegetation, floating aquatic plants, shallow "riffles" and deeper pools, a natural rather than hard engineered banks and a more or less meandering rather than canalised course (WSS 10: naturalness, rarity, size, diversity, fragility).

Saline Lagoons

HCr28 – Sections of borrow dyke and tidal or semi-tidal brackish or saline lagoons not lying within SSSIs should be considered for selection. Such sites should have some ecological link with the adjacent coastal habitats and be free from gross pollution (WSS 9, 10).

Sand Dune and Shingle

HCr29 - All remaining fragments of sand dune and shingle habitat outside of SSSIs and exhibiting a characteristic land form and flora should be considered for selection (WSS 10).

The following BAP habitats are not included within specific criteria, although the system allows for their characteristic species to allow for site selection through Species Selection criteria.

Cereal Field Margins are only likely to be selected if part of a whole-farm conservation network and shown to be supporting populations of associated BAP species (at local or national BAP level).

Eel-grass Beds: Wildlife Site status is usually restricted in Essex to terrestrial and freshwater habitats rather than inter-tidal habitats. Most if not all Eel-grass beds off the Essex coast are already covered by SSSI protection as well as international designations.

Urban Habitats: the BAP for this category is very broad, encompassing old countryside features encapsulated in towns by urban sprawl, newly "designed" green areas within urban development and also brown field and post-industrial sites. The unique soil/geology/landform and associated flora and fauna of post-industrial and brown field sites may merit selection automatically, but the role of a site within an urban environment is more likely to be a supportive rather than primary designation. Exceptions to this are likely to be important wildlife corridors within urban developments.

One last criterion might be considered with caution. This is the case of a site with several "near misses". For example, a site might have an interesting suite of invertebrates but without any ERDL species being present, plus a good but not exceptional flora and also a presumed role as a wildlife corridor between two better sites. There is some justification in including special cases within the selection process although over-reliance on this criterion could be seen as a weakness in the system. It is, though, ecologically more defendable than merely altering the other habitat criteria so that these sites then qualify:

HCr30 – A site that comes close to qualifying on a number of other selection criteria can be considered for selection when the total sum of its wildlife interest is taken into account. The case for such selection must be argued by suitably qualified experts in those species and/or habitats involved (WSS 10).

Species Selection Criteria

Amphibians and Reptiles

SCr1 – Significant breeding populations of Great Crested Newts shall be considered for selection. Such sites should have a suitable flora for egg-laying and nursery areas and should include a core area of terrestrial habitat used outside the breeding season. Consideration shall be given to the proximity or otherwise of adjacent meta-populations and its location in the county (WSS 8, 9).

SCr2 – Any site (other than a garden pond) known to support a breeding population of Palmate Newts shall be considered for selection. Such sites should have a suitable flora for egg-laying and nursery areas and should include a core area of terrestrial habitat used outside the breeding season (WSS 7, 8, 12).

SCr3 – Any site (other than a garden pond) with three or more species of breeding amphibian shall be considered for selection. Such sites should have a suitable flora for egg-laying and nursery areas and should include a core area of terrestrial habitat used outside the breeding season (WSS 7, 8, 12).

SCr4 – Any site supporting significant populations of three or more reptile species shall be considered for selection. Such sites should include sufficient terrestrial (and in the case of Grass Snake also aquatic) habitat to maintain viable populations of the species. The threshold for significance in the vice-county of north Essex shall be lower than that for south Essex (WSS 7,8).

SCr5 – The presence of two species of reptile and/or amphibian species can be used to further the case for selection in the instance of marginal sites that might not otherwise have been selected, under other criteria. Such sites should include sufficient terrestrial (and in the case of Grass Snake also aquatic) habitat to maintain viable populations of the species. The

threshold for significance in the vice-county of north Essex shall be lower than that for south Essex (WSS 7, 8).

Mammals

Bats

SCr6 – All colonial winter hibernation sites for any bats species in Essex (other than an occupied residential property, should this occur) shall be considered for selection as a Wildlife Site (WSS 7, 9).

Dormouse

SCr7 – All sites known to support breeding populations of Dormouse should be considered for selection. All woodland immediately contiguous with the known site should also be included if it supports habitat conditions thought to be favourable to Dormice (WSS 7, 8, 9).

SCr8 – All woodland close to a known Dormouse population, with appropriate habitat conditions and connected to the colony site with one or more hedgerows should be considered for selection, as should the connecting corridors (WSS 7, 8, 9).

Otter

SCr9 – Any Otter holt, natural or artificial, known to have been occupied within the last 5 years, plus the sections of river 200 metres either side of that holt and all semi-natural vegetation 20 metres behind that length of river bank shall be considered for selection (WSS 7, 9).

Birds

SCr10 – Where significant breeding or over-wintering habitat of ERDL bird species can be reasonably identified as discrete areas, then they shall be considered for selection. Advice should be sought from the Essex Birdwatching Society and should include the recent stability of the breeding/over-wintering site rather than "one-off" year records.

Invertebrates

SCr11 – a site known or suspected to support a breeding assemblage of invertebrates with a Species Quality Index of at least 5 will be considered for selection (minimum sample of 60 species, 8 hours of field work) (WSS 10: Diversity, Rarity).

SCr12 – Significant populations of ERDL invertebrates or noteworthy assemblages of distinct taxa (e.g. dragonflies, butterflies) should be considered for selection. The interpretation of significance should take into account both the core populations at the centre of its range and also stable populations on the periphery, especially where colony expansion or colonisation of nearby habitat is likely (WSS 7).

Plants

SCr13 – Significant populations of ERDL vascular plants, bryophytes, lichens and/or fungi should be considered for selection. The interpretation of significance should take into account both the core populations at the centre of its range and also stable populations on the

periphery, especially where colony expansion or colonisation of nearby habitat is likely (WSS 7).

SCr14 – Particularly significant rare plant assemblages, other than those listed on the ERDL might also be considered if they form a significant proportion of the county's resource of that species.

APPENDIX 2
SPECIES INDICATIVE OF ANCIENT WOODLAND IN ESSEX

Wood Anemone		Anemone nemorosa
Woodruff	*	Galium odoratum
Nettle-leaved Bellflower	*	Campanula trachelium
Smooth-stalked Sedge	*	Carex laevigata
Pale Sedge	*	Carex pallescens
Pendulous Sedge		Carex pendula
Remote Sedge		Carex remota
Thin-spiked Wood Sedge	*	Carex strigosa
Pignut		Conopodium majus
Lily of the Valley	*	Convallaria majalis
Climbing Fumitory		Corydalis claviculata
Midland Hawthorn	*	Crataegus laevigata
Scaly Male Fern		Dryopteris pseudomas
Broad-leaved Helleborine	*	Epipactis helleborine
Purple Helleborine	*	Epipactis purpurata
Spindle Tree		Euonymus europaeus
Wood Spurge	*	Euphorbia amygdaloides
Yellow Archangel		Galeobdolon luteum
Bluebell		Hyacinthoides non-scripta
Hairy St. John's-wort		Hypericum hirsutum
Bitter Vetchling	*	Lathyrus montanus
Hairy Woodrush	*	Luzula pilosa
Great Woodrush	*	Luzula sylvatica
Yellow Pimpernel		Lysimachia nemorum
Common Cow-wheat		Melampyrum pratense
Wood Melick		Melica uniflora
Dog's Mercury		Mercurialis perennis
Wood Millet		Milium effusum
Three-veined Sandwort		Moehringia trinervia
Bird's Nest Orchid		Neottia nidus-avis
Early Purple Orchid		Orchis mascula
Wood Sorrel		Oxalis acetosella
Herb Paris	*	Paris quadrifolia
Water Purslane	*	Peplis portula
Greater Butterfly Orchid		Platanthera chlorantha
Oxlip	*	Primula elatior
Primrose		Primula vulgaris
Sessile Oak		Quercus petraea
Goldilocks Buttercup		Ranunculus auricomus
Butcher's Broom	*	Ruscus aculeatus
Orpine		Sedum telephium
Wild service Tree	*	Sorbus torminalis
Small-leaved Lime	*	Tilia cordata
Early Dog Violet		Viola reichenbachiana

[Sources: Rackham (1986) Table 4, p.50 - species with an "indicator value" of 4 are marked "*" above, those with a value of 1 are not included here; Rackham (1980) Tables 5.1 and 5.2 - species with an affinity with ancient woodland which is described as "strong", "very strong" or "strict" are marked "*" above, those with an affinity below "moderate" are excluded here, as are plants which are extremely rare in Essex.]

APPENDIX 3
SPECIES INDICATIVE OF OLD, UNIMPROVED NEUTRAL/ACID GRASSLAND AND MARSH IN ESSEX

Key:
"*" denotes plants which seldom occur outside unimproved grasslands/marshes or are particularly indicative of a long period of traditional grassland management. "M" denotes species indicative of old, unimproved marshes "A" denotes species indicative of unimproved acidic grassland

Sneezewort	*	Achillea ptarmica
Quaking Grass	*	Briza media
Meadow Brome		Bromus commutatus
Smooth Brome		Bromus racemosus
Marsh Marigold	M	Caltha palustris
Harebell	A	Campanula rotundifolia
Lady's Smock		Cardamine pratensis
Tufted Sedge		Carex acuta
Ribbed Sedge	A	Carex binervis
Spring Sedge		Carex caryophyllea
Straight-beaked Sedge		Carex demissa
Distant Sedge		Carex distans
Soft Brown Sedge		Carex disticha
Star Sedge		Carex echinata
Black Sedge		Carex nigra
Carnation Sedge		Carex panicea
Greater Tussock Sedge		Carex paniculata
Bladder Sedge		Carex vesicaria
Pignut		Conopodium majus
Early Marsh Orchid		Dactylorhiza incarnata
Southern Marsh Orchid		Dactylorhiza praetermissa
Heath Grass	A	Danthonia decumbens
Water Horsetail		Equisetum fluviatile
Fen Bedstraw		Galium uliginosum
Lady's Bedstraw		Galium verum
Dyer's Greenweed		Genista tinctoria
Glaucous Sweet-grass		Glyceria declinata
Round-fruited Rush		Juncus compressus
Heath Rush	A	Juncus squarrosus
Blunt-flowered Rush	M	Juncus subnodulosus
Grass Vetchling		Lathyrus nissolia
Ragged Robin	M	Lychnis flos-cuculi
Creeping Jenny		Lysimachia nummularia
Purple Moor-grass	A	Molinea caerulea
Tubular Water-dropwort	M	Oenanthe fistulosa
Adder's Tongue Fern		Ophioglossum vulgatum
Green-winged Orchid	*	Orchis morio
Lousewort		Pedicularis sylvatica
Trailing Tormentil		Potentilla anglica
Tormentil	A	Potentilla erecta
Salad Burnet		Poterium sanguisorba
Cowslip		Primula veris
Yellow Rattle	*	Rhinanthus minor

Meadow Saxifrage	*	Saxifraga granulata
Lesser Skullcap	M	Scutellaria minor
Marsh Ragwort		Senecio aquaticus
Pepper Saxifrage	*	Silaum silaus
Autumn Lady's-tresses	*	Spiranthes spiralis
Betony		Stachys officinalis
Bog Stitchwort		Stellaria alsine
Meadow Rue		Thalictrum flavum
Wild Thyme		Thymus polytrichus
Sulphur Clover		Trifolium ochroleucon
Subterranean Clover		Trifolium subterraneum
Marsh Arrowgrass		Triglochin palustris
Marsh Valerian		Valeriana dioica
Pink Water Speedwell		Veronica catenata

APPENDIX 4
INDICATIVE CHALK GRASSLAND PLANTS

Note: Some of these species can also be found within unimproved chalky boulder clay or exception neutral soil meadows. This appendix is intended to be applied when considering sites on a solid chalk substrate.

Pyramidal Orchid	Anacamptis pyramidalis
Wild Liquorice	Astragalus glycyphyllos
Yellow-wort	Blackstonia perfoliata
Quaking Grass	Briza media
Clustered Bellflower	Campanula glomerata
Carline Thistle	Carlina vulgaris
Great Knapweed	Centaurea scabiosa
Stemless Thistle	Cirsium acaule
Woolly Thistle	Cirsium eriophorum
Basil-thyme	Clinopodium acinos
Crosswort	Cruciata laevipes
Autumn Gentian	Gentianella amarella
Rock-rose	Helianthemum nummularium
Meadow Oat-grass	Helictotrichon pratense
Ploughman's Spikenard	Inula conyzae
Catmint	Nepeta cataria
Marjoram	Origanum vulgare
Knapweed Broomrape	Orobanche elatior
Salad Burnet	Sanguisorba minor ssp. minor
Small Scabious	Scabiosa columbaria
Wild Thyme	Thymus polytrichus

APPENDIX 5

EVOLUTION OF LOCAL NATURE CONSERVATION INITIATIVES

This section examines the evolution of local, national and international policy and legislation that guides, enforces and encourages the consideration of nature conservation issues within the local planning system. It should be stressed that the role of local authorities in planning future development and management of land goes far beyond statutory requirements, such as those laid out in Planning Policy Statement 9 and other legal requirements. There is also a desire to conserve the intrinsic appeal of the land, to maintain and, where possible, enhance, "local character" in terms of assemblages of animals and plants, the landscape appeal that most semi-natural habitats have as well as ecological oddities that give the area a unique "selling point". There is an opinion, perhaps over-simplified, that land development inevitably leads to an ever-increasing erosion of the wildlife habitats and the number of plants and animals to be found in an area. The Greengrid being developed by Thurrock Council is seeking to ensure that all future developments within the borough actively contribute to the biodiversity and character of Thurrock.

UK Legislation and Guidance

Statutory site designation for nature conservation purposes has its basis in the 1949 National Parks and Access to the Countryside Act, which introduced the concept of Sites of Special Scientific Interest (SSSI) as well as National Nature Reserves (NNR). The need for habitat surveys and ultimately the desirability of being aware of the local network of important wildlife areas was identified as long ago as 1968. Section 11 of the Countryside Act 1968 advised local authorities,

> "to have regard to the desirability of conserving the natural beauty and amenity of the countryside", which embraces the conservation of flora and fauna. In particular, Paragraph 39 highlighted the advantage of having "a base of information, including thematic maps on wildlife and habitats, to inform and assist in the development of policies which take account of the needs of conservation..."

Still the single most important piece of recent wildlife legislation is The Wildlife and Countryside Act 1981, although it has undergone a number of significant amendments since its adoption, (e.g. the 1985 Wildlife and Countryside (Amendment) Act and most recently the Countryside and Rights of Way Act 2000 – the "CROW" Act). The 1981 Act made further provision for the protection of Sites of Special Scientific Interest (SSSI), which are among the most important wildlife habitats in the country. However, as discussed below, it was also widely recognised that there were a large number of sites of great value in the county and/or district context which had no legal protection but which contributed significantly to the diversity of habitat, flora and fauna in the countryside.

Over the last 20 years there has been a series of attempts to recognise and protect these "other" sites through the planning system. The first step in this direction came with the Department of the Environment's guidance to local authorities in DoE Circular 27/87: "Nature Conservation". In this, the Secretary of State said he was:

> "...anxious to ensure that conservation aspects, together with all other relevant factors, are given full consideration before planning policies are drawn up which

would affect such sensitive areas (SSSIs or other types of protected areas). The inclusion in a development plan of land-use policies dealing with nature conservation can make a significant contribution to the achievement of this objective."

Circular 27/87 also recognised the role of other wildlife sites in forming buffers, wildlife corridors and links between populations of plants and animals. The importance of these connections between the statutorily designated sites cannot be over-emphasised. In Paragraph 6 it stated that:

> "...our natural wildlife heritage is not confined to the various statutorily designated sites and there is a continuous gradation of nature conservation interest throughout the countryside and in many urban areas."

Later, DoE Circular 1/92: "Planning Controls Over Sites of Special Scientific Interest" reinforced and extended the consultation required on proposals that either directly or indirectly affect SSSIs.

More recently, the national government influenced local planning policies (on all matters) through the publication of Planning Policy Guidance (PPG) notes. The most significant one for wildlife matters was PPG9 “Nature Conservation”, issued October 1994. This cancelled DoE Circulars 27/87 and 1/92 quoted above. The aims of PPG9 were to:

- set out the Government’s objectives for nature conservation, and the framework for safeguarding our natural heritage under domestic and international law;
- describe the key role of local planning authorities and English Nature;
- emphasise the importance of both designated sites and undesignated areas for nature conservation;
- advise on the treatment of nature conservation issues in development plans;
- state the development control criteria, particularly for Sites of Special Scientific Interest and sites with additional national and international designations;
- contribute to the implementation of the EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (“the Habitats Directive”);
- elaborate on mineral development and nature conservation, and on the development control implications of species protection.

Adapted from DoE (1994).

Nature conservation considerations were not restricted to PPG9, however, with further guidance given where it impinges upon countryside and agricultural economics and development (PPG7), development plans and sustainable development (PPG12), mitigation of transport proposals (PPG13), interactions with sport and recreation (PPG17), coastal planning (PPG20) and tourism (PPG21).

PPG9 advised that local authorities should identify relevant nature conservation interests in local plans and ensure that the protection and enhancement of those interests is properly provided for in development and land-use policies.

The latest significant piece of environmental legislation is the Countryside and Rights of Way (CROW) Act 2000. Campaigners were originally hoping to see some form of statutory protection for Local Wildlife Sites included in this Act and although this did not happen, there are sections that reinforce the need to conserve local biodiversity.

In September 2004 the Office of the Deputy Prime Minister (ODPM) issued a Consultation document detailing the proposed replacement of PPG9 with "Planning Policy Statement 9: Biodiversity and Geological Conservation" (PPS9), claiming that the broad policy objectives included therein are, "firmly based on the principles set out in '*Working with the grain of nature – a biodiversity strategy for England*', published by Defra in 2002. [Note: on May 5th 2006 the ODPM became the Department for Communities and Local Government, DCLG].

Parallel to this, a consultation draft of a Circular was also published. The circular set out administrative guidance on the application of the law relating to planning and nature conservation. All other previous PPGs are replaced by equivalent PPS documents.

PPS9 was published in August 2005, along with a Code of Good Practice and a Government Circular (06/2005) setting out statutory obligations for local authorities. PPS9 now sets out policies that will need to be taken into account by local planning authorities in the preparation of local development documents (Local Development Frameworks) and may also be material to decisions on individual planning applications. PPS9 promotes in general terms the various biodiversity initiatives now established at national and local level. Referring to *Working with the grain of nature – a biodiversity strategy for England* (Defra, 2002) PPS9 states that,

> "It [the Defra publication] includes the broad aim that planning, construction, development and regeneration should have minimal impacts on biodiversity and enhance it wherever possible".

By basing future Local Wildlife Site selection criteria strongly within the realm of protecting biodiversity, it should be possible to demonstrate that the Local Wildlife Site system is an integral and key part of delivering this broad aim and that, as such, Local Wildlife Sites have an irrefutable place within all local authority planning documents.

The notion of sites of "local importance" is referred to within the Key Principles of the National Planning Policies within PPS9:

> "1. Regional planning bodies and local planning authorities should adhere to the following key principles to ensure the potential impacts of planning decisions on biodiversity and geological conservation are fully considered.
> (i) Development plan policies and planning decisions should be based upon up-to-date information about the environmental characteristics of their areas. These characteristics should include the relevant biodiversity and geological resources of the area. In reviewing environmental characteristics local authorities should assess the potential to sustain and enhance those resources.
> (ii) Plan policies and planning decisions should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests. In taking decisions, local planning authorities should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; and to biodiversity and geological interests within the wider environment" (ODPM, 2005).

The issue of "appropriate" weight for sites that are deemed by the ODPM to be of "local importance" was also a matter of concern within the Wildlife Trust movement. Whilst Defra and English Nature favoured the term "Local Wildlife Sites" for the former SINC network, the use of the word "local" was generally resisted by the Wildlife Trusts. It implies that Local Wildlife Sites cannot be of national importance, which is often incorrect, and therefore

enhances the idea that "Local Wildlife Sites" are only second or third tier sites in terms of nature conservation value. Thus, a developer might interpret the need to "ensure that appropriate weight" is given to local sites as the need to give them little if any attention, because they are of such lowly rank. However, recent Defra guidance publications have reinforced the name of Local Wildlife Sites or Local Sites and the name "Local Wildlife Sites" is therefore now being adopted by the Essex Wildlife Trust.

This "pecking order" for nature conservation sites is unfortunately further emphasised, when dealing with local development documents. Key Principle 5 states that, Local Development Frameworks should,

> "indicate the location of designated sites of importance for biodiversity and geodiversity, making clear distinctions between the hierarchy of international, national, regional, and locally designated sites"

An interesting point to dwell on here is that the level at which sites are designated i.e. by the European Union, national government or local authority is NOT always directly correlated to the level of nature conservation importance of that site. Local authorities are still looking after sites of national importance that have not been recognised as SSSIs by central government. Such sites can be included within the Local Wildlife Site network but it should not be inferred that they are, by default, only of local importance.

Traditionally, the "Wildlife Site" networks across the country have been led, or at least strongly influenced by, county Wildlife Trusts. In recent years, however, the desires to see a national standard identified for such sites and calls to give greater statutory protection to Sites have led to English Nature and Defra now taking a more active interest in developing such systems. In April 2000 the DETR (now Defra) established a Local Sites Review Group (LSRG), with English Nature reporting its position in 2002, as cited above. The dialogue between Defra, English Nature and the Wildlife Trusts lasted for several years and resulted in final publications in 2006. Much of the deliberations dominating these discussions relate to policy emphasis, funding and management of wildlife site systems, the processes by which sites should be designated and broad ecological and biodiversity principles rather than fine detail of selection criteria.

In recent years, much more emphasis has been given to all aspects of local government acting and decision-making at a regional rather than county level. Of relevance here is the East of England Plan Regional Spatial Strategy (RSS14), which was first produced in 2004. The "vision statement" for RSS14 is,

> To sustain and improve the quality of life for all people who live in, work in, or visit the region, by developing a more sustainable, prosperous and outward-looking region, while respecting its diversity and enhancing its assets".

Its objectives are to:

(i) increase prosperity and employment growth to meet identified employment needs of the Region, and achieve a more sustainable balance between workers and jobs;
(ii) improve social inclusion and access to employment and services and leisure and tourist facilities among those who are disadvantaged;
(iii) maintain and enhance cultural diversity while addressing the distinctive needs of different parts of the region;
(iv) increase the regeneration and renewal of disadvantaged areas;

(v) deliver more integrated patterns of land use, movement, activity and development, including employment and housing;
(vi) sustain and enhance the vitality and viability of town centres;
(vii) make more use of previously developed land and existing buildings, and use land more efficiently, in meeting future development needs;
(viii) meet the region's identified housing needs, and in particular provide sufficient affordable housing;
(ix) protect and enhance the built and historic environment and encourage good quality design and use of sustainable construction methods for all new development;
(x) protect and enhance the natural environment, including its biodiversity and landscape character;
(xi) minimise the demand for use of resources, particularly water, energy supplies, minerals, aggregates, and other natural resources, whether finite or renewable, by encouraging efficient use, re-use, or use of recycled alternatives, and trying to meet needs with minimum impact;
(xii) minimise the environmental impact of travel, by reducing the need to travel, encouraging the use of more environmentally friendly modes of transport, and widening choice of modes;
(xiii) ensure that infrastructure programmes, whether for transport, utilities or social infrastructure, will meet current deficiencies and development requirements; and that the responsible agencies commit the resources needed to implement these programmes and co-ordinate delivery with development; and
(xiv) minimise the risk of flooding.

Finally and most recently, the Natural Environment and Rural Communities Act 2006 places a duty on public bodies [Section 40(1)] to consider biodiversity:

> "Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity".

In order to help local authorities consider the needs of biodiversity within the planning process, the Essex Wildlife Trust has produced a CD ROM "Integrating Biodiversity into development....realising the benefits, Guidance for Developers and Planners in Essex, Southend and Thurrock".

The Town & Country Planning Association has also produced Biodiversity by Design, a Sustainable Communities Guide. Its aim is to provide guidance on how to maximise the opportunities for biodiversity in the planning and design of sustainable communities. It covers each stage of the design process, presenting a toolkit of best practice that can be tailored to different scales of opportunity.

International Responsibilities

Nationally and internationally important sites have a degree of statutory protection. Some designations arise from international agreements to which the British Government is a signatory, with two of the most important early agreements being those relating to Special Protection Areas (SPAs) and Ramsar sites. SPAs are defined under Article 4 of European Council Directive on Conservation of Wild Birds 79/409/EEC. Designation of the most important wetland sites is urged by the Ramsar Convention on Wetlands of International Importance.

One of the newest government initiatives, again cutting across all aspects of local government, is the introduction of "best value" indicators at both national and local levels. In order to assist local authorities with the task of determining appropriate Performance Indicators (PI), the Audit Commission and the Improvement and Development Agency (IDeA) have developed a library of "off the shelf" local PIs, including those for sustaining Biodiversity.

PPS9 states in Key Principle 6 that,

> "The most important sites for biodiversity are those identified through international conventions and European Directives."

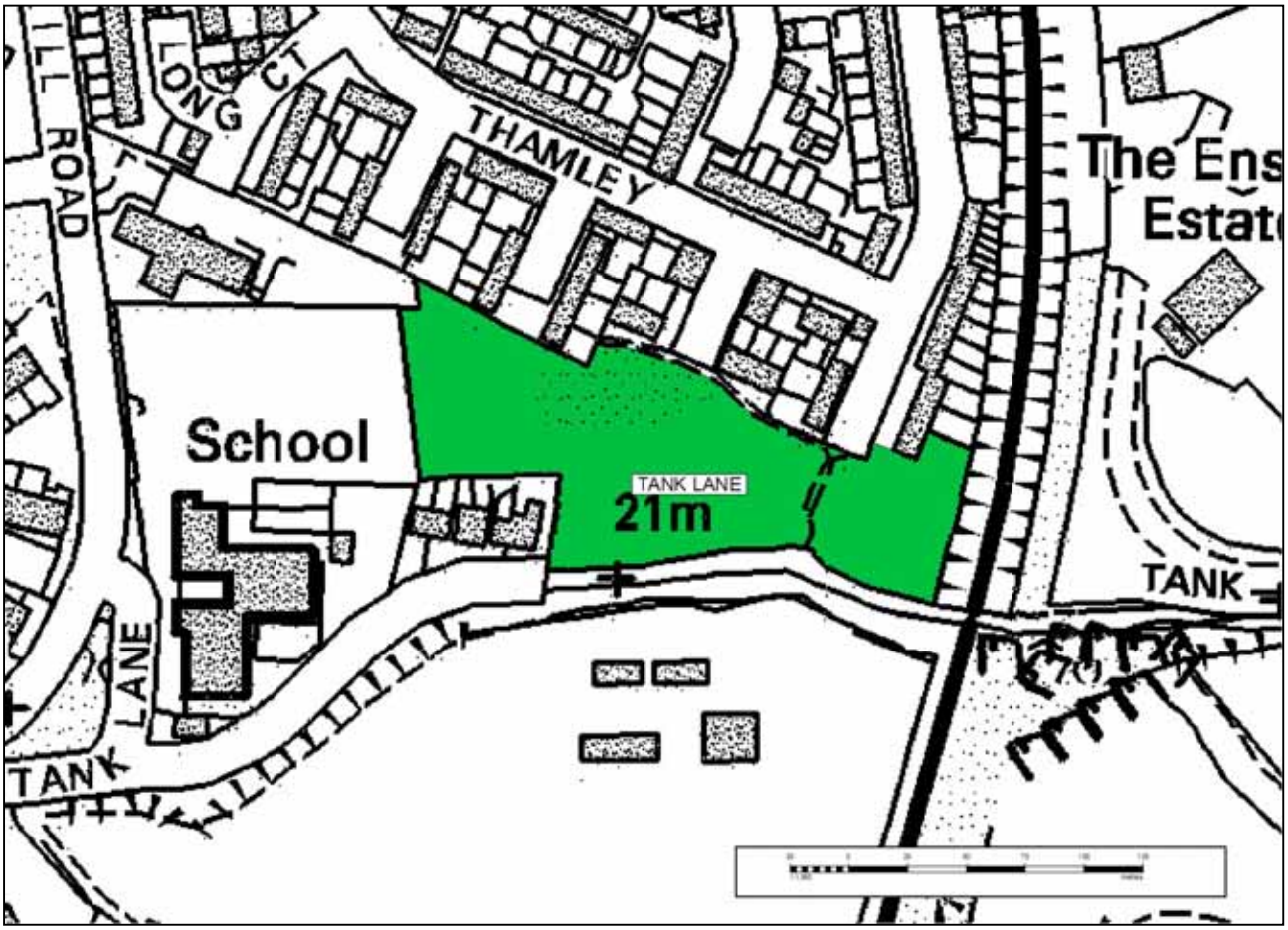
Whilst this may be true at a global level, it can be argued that it not true at a more local level, if one draws a distinction between "biodiversity" in the widest sense of the word i.e. the diversity of biological organisms and the more limited set of those species and habitats for which Biodiversity Action Plans have been or are being written. Most internationally designated sites in Essex are coastal mud-flats and marshes. These support very significant numbers of international migrant birds, such as Brent Goose, Dunlin, Redshank, Godwits and Wigeon. These birds are supported by an enormous biomass of mud invertebrates, but the number of species involved is quite small. An international site may be designated for the presence in large numbers of only a handful of birds, which feed on a few dozen invertebrate species – not a very "biodiverse" assemblage, compared to a large brownfield site that may support hundreds of invertebrate species and dozens of national rarities covering plants, bugs, spiders, bees and wasps and so on. A similar logic can be applied to ancient woods and many grassland habitats – they are all more diverse than mudflats. Some people would argue that because the brownfield site or ancient wood is more biodiverse than a mudflat, the Key Principle 6 quoted above does not hold true at a local or even national level. This does not, of course, mean to say that we should abandon our international responsibility to protect these migrant birds and their habitats, but it further illustrates the fact that true conservation of biodiversity comes through the protection of a sound Wildlife Site network, rather than a few representative SSSIs or international sites.

APPENDIX 6

LOCAL WILDLIFE SITES REGISTER

Site Number							
New	**Old**	**Site Name**	**Area (ha)**	**Grid Reference**		**Status Change**	**Reason for Selection**
Th1	-	Tank Lane	1.1	TQ	554786	New	Chalk grassland flora; invertebrates
Th2	FW1	Aveley Lake	10.7	TQ	555822	Unchanged	Reedbed; grassland flora
Th3	-	"Jill's Field"	4.8	TQ	556798	New	Grassland flora
Th4	W1	Warwick Wood	5.5	TQ	557828	Unchanged	Ancient Wood
Th5	-	Purfleet Pit	3.2	TQ	560784	New	Invertebrates
Th6	W2	White Post Wood	5.2	TQ	563828	Unchanged	Ancient Wood
Th7	W3	Watts's Wood	9.9	TQ	565788	Unchanged	Ancient Wood
Th8	W4	Brickkiln Wood	2.6	TQ	571822	Unchanged	Ancient Wood
Th9	FW3	Belhus Lakes	15.6	TQ	574826	Enlarged	Wet woodland; breeding birds
Th10	-	Belhus Park East	13.9	TQ	575814	New	Grassland flora
Th11	G2	Mar Dyke	77.6	TQ	577798	Boundary revisions	River flood-plain
Th12	W5	Hangman's Wood	3.8	TQ	578804	Unchanged	Ancient Wood
Th13	W6	Oak Wood	5.3	TQ	578817	Unchanged	Ancient Wood
Th14	W9	Low Well Wood	4.8	TQ	580801	Enlarged/split	Ancient Wood
Th15	G3	West Thurrock Reedbed	2.8	TQ	581771	Boundary revision	Reedbed
Th16	-	Arena Essex	24.4	TQ	583797	New	Rare flora
Th17	W7	Little Dilkes Wood	1.1	TQ	583811	Unchanged	Ancient Wood
Th18	M1	West Thurrock Lagoon	20.5	TQ	585771	Split from SSSI	Invertebrates
Th19	W8/9	Millard's Garden/Brannett's Wood	20.4	TQ	585803	Boundaries revised	Woodland complex
Th20	W10	Brickbarn Wood	10.6	TQ	586799	Greatly enlarged	Woodland complex; rare flora
Th21	-	Arisdale Avenue	16.6	TQ	586827	New	Invertebrates
Th22	-	Grenville Road Grasslands	1.3	TQ	589783	New	Chalk grassland flora; invertebrates
Th23	-	Anchor Field	3.3	TQ	590779	New	Invertebrates; reptiles
Th24	-	Mill Wood And Cliff	3.5	TQ	594787	New	Invertebrates; ancient wood
Th25	-	South Ockendon Church	1.2	TQ	595829	New	Grassland flora
Th26	-	Warren Lane Grasslands	1.4	TQ	597787	New	Invertebrates
Th27	M2	Warren Gorge	26.4	TQ	598791	Boundary revised	Grassland flora; invertebrates
Th28	M3	Lion Gorge	7.4	TQ	599786	Boundary revised	Flora; invertebrates; bats
Th29	W11/12	Palmer's Shaws	3.2	TQ	601812	Enlarged	Ancient Wood
Th30	-	Clockhouse Cliff	1.3	TQ	602790	New	Chalk grassland flora; invertebrates
Th31	part M4	Grays Pit Extensions	5.9	TQ	606789	Largely New	Invertebrates; wildlife corridor
Th32	-	Sandmartin Cliff	0.4	TQ	607792	New	Invertebrates
Th33	W13	Cats Mede	2.6	TQ	609809	Unchanged	Ancient Wood
Th34	-	Blackshots Nature Area	18.7	TQ	630807	New	Invertebrates
Th35	-	Little Thurrock Reedbeds	1.4	TQ	631778	New	Reedbed
Th36	W15	Terrels Heath	2.5	TQ	638792	Unchanged	Ancient Wood
Th37	M5	Tilbury Marshes	39.8	TQ	651757	Boundaries revised	Coastal grazing marsh

Th38	G5	Broom Hill	11.3	TQ	654778	Unchanged	Invertebrates; flora
Th39	-	Lytag Brownfield	12.4	TQ	657764	New	Acid grassland; reptiles
Th40	M6	Tilbury Centre	2.8	TQ	658759	Boundaries revised	Reedbed; invertebrates
Th41	G6	Mucking Heath	50.5	TQ	658806	Unchanged	Flora; invertebrates
Th42	G7	West Tilbury Hall	2.5	TQ	660776	Enlarged	Grassland flora
Th43	G8	West Tilbury Church	0.5	TQ	661777	Unchanged	Grassland flora
Th44	-	Orsett Camp Quarry	8.6	TQ	661809	New	Invertebrates; reptiles
Th45	-	Rainbow Shaw	2.2	TQ	662798	New	Ancient Wood
Th46	-	Linford Pit	14.3	TQ	668802	New	Invertebrates
Th47	-	Low Street Pit	3.5	TQ	672775	New	Invertebrates; flora
Th48	G9	Horndon Meadow	0.7	TQ	672851	Unchanged	Grassland flora
Th49	-	Goshems Farm	74.0	TQ	674760	New	Invertebrates; flora
Th50	-	Buckingham Hill	22.9	TQ	674809	New	Acid grassland
Th51	W16	Linford Wood	3.2	TQ	676797	Boundary revised	Wet woodland complex
Th52	-	Goldsmiths Meadow	3.3	TQ	676862	New	Old grassland
Th53	W17	Hall/Gravelhill Woods	9.9	TQ	678866	Unchanged	Ancient Wood
Th54	W18	The Park/Coombe Wood	24.6	TQ	679862	Greatly enlarged	Woodland complex
Th55	FW4	Gobions Lake	19.1	TQ	682800	Boundary revised	Reedbed; breeding birds; wet woodland
Th56	-	Fell-Me-Down Shaw	4.2	TQ	683850	New	Ancient Wood
Th57	W19	Old Hill/Gt. Sutton Wood	13.7	TQ	683856	Greatly enlarged	Woodland complex
Th58	G10	Stanford Meadow	2.6	TQ	685813	Unchanged	Old grassland
Th59	-	Grovehouse Wood And Marsh	2.3	TQ	685818	New	Wet woodland; reedbed; Elmwood
Th60	G11	Stanford Warren Wetland	20.9	TQ	687813	Enlarged	Reedbed and damp grassland
Th61	W20/21	Northlands Wood	19.8	TQ	691857	Enlarged	Woodland complex; hedgerows
Th62	FW5	Warren Lakes	9.8	TQ	693814	Reduced	Wet woodland
Th63	G12	One Tree Hill	3.3	TQ	696859	Split, reduced	Grassland flora
Th64	G12	Martinhole Meadow	1.3	TQ	697862	Split	Old grassland
Th65	W22	Martinhole Wood Complex	7.0	TQ	700860	Enlarged, some loss	Ancient Wood; hedgerows
Th66	G14	Hawkesbury Grasslands	13.5	TQ	703865	Unchanged	Old grassland
Th67	-	Vange Depot	7.1	TQ	710860	New	Reptiles; flora
Th68	G17	Fobbing Reedbeds	4.9	TQ	724850	Greatly enlarged	Reedbed
Th69	G15/18	Corringham/Fobbing Marsh	307.2	TQ	727834	Boundaries revised	Coastal grazing marsh
Th70	part G15	Manorway Fleet Reedbed	9.5	TQ	733827	Split, enlarged	Reedbed



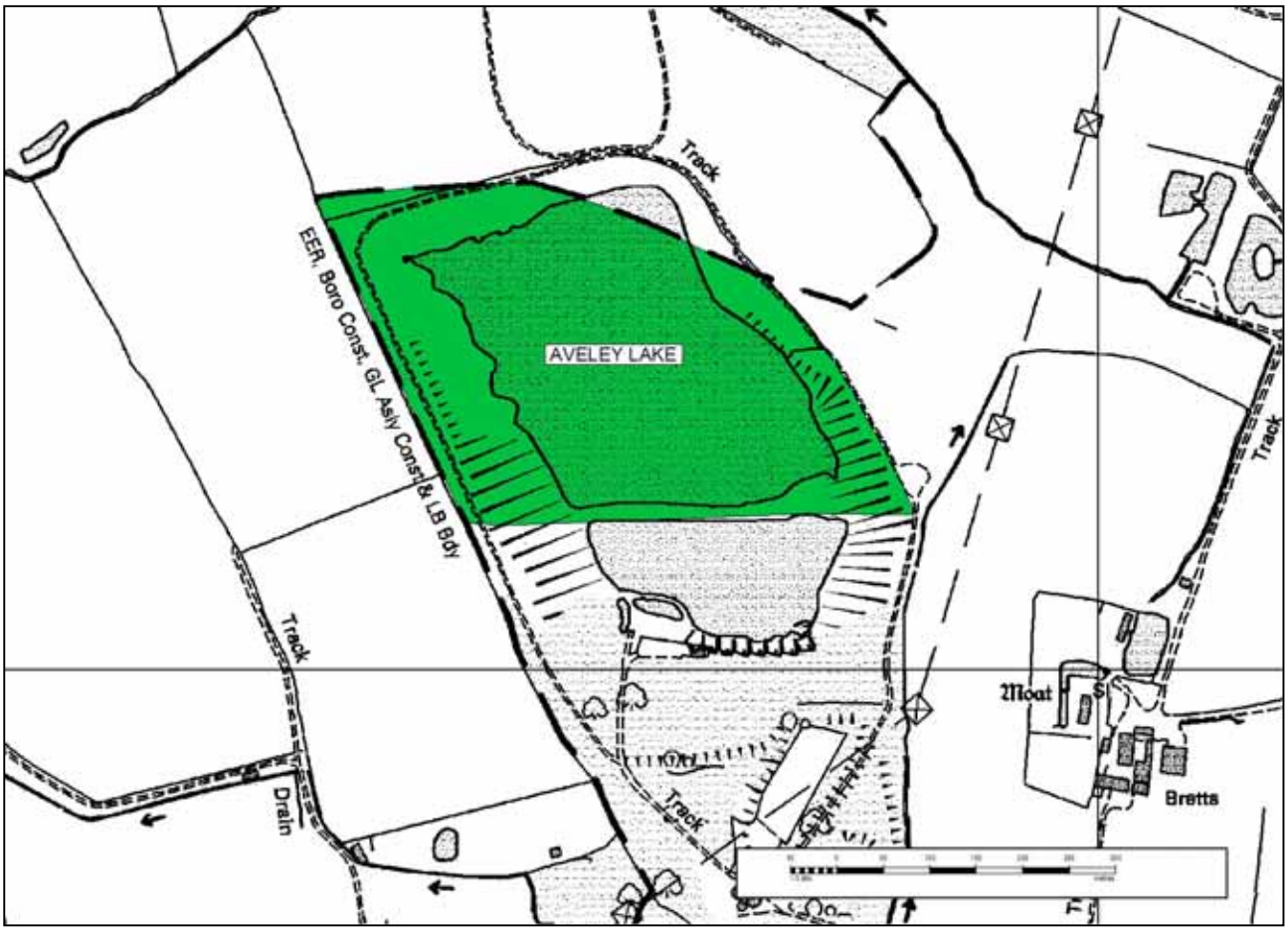
Th1. Tank Lane (1.1 ha) TQ 554786

This site comprises a remnant of chalk grassland, now becoming rather badly infested with scrub growth, with a small block of maturing secondary woodland at the eastern end. Nevertheless, the site still supports an interesting chalk flora, including Marjoram (*Origanum vulgare*), Ploughman's Spikenard (*Inula conyzae*), Viper's Bugloss (*Echium vulgare*) and Vervain (*Verbena officinalis*).

In addition, the site has been shown to support a very significant assemblage of scarce invertebrates, including national BAP, Red Data Book and Essex Red Data List species. The national BAP bumblebee *Bombus humilis* has been shown to be nesting here, with important forage plants Red Bartsia (*Odontites vernus*) and Bird's-foot Trefoil (*Lotus corniculatus*) present.

Selection Criteria: HCr15; SCr11; SCr12

Condition and Proposed Management: Some small-scale cyclical management of scrub invasion should be undertaken, following an initial larger-scale clearance to improve the currently rather scrubby situation. This should comprise cutting out individual trees and shrubs, rather than by wholesale cutting of large areas of grass and scrub together. One of the important features of the site is the unmanaged flower-rich tall herbage that provides good physical structure as well as a good nectar source for many species.

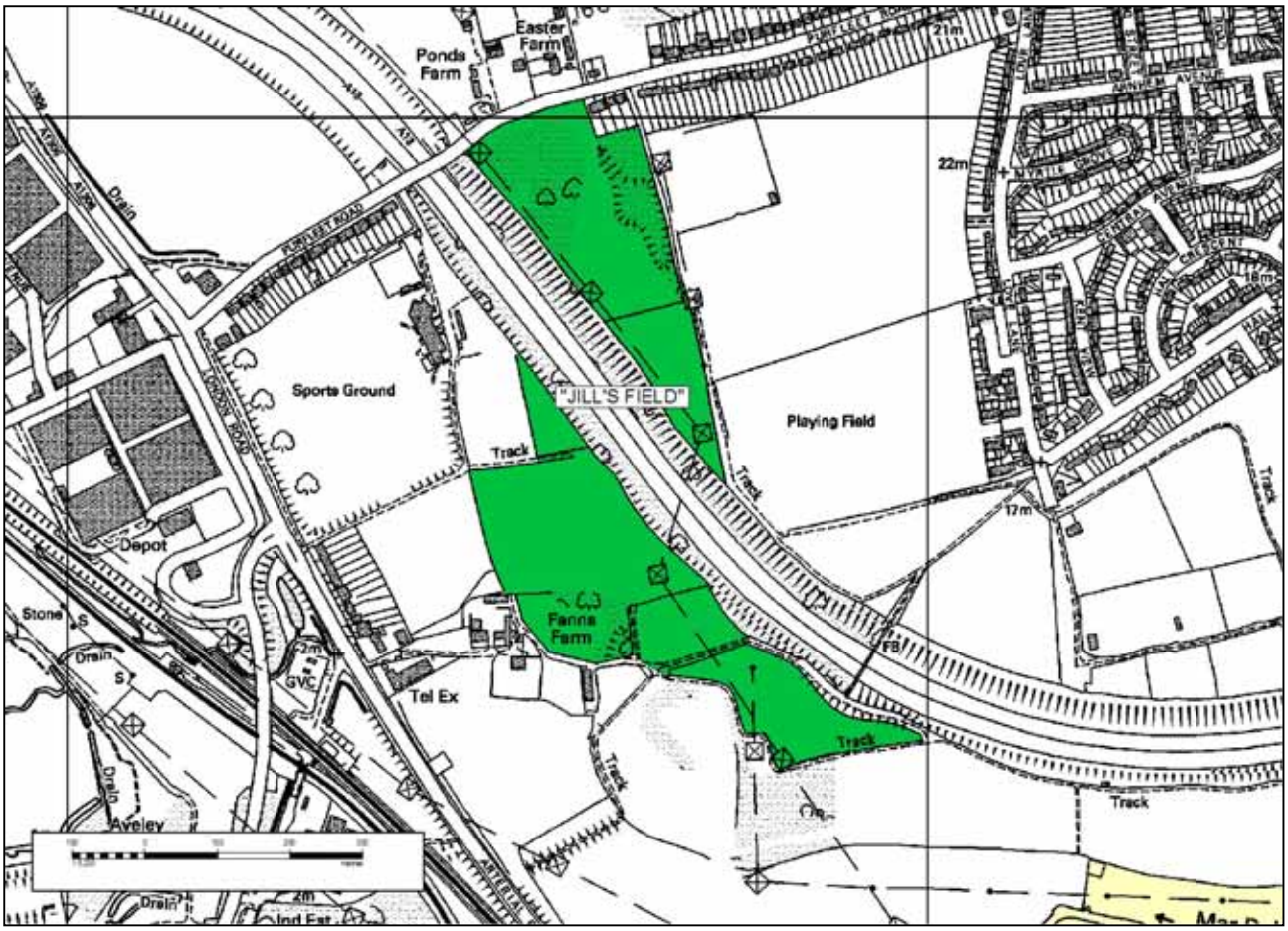


Th2. Aveley Lake (10.7 ha) TQ 555822

The larger, northern lake of this old mineral extraction site is included here and of interest because of the extensive developing bed of Reed (*Phragmites australis*) and associated marginal vegetation. The reed is developing in bands indicating ridges of shallow water within the lake, giving rise to a complex aquatic habitat. The surrounding grassland and scrub contains a wide variety of grasses and herbs, including Yellow-wort (*Blackstonia perfoliata*) with Bee Orchid (*Ophrys apifera*), Pyramidal Orchid (*Anacamptis pyramidalis*) and Common Spotted Orchid (*Dactylorhiza fuchsii*).

Selection Criteria: HCr11; HCr21

Condition and Proposed Management: Future spread of the reedbed is likely to be determined by the ground water regime, which may not be easily controlled in this deep pit location. If possible, further reed growth should be encouraged, without compromising its use as a fishing lake. On the surrounding slopes, excessive scrub growth should be controlled, although a scatter of scrub in the grassland sward will add to the wildlife value of the site. The combination of reed and scrubby margins should attract Reed, Sedge and perhaps Cetti's Warblers. The site may also have an interesting invertebrate fauna associated with the grassland slopes, and the potential for reptiles may be worth considering.



Th3. "Jill's Field" (4.8 ha) TQ 556798

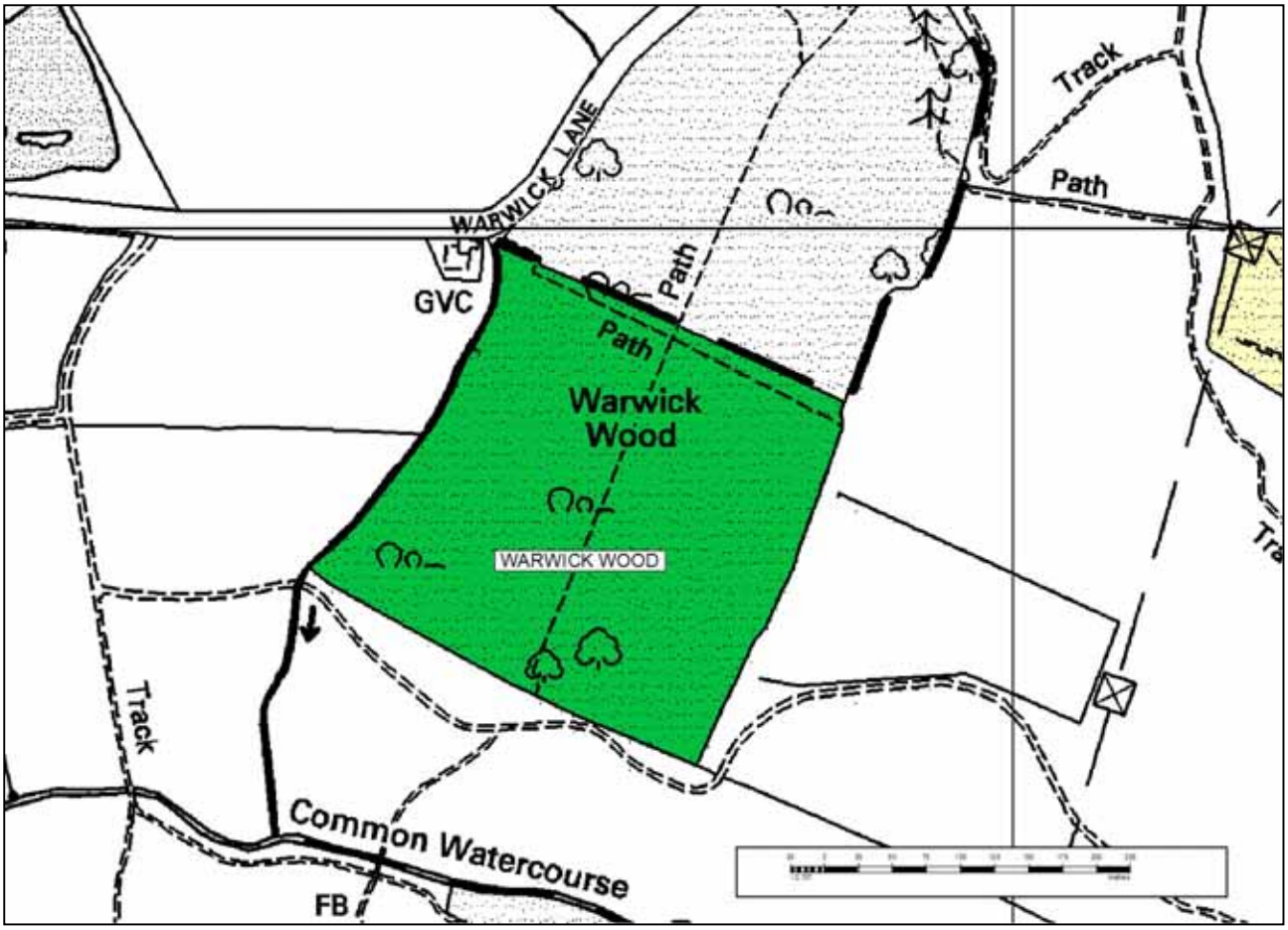
This site actually comprises a series of grasslands, ranging from short, dry acid grassland through to more lush, damp and nutrient rich swards. The northern triangle, known to local naturalists as Jill's Field, supports an exceptional range of local and Essex Red Data List plants, the most notable of which are Subterranean Clover (*Trifolium subterraneum*), Divided Sedge (*Carex divisa*, Nationally Scarce and usually associated with coastal grazing-marsh), Toothed Medick (*Medicago polymorpha,* Nationally Scarce), the forget-me-nots *Myosotis discolor* and *M. ramosissima,* Fiddle Dock (*Rumex pulcher*), Clustered Clover (*Trifolium glomeratum*, Nationally Scarce) and Spring Vetch (*Vicia lathyroides*).

The fields to the south range from similar acid grassland to the north, down slope to damper grasslands to the south. The plants of interest here include abundant Clustered Clover, with subterranean Clover, Green-winged Orchid and Vervain (*Verbena officinalis*).

The northern part of Jill's Field is a geological SSSI.

Selection Criteria: HCr11; SCr13

Condition and Proposed Management: Within the early successional grasslands on the dry, sandy ground, light disturbance can benefit the flora, providing small patches of bare ground for seedling establishment of small annuals and short-lived perennials. Grazing is the best form of such disturbance, if not over-stocked, since it provides a longer duration of light pressure, rather than periodic, one-off physical events. Scrub encroachment from the north will have a detrimental affect. As with other sites, maintenance of a low soil nutrient status is also important.



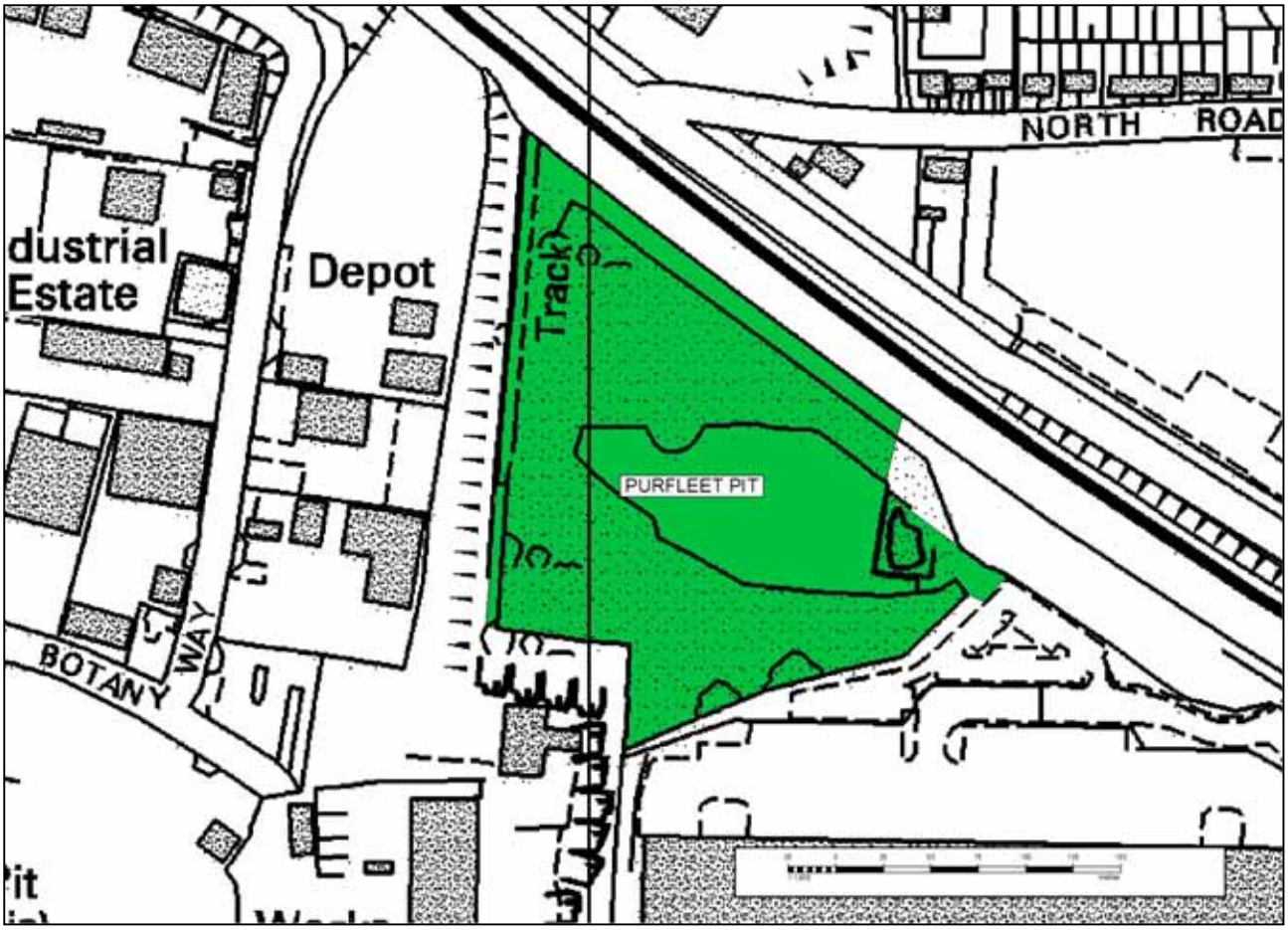
Th4. Warwick Wood (5.5 ha) TQ 557828

This ancient wood, partly within Essex and partly in Greater London, has a coppice-with-standards structure of Pedunculate Oak (*Quercus robur*), Sweet Chestnut (*Castanea sativa*), Hazel (*Corylus avellana*) and Ash (*Fraxinus excelsior*). Invasion of Sycamore (*Acer pseudoplatanus*) is a problem and there is also some localised suckering Elm (*Ulmus* spp.). The ground flora is reasonably diverse and includes abundant Bluebell (*Hyacinthoides non-scripta*), Wood Spurge (*Euphorbia amygdaloides*) Remote Sedge (*Carex remota*), Wood Millet (*Milium effusum*) and Three-veined Sandwort (*Moehringia trinervia*).

The habitats present here are seemingly suitable for Dormouse, for which an appropriate survey should be carried out.

Selection Criteria: HCr1(a)

Condition and Proposed Management: This wood is in a good condition, but threatened by the spread of Sycamore. This spread may be all the more rapid in areas of recent coppice. Despite this, a resumption of Hazel coppicing would be desirable to improve the habitat diversification.

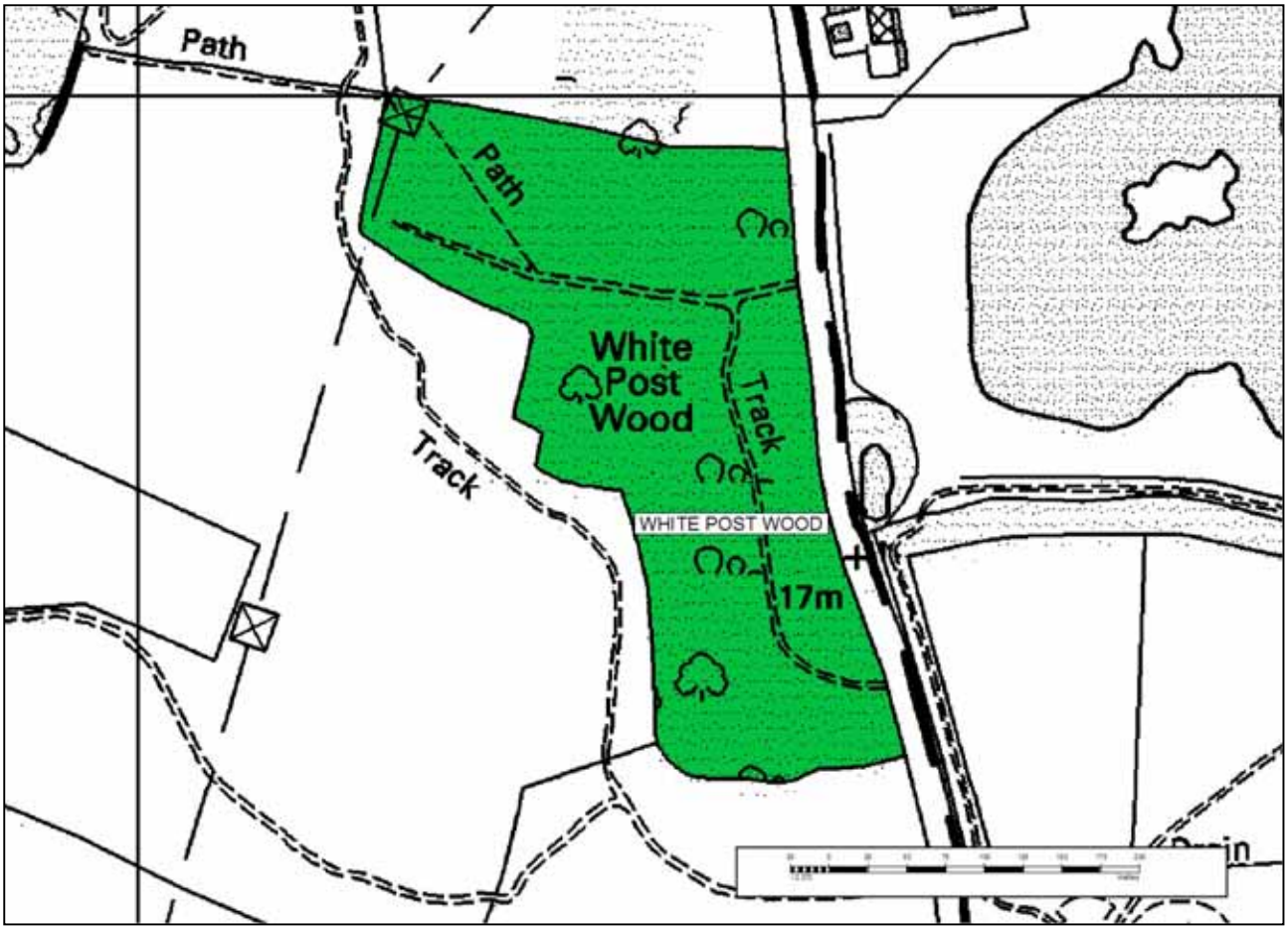


Th5. Purfleet Pit (3.2 ha) TQ 560784

This site is known to support at least two UK BAP species, six nationally rare Red Data Book and eleven Nationally scarce species of invertebrate. These include the recently rediscovered bug *Stictopleuron abutilon*, the RDB1 (endangered) fly *Gymnosoma nitens*, the digger wasp *Cerceris quinquefasciata* (UK BAP and RDB3), the Small Blue Carpenter Bee (*Ceratina cyanea*, RDB3) and the bumblebee *Bombus humilis* (UK BAP). The record of the sporadic visitor to Britain, Yellow-winged Darter Dragonfly is of interest. An independent ecological assessment of the site has concluded that "the aculeate fauna...is outstanding".

Selection Criteria: SCr12

Condition and Proposed Management: It is believed that this Site is threatened by development. The main value of this brownfield site lies in its impoverished soils and floristically rich vegetation, which can support a large diversity of scarce and rare species. The control of scrub encroachment will also be an issue.



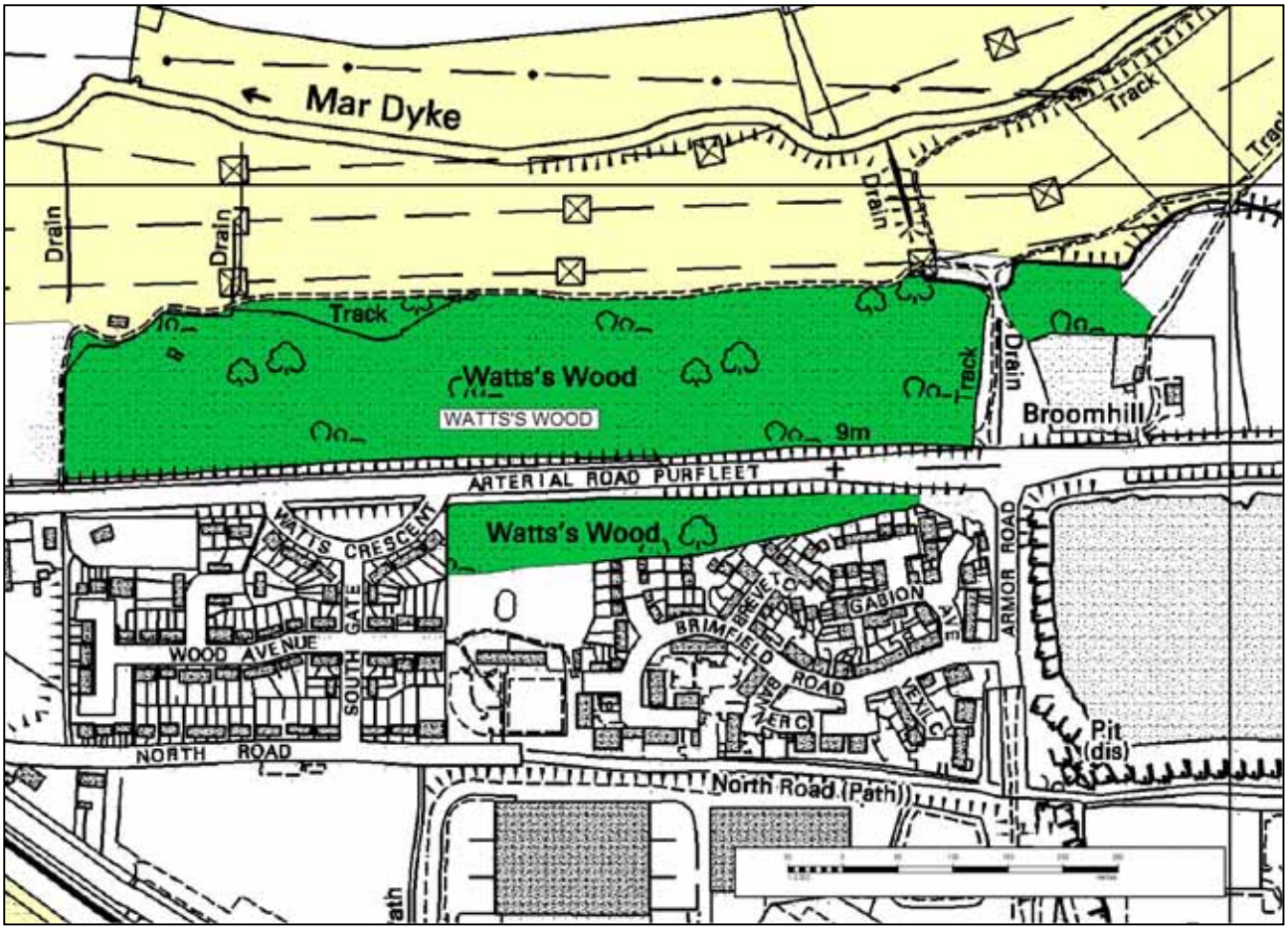
Th6. White Post Wood (5.2 ha) TQ 563828

This coppice-with-standards wood has a canopy of Pedunculate Oak (*Quercus robur*), Sweet Chestnut (*Castanea sativa*) and Silver Birch (*Betula pendula*) with an understorey of Hazel (*Corylus avellana*) and Sweet Chestnut. Sycamore (*Acer pseudoplatanus*) is becoming abundant, seemingly re-sprouting from previously cut stumps. The ground flora, which includes abundant Bluebell (*Hyacinthoides non-scripta*), Greater Stitchwort (*Stellaria holostea*), Red Campion (*Silene dioica*), Wood Millet (*Milium effusum*) and Wood Sage (*Teucrium scorodonia*), is reasonably diverse, particularly in the south of the site.

The habitats present here are seemingly suitable for Dormouse, for which an appropriate survey should be carried out.

Selection Criteria: HCr1(a)

Condition and Proposed Management: This wood is in reasonable condition, but threatened by being engulfed by Sycamore. This spread may be all the more rapid in areas of recent coppice. Despite this, a resumption of Hazel coppicing would be desirable to improve the habitat diversification.



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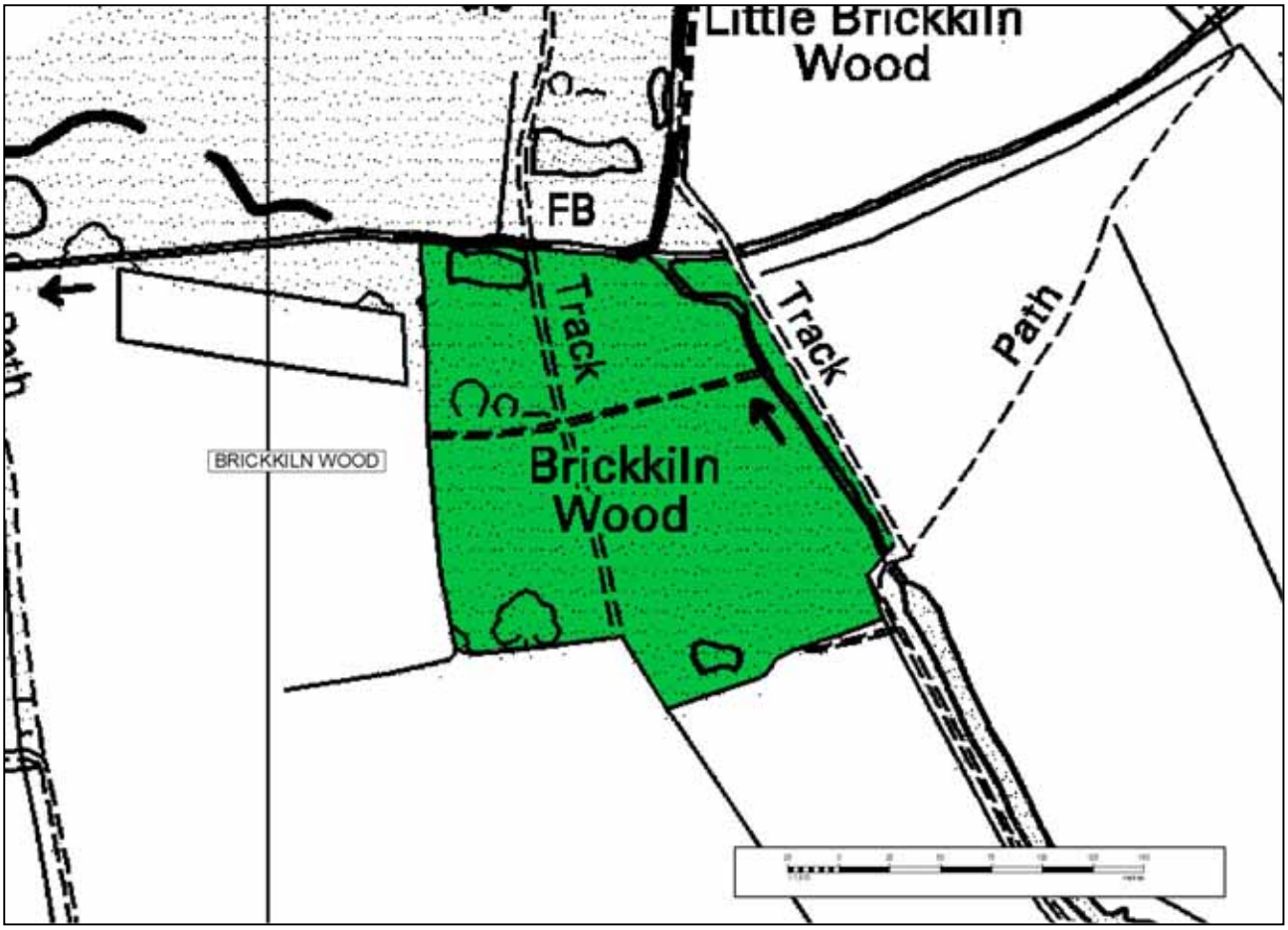
Th7. Watts's Wood (9.9 ha) TQ 565788

This ancient wood is bisected by the Purfleet arterial road, forming two woods of very different character. The northern section (much the larger) has a high canopy of Pedunculate Oak (*Quercus robur*) and Ash (*Fraxinus excelsior*) over old Hazel (*Corylus avellana*) coppice and Field Maple (*Acer campestre*). The flora is dominated by Ivy (*Hedera helix*) and with Bluebell (*Hyacinthoides non-scripta*), Wood Spurge (*Euphorbia amygdaloides*), Spindle (*Euonymus europaeus*) and Greater Stitchwort (*Stellaria holostea*).

The southern section is largely dominated by English Elm (*Ulmus procera*), with some Pedunculate Oak and Hazel to the east. The Ivy-dominated flora also includes Spindle, Three-veined Sandwort (*Moehringia trinervia*) and Bluebell.

Selection Criteria: HCr1(a)

Condition and Proposed Management: The flora of this much-fragmented wood appears to be quite poor and the whole site is suffering from neglect. Small piles of cut material in the north section (viewed from the road) indicate some sort of *ad hoc* management effort, although the purpose of this work is not known. The southern section is suffering from heavy recreational pressure.

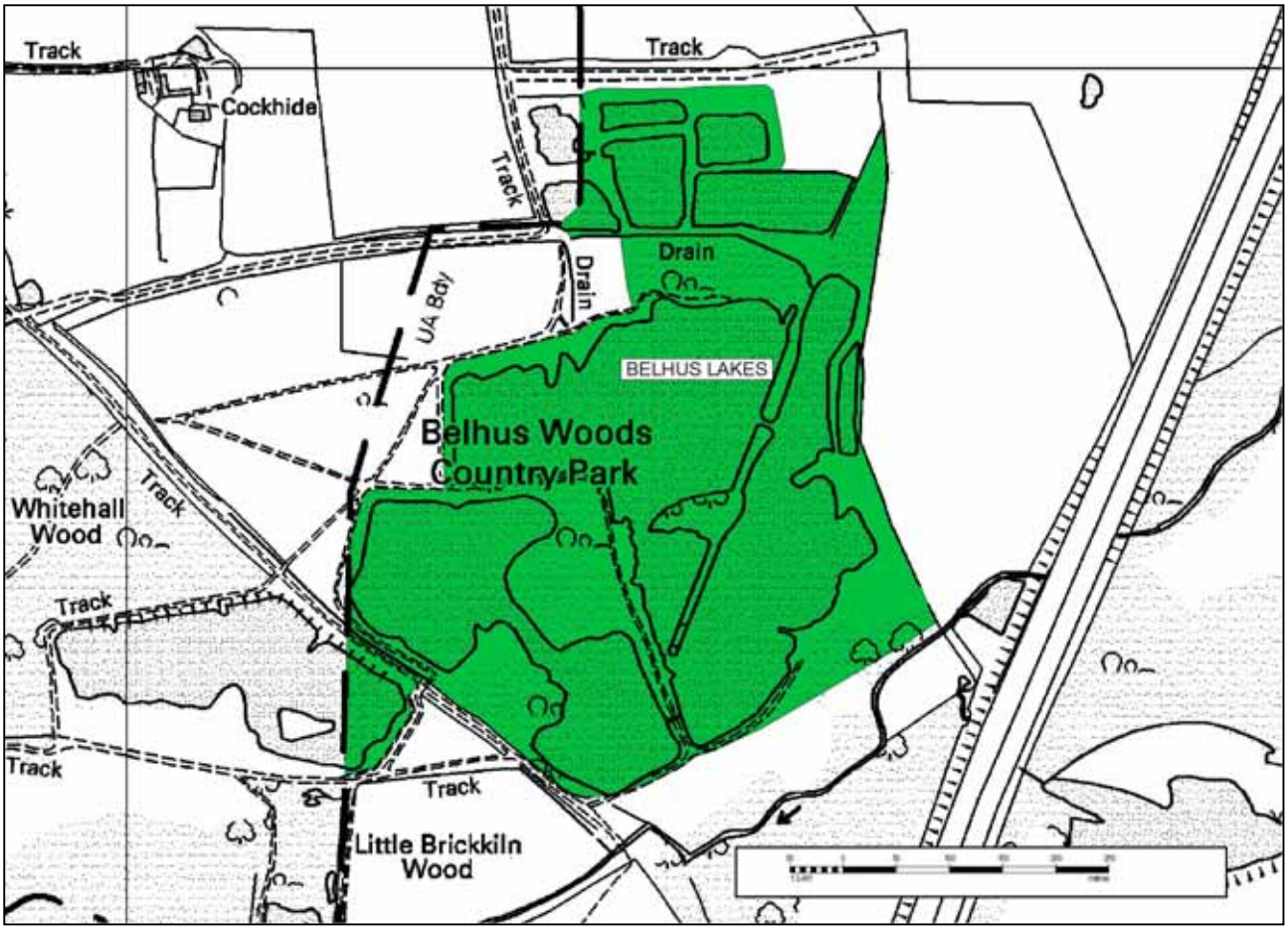


Th8. Brickkiln Wood (2.6 ha) TQ 571822

Brickkiln Wood comprises old Hazel (*Corylus avellana*) coppice under mainly Ash (*Fraxinus excelsior*) with some Pedunculate Oak (*Quercus robur*) standards and stream-side Alder (*Alnus glutinosa*). Towards the west is a stand of apparently healthy Elm (*Ulmus* spp.)-wood. Sycamore is currently rare. The shaded ground flora includes Spindle (*Euonymus europaeus*), Three-veined Sandwort (*Moehringia trinervia*), Wood Millet (*Milium effusum*), Lesser Celandine (*Ranunculus ficaria*) and Bluebell (*Hyacinthoides non-scripta*). Of note amongst the streamside ferns is Soft Shield-fern (*Polystichum setiferum*), an Essex Red Data List plant that has declined dramatically in recent years. Although situated within a busy country park the wood does not suffer much from visitor pressure.

Selection Criteria: HCr1(a); SCr13

Condition and Proposed Management: The wood shows signs of former coppicing and this could be resumed in order to diversify habitat structure and let more light into the field layer. This, and other ancient woods in the area, may be suitable habitat for Dormouse and an appropriate survey should precede any management work.



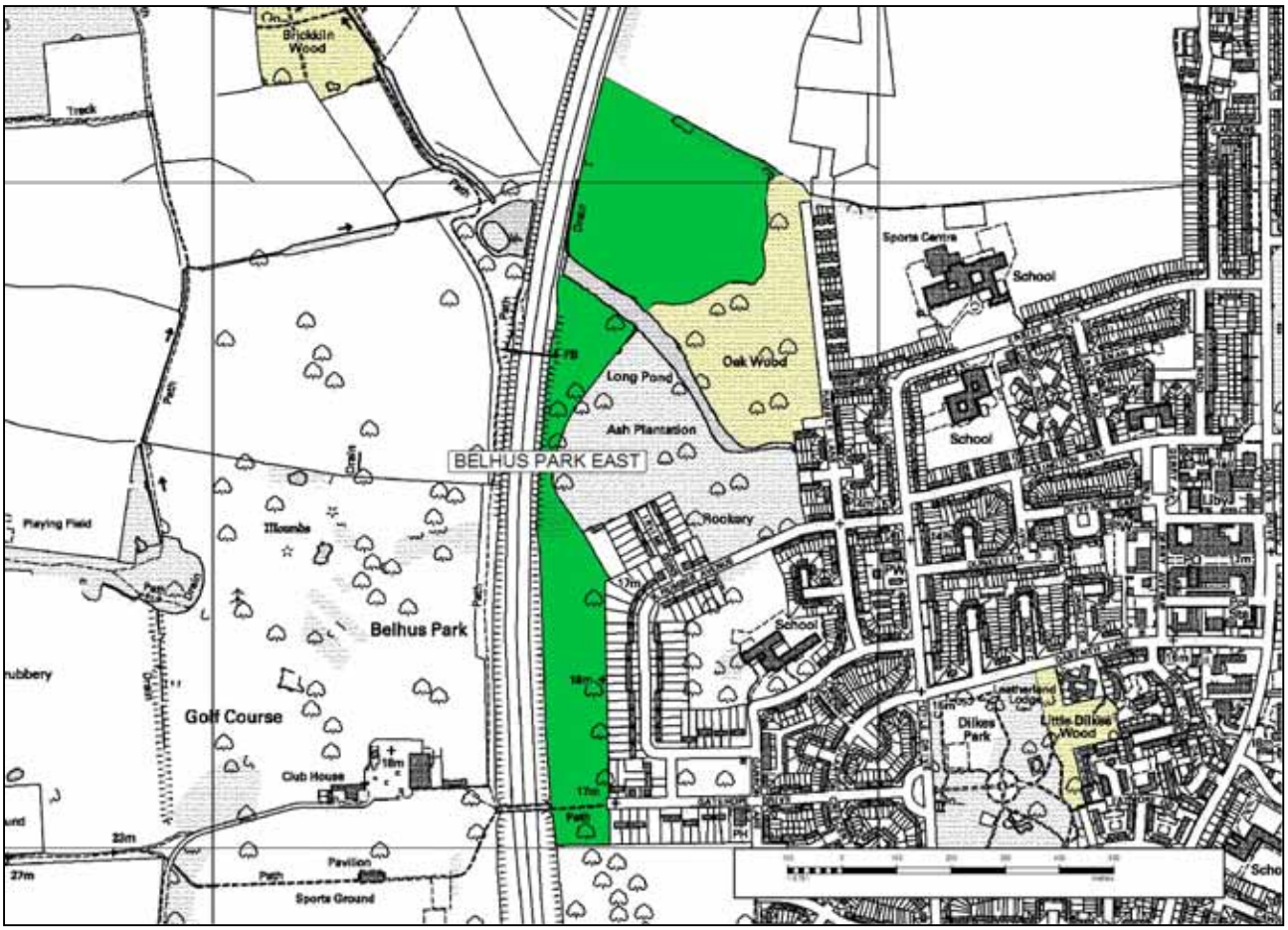
Th9. Belhus Lakes (15.6 ha) TQ 574826

This Site comprises a complex of lakes formed from old gravel pits that lie within Belhus Woods Country Park, plus a cluster of smaller lakes to the north that are outside the park boundary. The main, roughly triangular, lake is zoned as a conservation area in which fishing is not permitted. The lakes have good developing reedbeds and a marginal vegetation, which includes Reedmace (*Typha latifolia*), Fool's Watercress (*Apium nodiflorum*), Bur-reed (*Sparganium erectum*), Lesser Pond-sedge (*Carex acutiformis*) and Water Mint (*Mentha aquatica*). They are fringed by bands of wet willow (*Salix* spp.) and Alder (*Alnus glutinosa*), which form a more coherent wet woodland habitat around the smaller northern lakes. The open water includes much Fringed Water-lily (*Nymphoides peltata*).

Of particular interest here is the small but seemingly stable breeding population of Little Ringed Plover, a rare breeding bird in Essex and therefore included on the Essex Red Data List.

Selection Criteria: HCr5; HCr22; SCr10

Condition and Proposed Management: Management of human activity is likely to be important in maintaining the presence of breeding Little Ringed Plovers, as will be the maintenance of attractive open areas as breeding habitat. Maintenance of open or early succession vegetation is also likely to encourage an interesting invertebrate assemblage, which should be investigated. Some coppicing of willows may be beneficial, to maintain a low, dense wet woodland/scrub structure that is favoured by some breeding warblers, especially if found in a mosaic with Reed or other tall emergent vegetation.

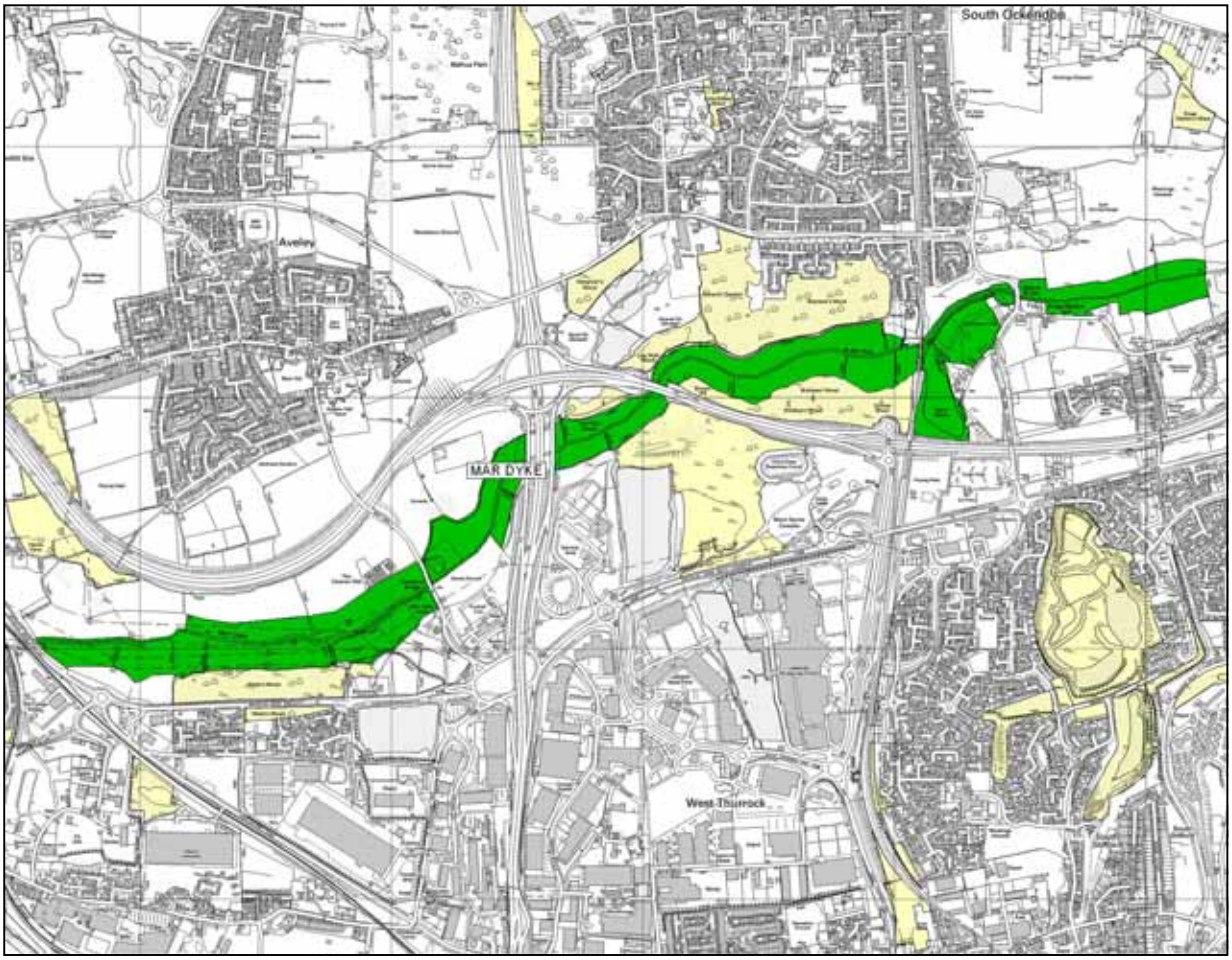


Th10. Belhus Park East (13.9 ha) TQ 575814

This strip of grassland is part of the former Belhus Park grounds, now separated from the main body of the site by the M25. It presents an interesting range of grassland types that includes several species of note. The southern strip is managed as rough amenity grassland and comprises a neutral soil "meadow" flora in which Meadow Foxtail (*Alopecurus pratensis*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Red Fescue (*Festuca rubra*) and Smooth Meadow-grass (*Poa pratensis*) are the most prominent grasses. Of interest amongst the herbage are patches of an acid grassland sward, where Sheep's Sorrel (*Rumex acetosella*), Bird's-foot (*Ornithopus perpusillus*), Field Wood-rush (*Luzula campestris*), Lady's Bedstraw (*Galium verum*) and, most notably, Subterranean Clover (*Trifolium subterraneum*) are of interest. The last species is rare in Essex and is included in the Essex Red Data List of plants, with many of its few remaining sites being more coastal than this Site. The central and northern sections of the Site comprise rougher grassland with scattered trees, areas of planted trees and natural scrub growth. Of note amongst the flora here is Harebell (*Campanula rotundifolia*), another Essex Red Data List plant and one that supports the rare Essex bee *Melitta haemorrhoidalis.*

Selection Criteria: HCr11; SCr13

Condition and Proposed Management: The important acid grassland sward is threatened by two factors: nutrient enrichment of the soil if the sward is cut and left to rot down *in situ*, and shading from the new hedge planted along the boundary of the M25 as it matures. This will lead to morning-only sunlight on this sward and may lead to the loss of the species of interest. The central and northern parts are being threatened by excessive scrub growth and tree-planting schemes. The occasional fire may not be so deleterious, by inhibiting scrub growth and clearing accumulated plant litter. Trees should be held at bay, not planted, on this old grassland site. The northern part may prove to be of value for reptiles.



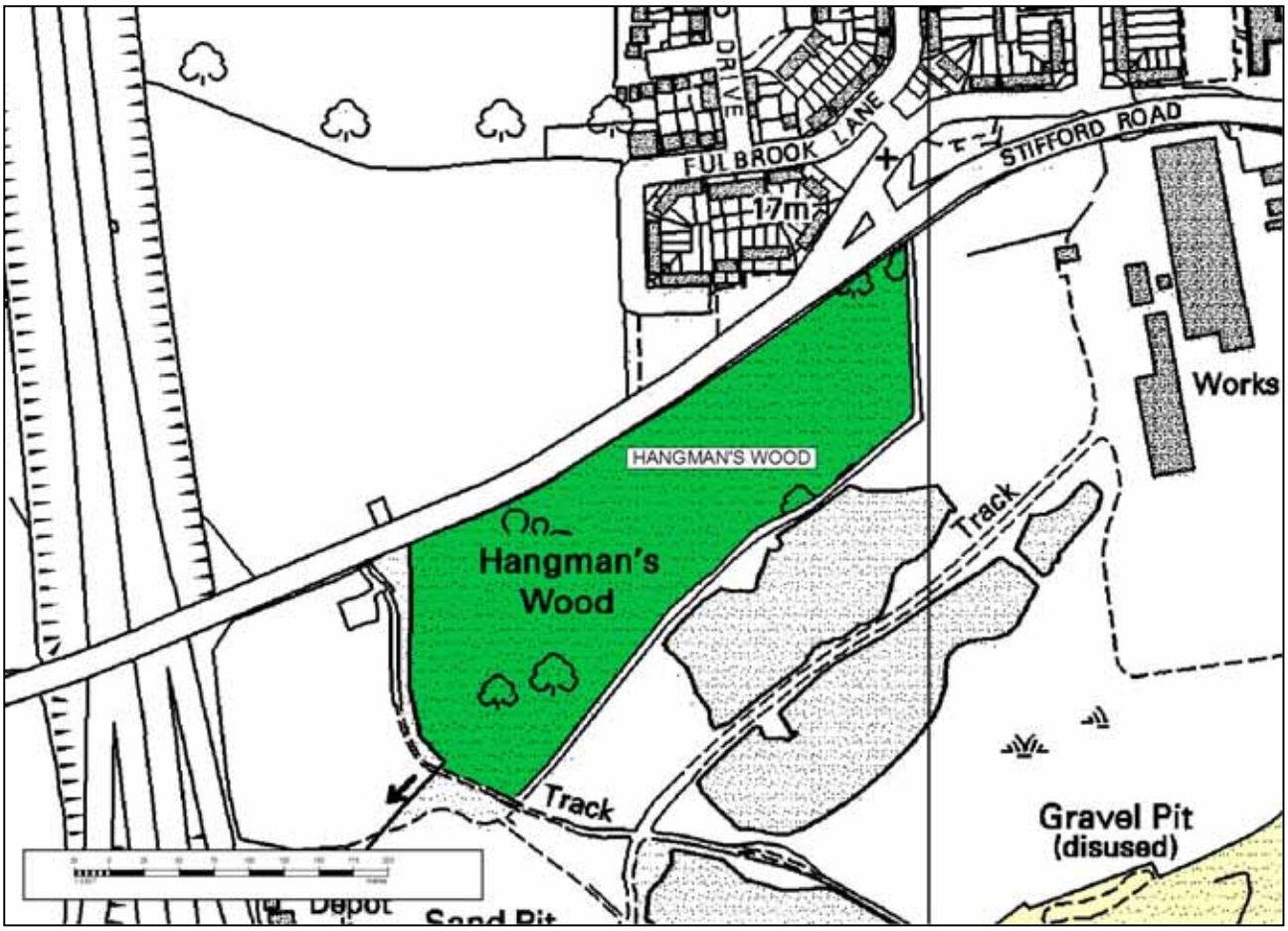
Th11. Mar Dyke (85.8 ha) TQ 577798

These pastures bordering the Mar Dyke form, in the borough context, a particularly extensive grassland area and an important wildlife corridor. Although floristically unremarkable, such extensive river flood plain grassland systems are rare in Essex. They have a sward typified by Cock's-foot (*Dactylis glomerata*), Ryegrass (*Lolium perenne*), Yorkshire Fog (*Holcus lanatus*) and various clovers (*Trifolium* sp.). Some areas have localised areas of semi-improved acid grassland, where Sheep's Sorrel (*Rumex acetosella*) can be found. The Mar Dyke itself has little floating aquatic vegetation but the banks support a marginal flora of Purple Loosestrife (*Lythrum salicaria*), Bur-reed (*Sparganium* sp.), Reed (*Phragmites australis*), Reed Sweet-grass (*Glyceria maxima*), Greater Pond-sedge (*Carex riparia*), Reed Canary-grass (*Phalaris arundinacea*) and Reedmace (*Typha latifolia* and *T. angustifolia*). Barn Owls are known to frequent the Mar Dyke/Watts's Wood area. Areas such as Davy Down have notable reptile populations, with all four Essex species having been recorded.

Some areas, such as to the north of Watts's Wood have been unmanaged and are becoming rather scrubbed up. Whilst limited scrub is of some wildlife value, the overall integrity of the site would be compromised if too much scrub cover developed.

Selection Criteria: HCr13; HCr14; SCr4

Condition and Proposed Management: Current management covers the entire spectrum from unmanaged and becoming covered with scrub, right through to over-stocked with grazing horses and being trampled almost bare. A more holistic approach to the distribution and intensity of grazing would be beneficial, so that this beneficial management practice is more evenly distributed along the length of the valley.

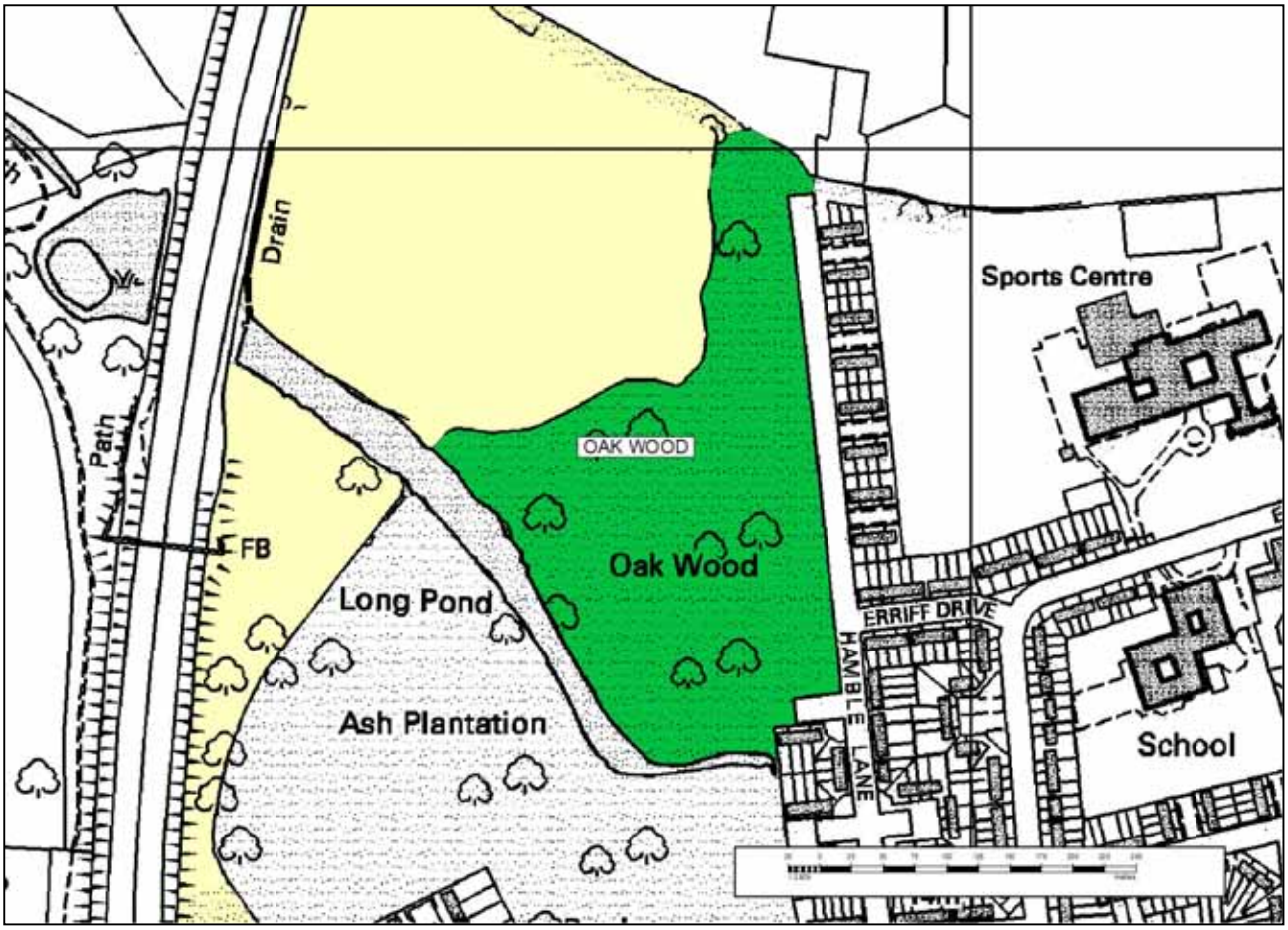


Th12. Hangman's Wood (3.8 ha) TQ 578804

Although originally a Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*) stand, Hangman's wood was long ago planted with Sweet Chestnut (*Castanea sativa*) and is now badly invaded by Sycamore (*Acer pseudoplatanus*) and Elm (*Ulmus* sp.), the latter mainly along the roadside. The whole wood was badly storm damaged in 1987 but was at the time the subject of a restoration project. Little seems to have been done in recent years. Spindle (*Euonymus europaeus*), locally abundant Bluebell (*Hyacinthoides non-scripta*) and Three-veined Sandwort (*Moehringia trinervia*) occur amongst the flora. The field layer is, on the whole, dominated by Ivy (*Hedera helix*) and Enchanter's Nightshade (*Circaea lutetiana*).

Selection Criteria: HCr1(a)

Condition and Proposed Management: As with other ancient woods in the west of the borough, Sycamore invasion is a big problem, casting a dense shade over the now impoverished ground flora. Its removal and subsequent control of seedling growth will take many years to reverse this trend.

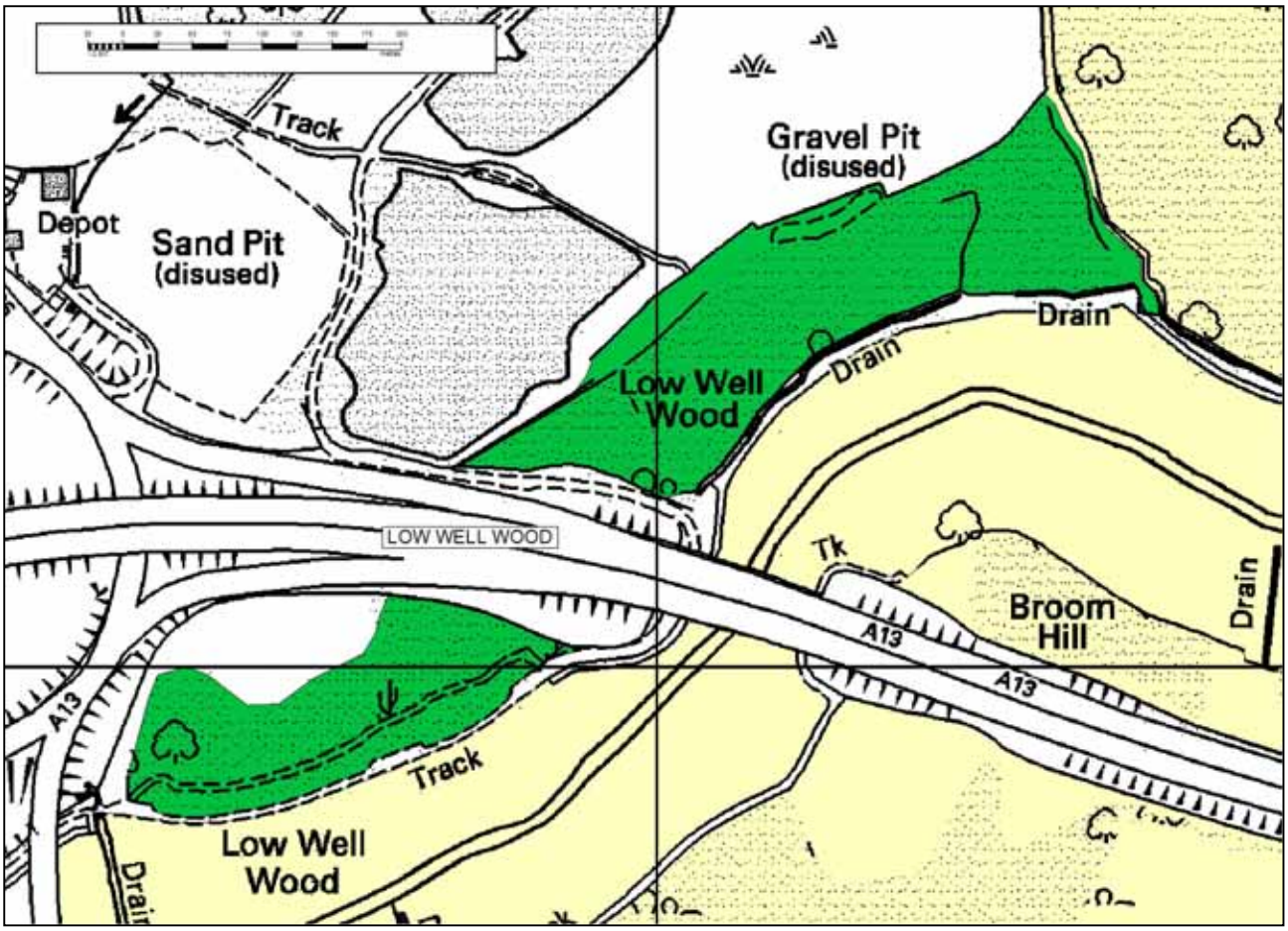


Th13. Oak Wood (5.3 ha) TQ 578817

Oak Wood is dominated by mature Sycamore (*Acer pseudoplatanus*), with a variety of other planted trees such as Horse Chestnut (*Aesculus hippocastanum*), Common Lime (*Tilia vulgaris*) and Black poplar (*Populus nigra*). Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*), Alder (*Alnus glutinosa*) and Elm (*Ulmus* spp.) also occur in this ancient wood. The ground flora is poor, highly disturbed and subject to much dumping of garden rubbish. Bluebell (*Hyacinthoides non-scripta*) is locally frequent, whilst Wood Millet (*Milium effusum*) and Remote Sedge (*Carex remota*) occur in modest quantities.

Selection Criteria: HCr1(a)

Condition and Proposed Management: It is assumed that much of the exotic tree planting within this wood stems from its former position within Belhus Park. The Long Pond to the south is another landscape feature, now bisected by the M25. Removal of this exotic canopy would leave little in the way of tree cover and there may be some social history value in retaining some of this park character. However, the canopy and understorey could still be managed to improve the currently poor shrub and field layers.



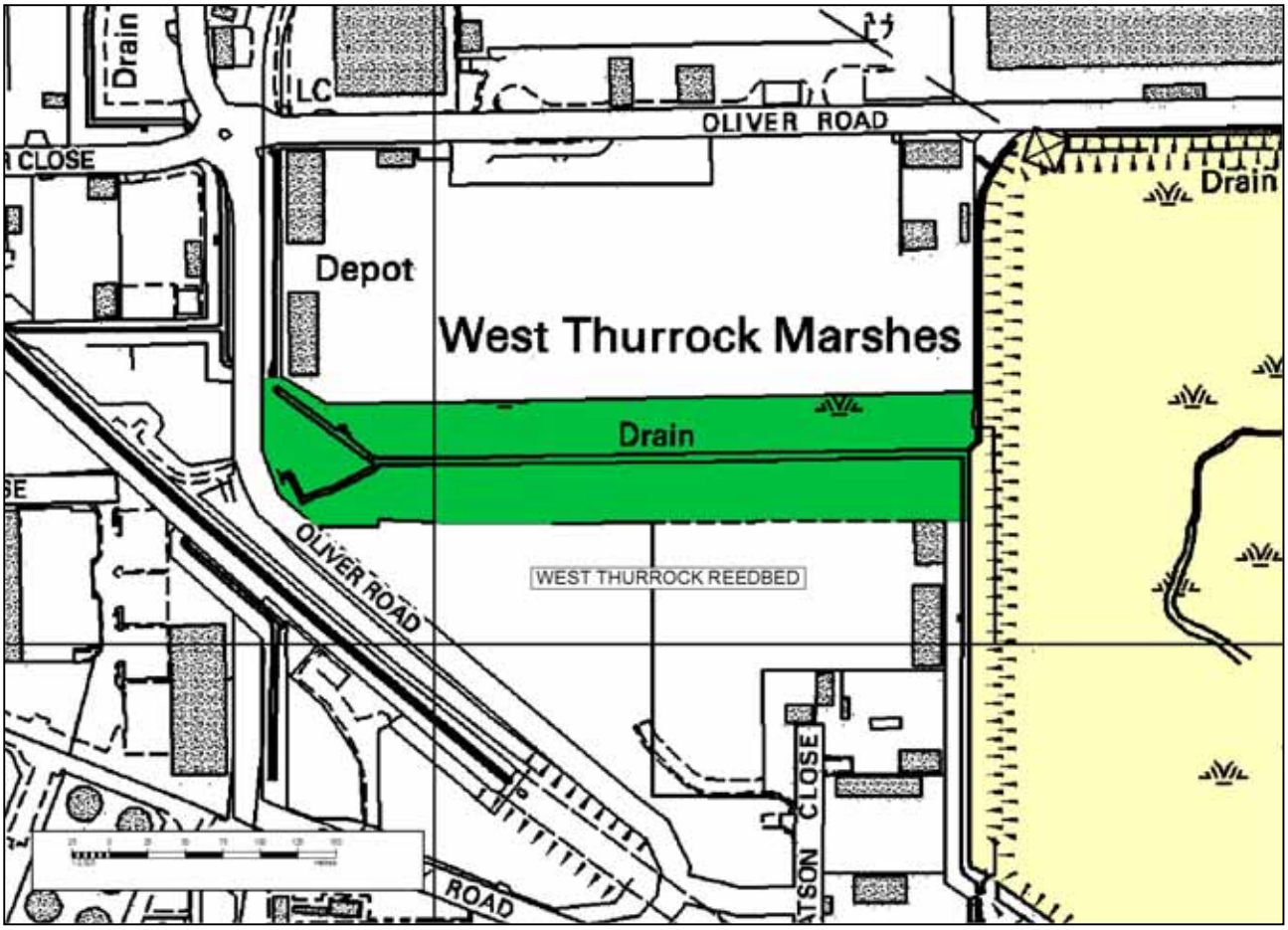
Th14. Low Well Wood (4.8 ha) TQ 580801

This ancient wood is bisected by the A13, providing a significant barrier to migration and effectively creating two ecologically separate woods. Sycamore (*Acer pseudoplatanus*) is abundant amongst a native canopy of Ash (*Fraxinus excelsior*), Pedunculate Oak (*Quercus robur*) and long-ago planted Sweet Chestnut (*Castanea sativa*). A rather impoverished ground flora includes locally frequent Creeping soft-grass (*Holcus mollis*), Lesser Celandine (*Ranunculus ficaria*) and Bluebell (*Hyacinthoides non-scripta*), along with Wood Spurge (*Euphorbia amygdaloides*), Wood Meadow-grass (*Poa nemoralis*), Primrose (*Primula vulgaris*) and Red Campion (*Silene dioica*). The flora of the southern section is rather better, with less Sycamore.

Along the northern edge of the northern section is an interesting strip of short perennial/developing acid grassland. This flower-rich sward includes much Black Medick (*Medicago lupulina*), Common Stork's-bill (*Erodium cicutarium*), Dove's-foot Crane's-bill (*Geranium molle*), Marsh Cudweed (*Gnaphalium uliginosum*), Early Forget-me-not (*Myosotis ramosissima*) and Wall Speedwell (*Veronica arvensis*). As a small grassy glade of some value to invertebrates, this small patch would be worthy of retention, with some local coppicing of the wood to the south to improve light levels.

Selection Criteria: HCr1(a)

Condition and Proposed Management: Restoration of the original semi-natural canopy at the expense of the dominant Sycamore would be a major undertaking, but it is one that should be considered. The acid grassland glade should be enhanced.

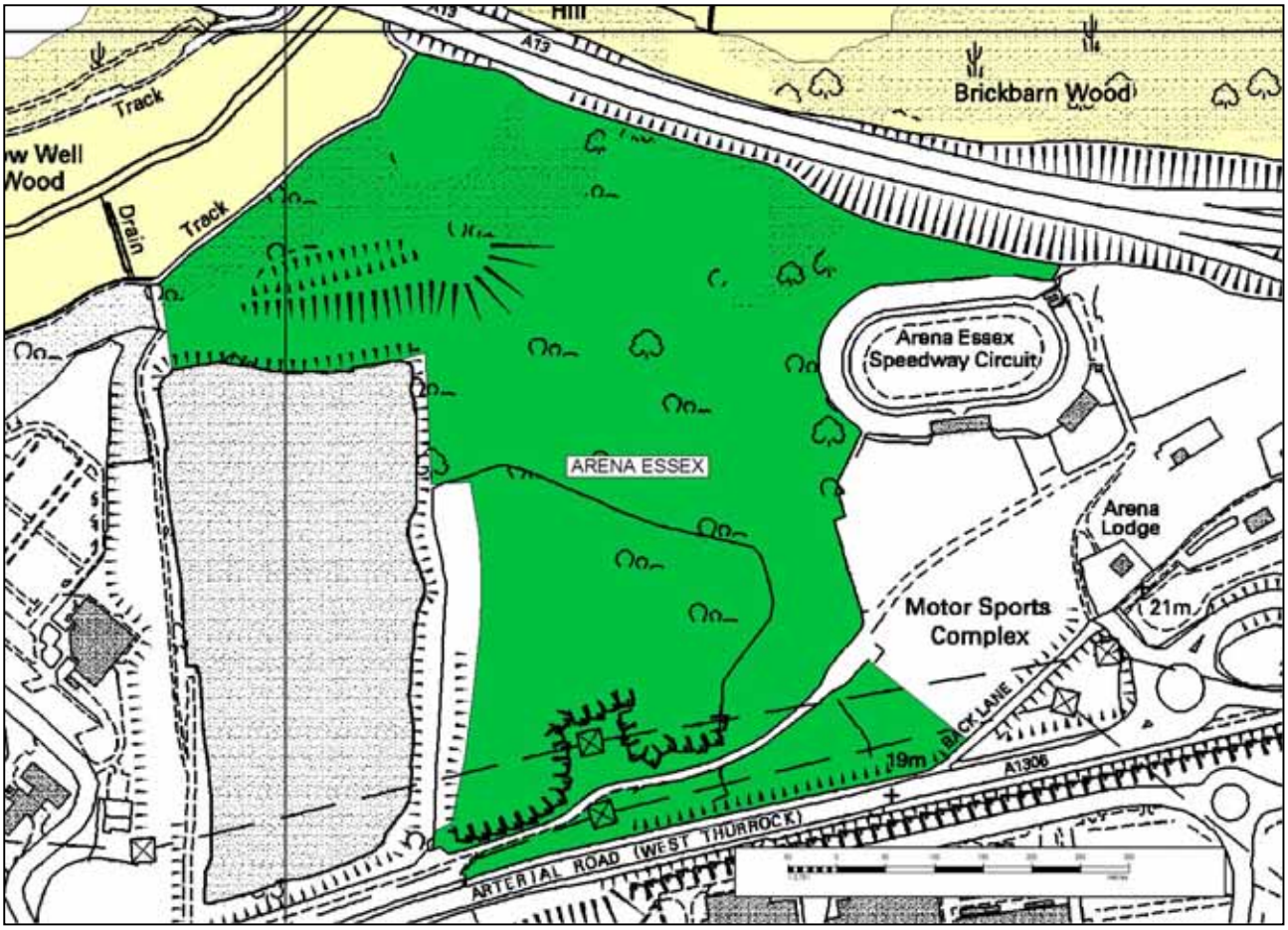


Th15. West Thurrock Reedbed (2.8 ha) TQ 582770

This Reed (*Phragmites australis*)-bed, a scarce and important habitat in its own right, forms a significant habitat extension to the bordering West Thurrock Lagoon Local Wildlife Site (Th18) and the West Thurrock Lagoons and Marshes SSSI, both of which have thinner stands of Reed associated with drainage ditches. Both Reed and Sedge Warbler have been recorded, being two species dependent upon the survival of extensive reedbeds. This is one of the largest continuous blocks of reedbed habitat left in Thurrock.

Selection Criteria: HCr21

Condition and Proposed Management: The site is in good condition, but is prone to changes in the local water table and may be drying out in the long term. Some willow scrub peripherally is beneficial, but this should not be allowed to spread across the reedbed.



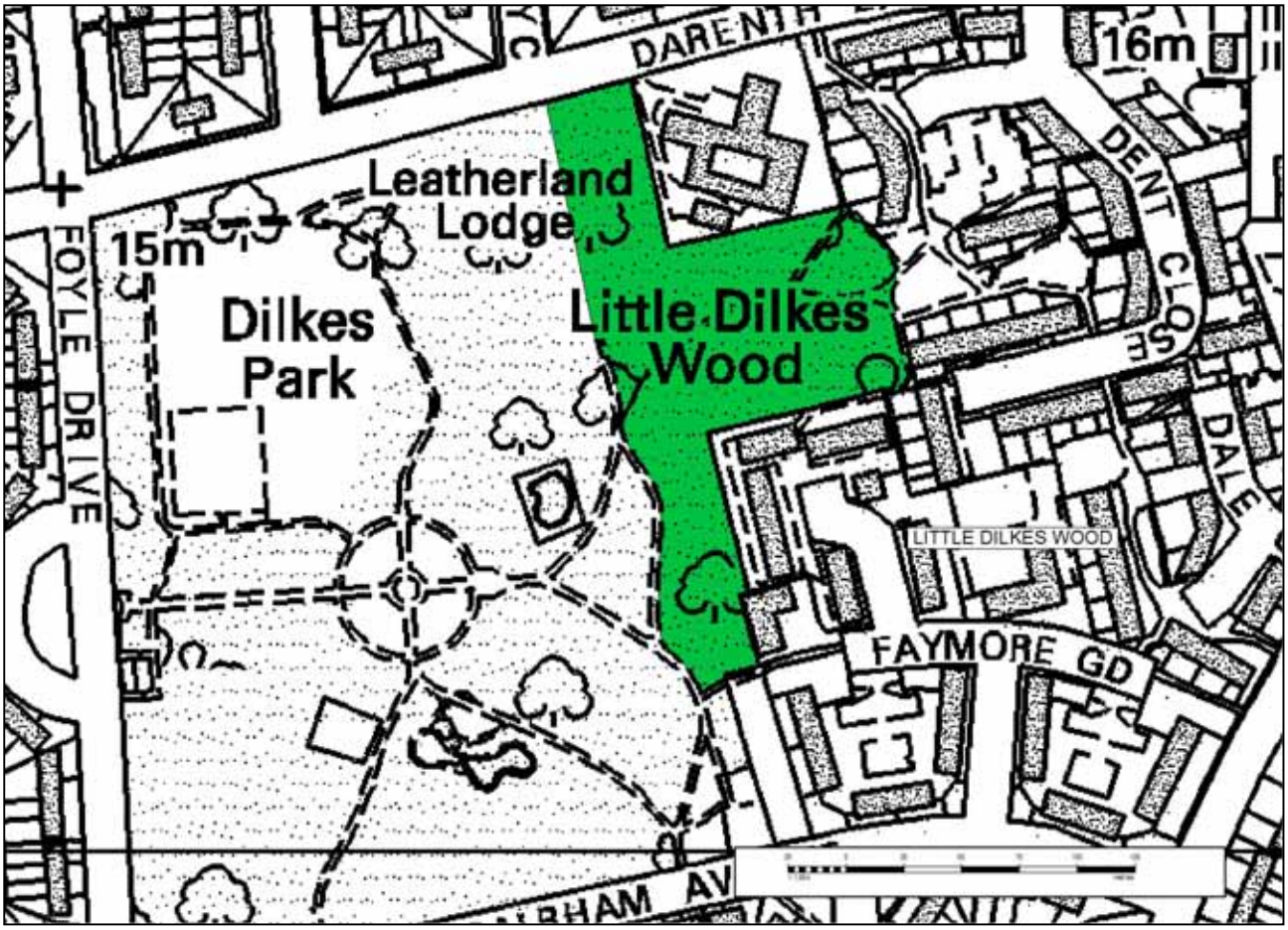
Th16. Arena Essex (24.4 ha) TQ 583797

This site has been selected on account of its very significant population of Broad-leaved Cudweed (*Filago pyramidata*). This national Red Data Book (Endangered) plant is known from less than a dozen sites nationally and is only found in Essex at this location and one other nearby site. It is protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended).

It is likely that this site will also prove to be of great interest for brownfield invertebrate assemblages, but this does not currently form the basis of its identification as a Local Wildlife Site.

Selection Criteria: SCr13

Condition and Proposed Management: This is a large site, with a good deal of actual and potential habitat for this species. Broad-leaved Cudweed is a plant of arable land and other disturbed habitats. As such, the use of the Arena Essex land for a variety of motor sports activities is not necessarily detrimental to its survival and, indeed, may be instrumental in maintaining some bare areas where it can colonise and spread. In general, maintaining a mosaic of recently disturbed areas with other areas of sparsely vegetated ground will be important for the survival of this plant.



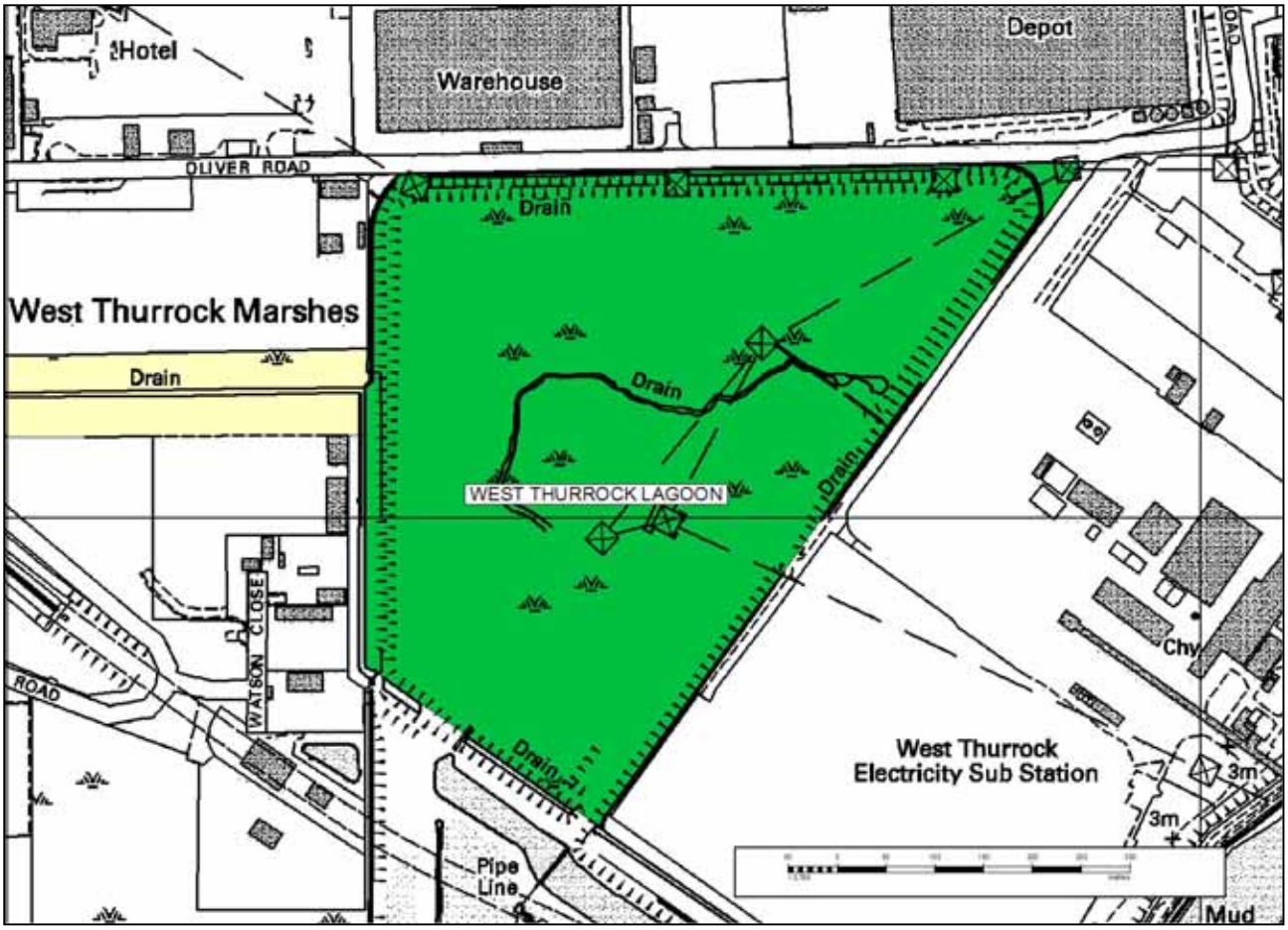
Th17. Little Dilkes Wood (1.1 ha) TQ 583811

This ancient wood remnant within South Ockendon is of poor quality due to heavy recreation pressure. The canopy is mainly Pedunculate Oak (*Quercus robur*) and Ash (*Fraxinus excelsior*) with invasive Elm (*Ulmus* sp.) and some Hornbeam (*Carpinus betulus*) and Sweet Chestnut (*Castanea sativa*) over a ground flora dominated by Bramble (*Rubus fruticosus* agg.), Nettle (*Urtica dioica*) and Ivy (*Hedera helix*).

This site is all that is left of a once much larger woodland, now forming Dilkes Park to the west.

Selection Criteria: HCr1(a)

Condition and Proposed Management: The wood would benefit from management to open up the canopy and control of public usage. A more ambition scheme would be to plant up a belt of trees along the western margin, to increase the overall size of the wood.



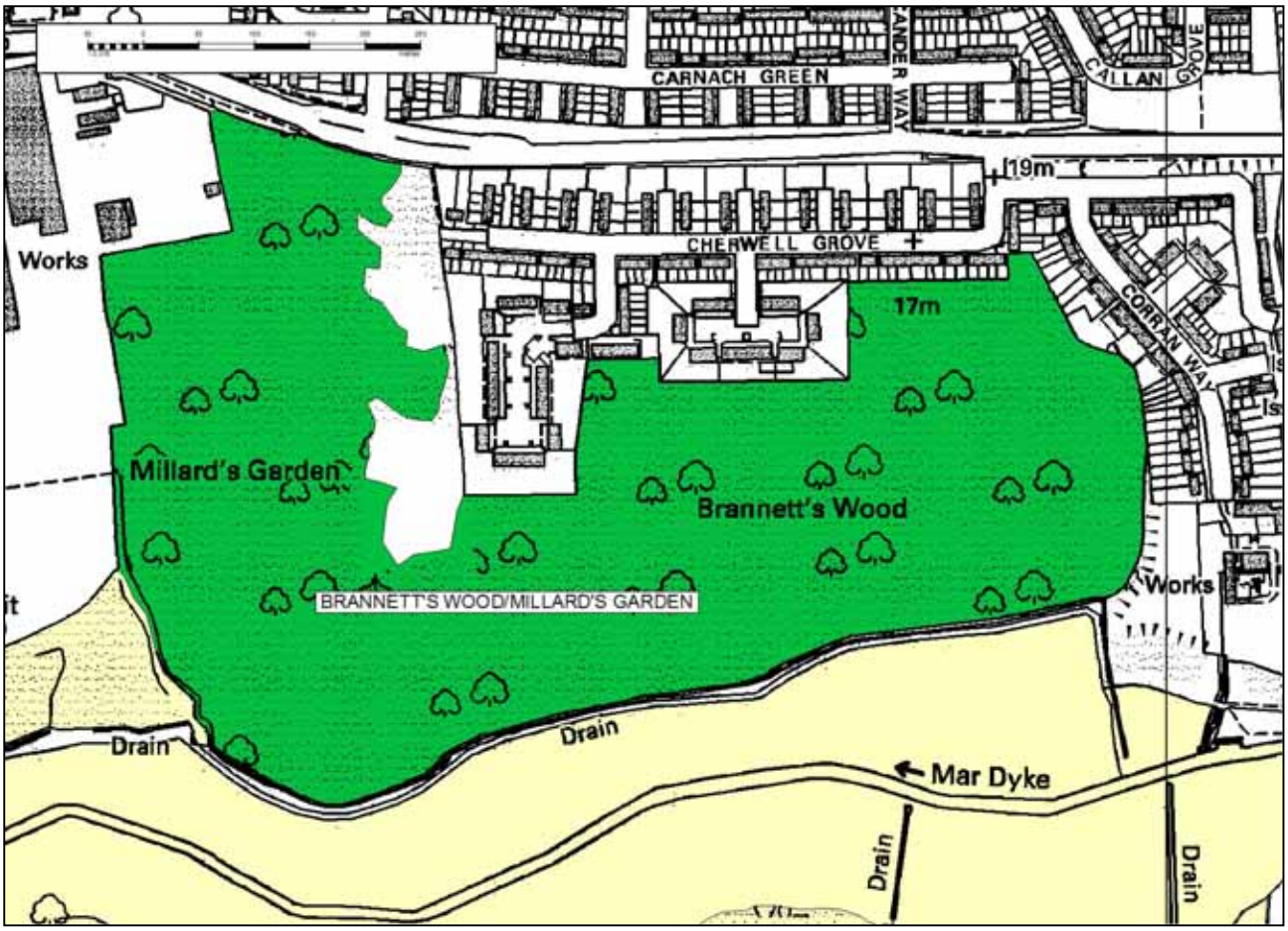
Th18. West Thurrock Lagoon (20.5 ha) TQ 585771

This former PFA (pulverised fuel ash) dump has developed a complex vegetation mosaic and now supports an exceptionally diverse and important invertebrate fauna. Peripheral ditches support bands of reedbed, complementing the West Thurrock Reedbed Site to the west. The flora includes plants normally associated with chalk grassland, such as Yellow-wort (*Blackstonia perfoliata*) and Ploughman's Spikenard (*Inula conyzae*), and a suite of saltmarsh species, such as Sea Aster (*Aster tripolium*), Sea Club-rush (*Scirpus maritimus*), Saltmarsh-grasses (*Puccinellia* spp.) and Lesser Sea-spurrey (*Spergularia marina*). The remaining areas of dry grassland are species-rich and provide an important foraging resource for an exceptional invertebrate fauna.

At least 59 Essex Red Data List species have been recorded, including three national BAP species, nine Red Data Book and 27 Nationally Scarce species. Species of particular note include the spider *Sitticus saltator*, a dune specialist known from very few other sites in the county, and the beetle *Leptophloeus clematidis* (RDB1).

Selection Criteria: HCr20; HCr22; SCr11; SCr12

Condition and Proposed Management: This site is threatened by development. This would be a serious loss to the biodiversity of Essex. If saved, scrub growth should be inhibited, but not eradicated. No other routine management is needed, although periodic small-scale disturbance of rank vegetation to recreate areas of bare ground may be beneficial in the long term. It is suggested that this site is of SSSI quality for its invertebrate populations.

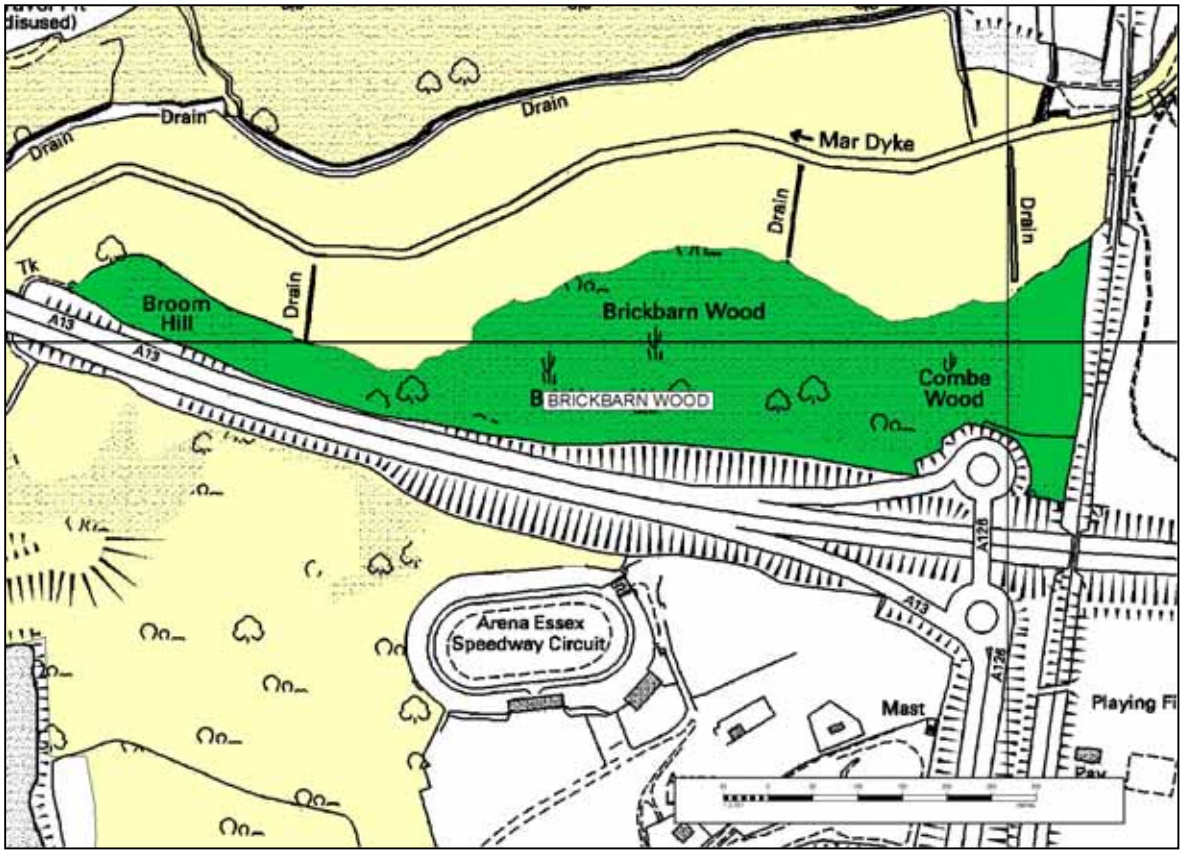


Th19. Millard's Garden/Brannett's Wood (20.4 ha) TQ 585803

Millard's Garden with Brannett's Wood to the east and Low Well Wood (Th14) to the west forms one of the largest woodland blocks in the borough. The canopy comprises mature specimens of Sycamore (*Acer pseudoplatanus*), Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Sweet Chestnut (*Castanea sativa*) over an understorey of Hawthorn (*Crataegus monogyna*), old Hazel (*Corylus avellana*) coppice and Sycamore seedlings. The ground layer has a typical array of woodland species, including several ancient woodland indicators, such as Pignut (*Conopodium majus*), Bluebell (*Hyacinthoides non-scripta*), Remote Sedge (*Carex remota*) and Goldilocks Buttercup (*Ranunculus auricomus*). Other frequent species include Wood Avens (*Geum urbanum*), Wood Meadow-grass (*Poa nemoralis*), Ivy (*Hedera helix*), Creeping Soft-grass (*Holcus mollis*) and Greater Stitchwort (*Stellaria holostea*).

Selection Criteria: HCr1(a); HCr2(b)

Condition and Proposed Management: The control of Sycamore invasion should be a high priority. The northern boundary of the wood is being despoilt by the neighbouring residents who dump rubbish over the boundary. Thereafter, management as high forest is likely to be the most practicable measure.



Th20. Brickbarn Wood (10.6 ha) TQ 586799

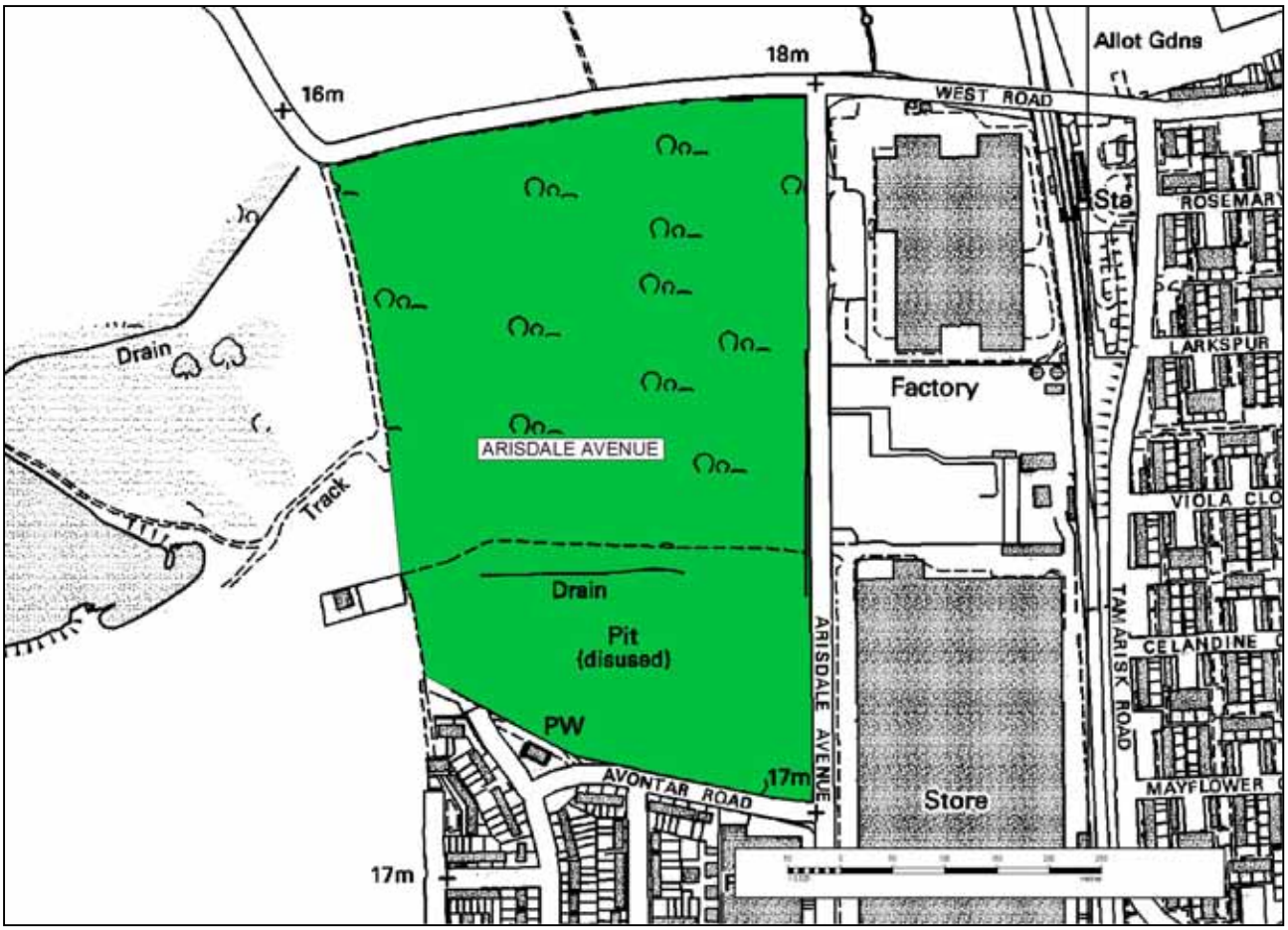
This Site comprises a small area of apparently ancient woodland, surrounded by secondary wood and with an important open grassland/scrub zone along the southern and eastern boundaries. The canopy is mainly Pedunculate Oak (*Quercus robur*) with a little Ash (*Fraxinus excelsior*) and with Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and Elder (*Sambucus nigra*) forming the understorey. Deadly Nightshade (*Atropa belladonna*) is of interest in the woodland flora. In undisturbed areas Bramble (*Rubus fruticosus*) covers much of the ground layer, but elsewhere a diverse if occasionally sparse woodland flora includes Pignut (*Conopodium majus*), Bluebell (*Hyacinthoides non-scripta*), Primrose (*Primula vulgaris*) and Greater Stitchwort (*Stellaria holostea*).

The southern disturbed grassland area is of note for the localised abundance of Broad-leaved Cudweed, a national Red Data Book (Endangered) plant known from less than a dozen sites nationally and is only found in Essex at this location and Arena Essex to the south. It is protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended). This grassland zone includes several chalk grassland species, including Wild Liquorice (*Astragalus glycyphyllos*), Yellow-wort (*Blackstonia perfoliata*) and Carline Thistle (*Carlina vulgaris*), as well as areas of acid grassland where sand caps the underlying chalk.

The site is also of geological interest for the numerous Sarsen Stones to be found along the southern margin.

Selection Criteria: HCr1(a); HCr2(a); HCr15; HCr19; SCr13

Condition and Proposed Management: The quality of the wood is being periodically impaired by the intrusion of grazing livestock from the Mar Dyke grasslands to the north. The site should be fenced to prevent future bark-stripping from the trees. There may be a need to undertake periodic scrub control along the southern grassland margin.

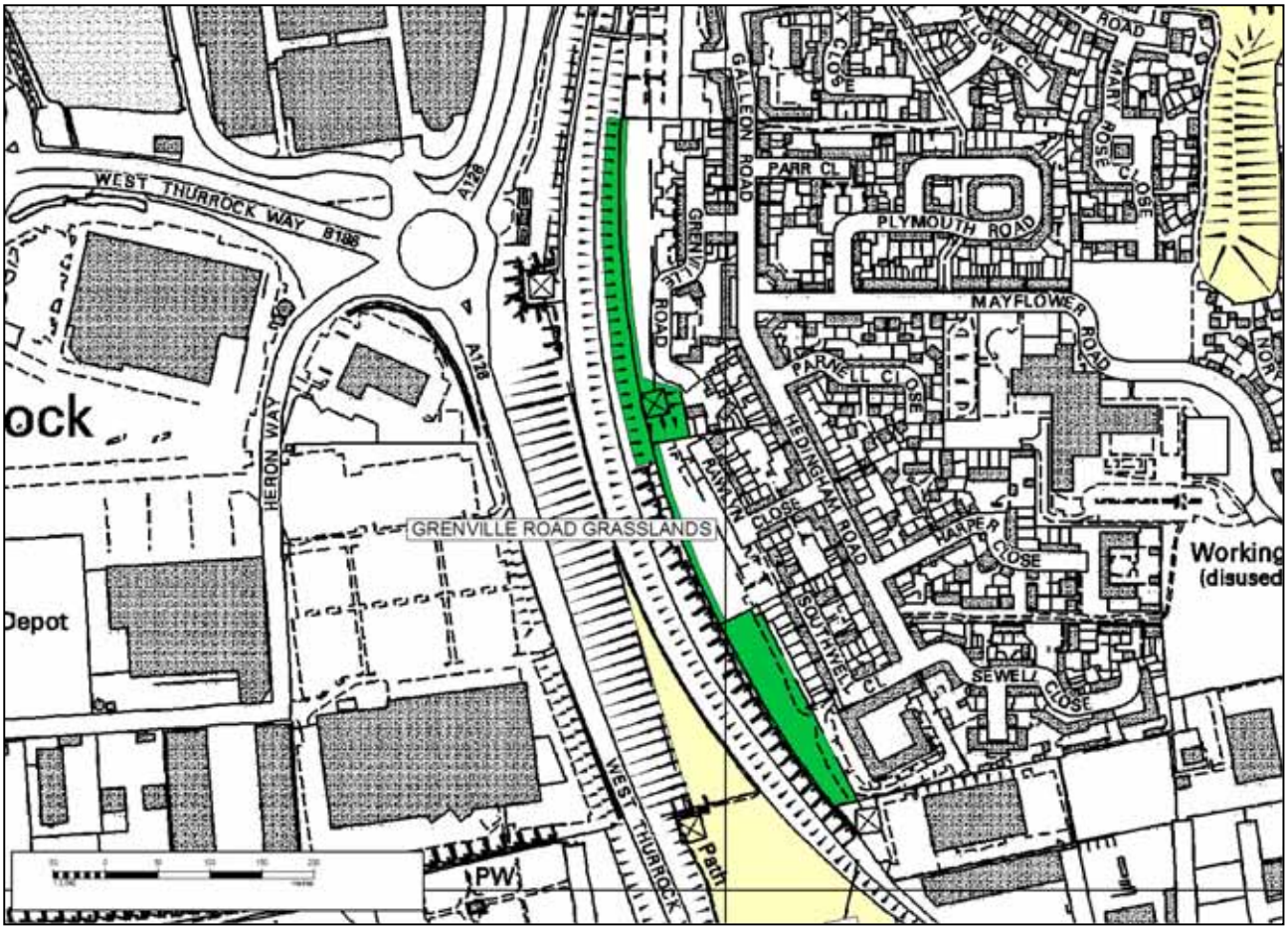


Th21. Arisdale Avenue (16.6 ha) TQ 586827

This brownfield site comprises rough, weedy and flower-rich grassland and a small reed-filled hollow. It is of value for its invertebrate assemblage, amongst which the small mining bee *Andrena alfkenella* is of particular interest amongst a list of 15 Essex Red Data List species. Also present is the Long-winged Cone-head bush-cricket (*Conocephalus discolor*) and the national BAP bumblebee *Bombus humilis*. This latter species requires large areas of flower-rich grassland in which to forage and rough grassland for nest construction. The Long-winged cone-head requires areas of tall, unintensively managed grassland and, although expanding its range nationally, remains relatively uncommon in Essex.

Selection Criteria: SCr11; SCr12

Condition and Proposed Management: This is one of a suite of "early succession" habitats found in the borough, which favour the establishment of invertebrates that favour bare ground and/or flower-rich habitats. Management should aim to maintain the *status quo*, with large areas of tall, weedy grassland. Within this, the reed-filled hollow could be enhanced as a small wetland feature. This land may well prove to be of importance for reptiles.



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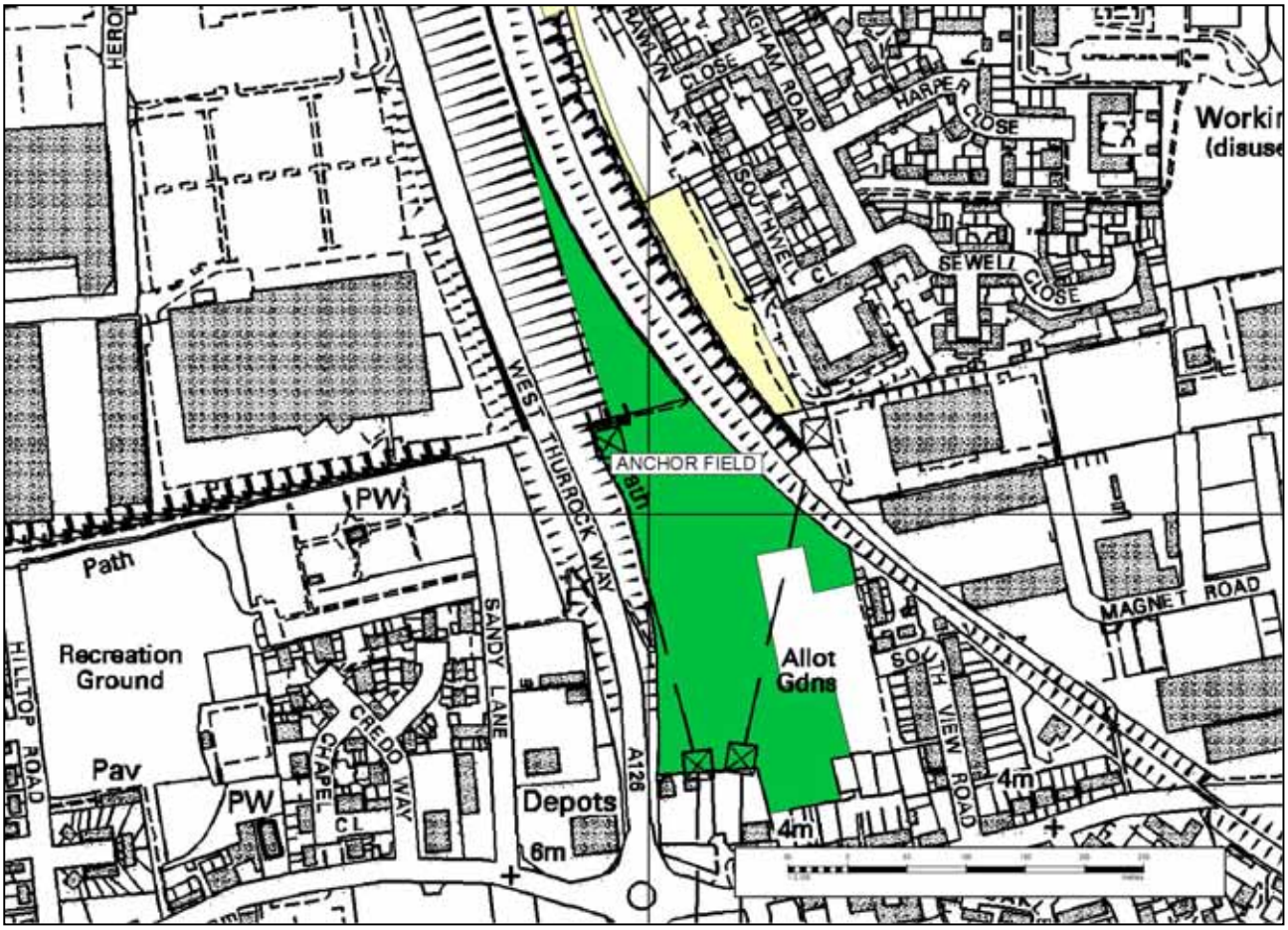
Th22. Grenville Road Grasslands (1.3 ha) TQ 589783

This site represents the western boundary of the old Mill Wood Pit, an exceptionally important invertebrate site that has been all but lost to the housing development within Chafford Hundred. This small chalk bank and part of the associated railway line cutting still supports an interesting flora and an insect assemblage that includes the Mottled Grasshopper (*Myrmeleotettix maculatus*). This is a rare insect in Essex and this is its only known location in Thurrock and only third known locality in south Essex. The site supports at least eight other Essex Red Data List species, including two national Red Data Book bees of which *Stelis ornatula* is of particular interest.

The flora includes Yellow-wort (*Blackstonia perfoliata*), Eyebright (*Euphrasia* spp.), Carline Thistle (*Carlina vulgaris*), Ploughman's Spikenard (*Inula conyzae*), Fairy Flax (*Linum catharticum*), Blue Fleabane (*Erigeron acer*), Sheep's Fescue (*Festuca ovina*), Lady's Bedstraw (*Galium verum*), Bee Orchid (*Ophrys apifera*), Kidney Vetch (*Anthyllis vulneraria*) and Salad Burnet (*Poterium sanguisorba*), making it one of the most varied chalk grassland sites in Thurrock. Three of these are on the Essex Red Data List for plants.

Selection Criteria: HCr15; SCr12; SCr13

Condition and Proposed Management: Being a linear site, much of this bank is prone to adverse "edge effect" phenomena. These include close mowing of the sward right up to the base of the bank, incursion of Ivy over the ground from the railway line boundary hedge and the planting and subsequent spread of a line of Buddleja bushes along the Grenville Road section. The Buddleja is visually attractive to humans and attracts large numbers of common butterflies and bumblebees but does little or anything for the rare species of interest found here. The spread of seedlings and the shading effect of the maturing bushes are of great concern.



Th23. Anchor Field (3.3 ha) TQ 590779

This former arable field represents the original land surface, largely lost to large-scale chalk quarrying to both the east and west. The occasionally weedy rough grassland has few species of note, although the chalk grassland plants Yellow-wort (*Blackstonia perfoliata*) and Ploughman's Spikenard (*Inula conyzae*) are of some interest.

The principal value of the site is its invertebrate interest, which includes what may well be the largest British population of the national BAP fly *Dorycera graminum*. The fauna includes a large number of nationally rare and scarce species as well as over 40 Essex Red Data List species. At least two other national BAP species occur here.

The site also supports three species of reptile: Adder, Common Lizard and Slow-worm, making it a significant site for reptiles in the borough.

Selection Criteria: HCr20; SCr4; SCr11; SCr12

Condition and Proposed Management: Cutting should be restricted to small-scale patch cutting to maintain structural diversity, rather than large-scale "cropping" of the grass, which is particularly detrimental if the cuttings are left to lie on the ground. Maintenance of a tall, flower-rich sward is of importance, and the presence of numerous ruderal ("weed") species should be seen as an asset rather than a concern, since these plants often provide invaluable late-summer forage. This management should improve habitat diversity and lead to an even more diverse fauna. Any scrub invasion should be tackled by removing individual bushes/saplings.

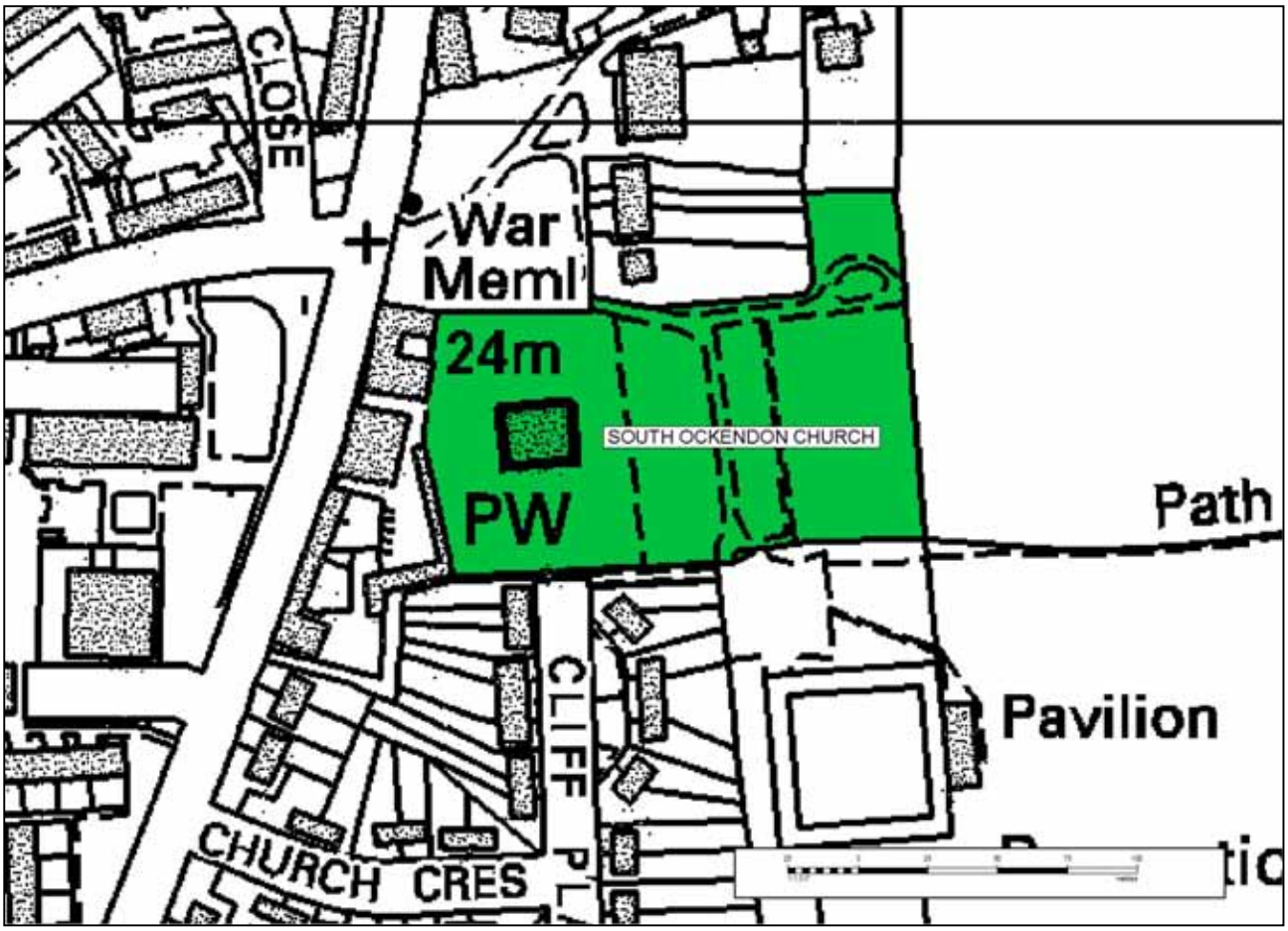
Th24. Mill Wood and Cliff (3.5 ha) TQ 594787

Mill Wood is thought to be an ancient woodland fragment. It has a canopy of Pedunculate Oak (*Quercus robur*), with some Field Maple (*Acer campestre*), frequent Hazel (*Corylus avellana*) and some Hawthorn (*Crataegus monogyna*) and Broom (*Cytisus scoparius*) scrub. Ancient woodland ground flora plants are rather sparse but Pignut (*Conopodium majus*) and Wood Spurge (*Euphorbia amygdaloides*) occur sparingly. The southern fringe supports a rather trampled acid grassland flora, characterised by Common Centaury (*Centaurium erythraea*), Mouse-ear Hawkweed (*Pilosella officinarum*), Red Bartsia (*Odontites vernus*), Hare's-foot Clover (*Trifolium arvense*) and Hop Trefoil (*Trifolium campestre*). Lower slopes towards the cliff support two chalk grassland species: Ploughman's Spikenard (*Inula conyzae*) and Kidney Vetch (*Anthyllis vulneraria*), both Essex Red Data List species.

The cliff is a small remnant of the once vast and regionally, if not nationally, important Mill Wood Pit. This supported an exceptional invertebrate fauna, which has been all but obliterated by the Chafford Hundred housing development. Only small pockets such as this site and the Grenville Road Grasslands (Th22) remain. The cliff here supports many Essex Red Data List invertebrates, including the ruby-tailed wasps *Chrysis viridula* and *Pseudospinolia neglecta*, both of which are brood parasites on the wasp *Odynerus spinipes*, which is abundant here. The nationally rare (Red Data Book) bees *Ceratina cyanea* and *Nomada fulvicornis* also occur here. The southern landscaped hillock is included here as foraging habitat for these invertebrates. The Site is part of the Essex Wildlife Trust's Chafford Gorges reserve.

Selection Criteria: HCr1(b); SCr12; SCr13

Condition and Proposed Management: Parts of the cliff face are being obscured by scrub and should be re-exposed. The landscape tree and shrub planting on the hillock should be removed, except for a few scattered bushes, and the site managed as tall herbage for invertebrates.



Th25. South Ockendon Church (1.2 ha) TQ 595829

This ancient church is surrounded by equally ancient grassland, although one that has been modified by centuries of burial and management. It is of particular interest for the presence of Subterranean Clover (*Trifolium subterraneum*), a rare Essex Data List plant. Other species of interest in the moderately species-rich sward include Lady's Bedstraw (*Galium verum*), Field Wood-rush (*Luzula campestris*), Meadow Buttercup (*Ranunculus acris*), Sheep's Sorrel (*Rumex acetosella*), Knotted Clover (*Trifolium striatum*), the Corn-salad *Valerianella carinata* and locally frequent Germander Speedwell (*Veronica chamaedrys*). This last species supports the Nationally Scarce bee *Andrena labiata*. Unlike most churchyards, the best sward is away from the church on the eastern side, rather than immediately surrounding the church, where the oldest sward is often found.

Selection Criteria: HCr11

Condition and Proposed Management: The grassland is currently being adversely affected by a mowing regime that sees the sward cut down in high summer. Fortunately this has perhaps less of an impact on the generally low-growing Subterranean Clover than it is for other species but the overall sward is doubtless declining in the face of this practice, along with the tendency to leave the cuttings lying on the ground. Early spring and late autumn cutting would be better. In the long-term a reduction on soil nutrient levels would lead to a shorter summer sward that would not need cutting so often.

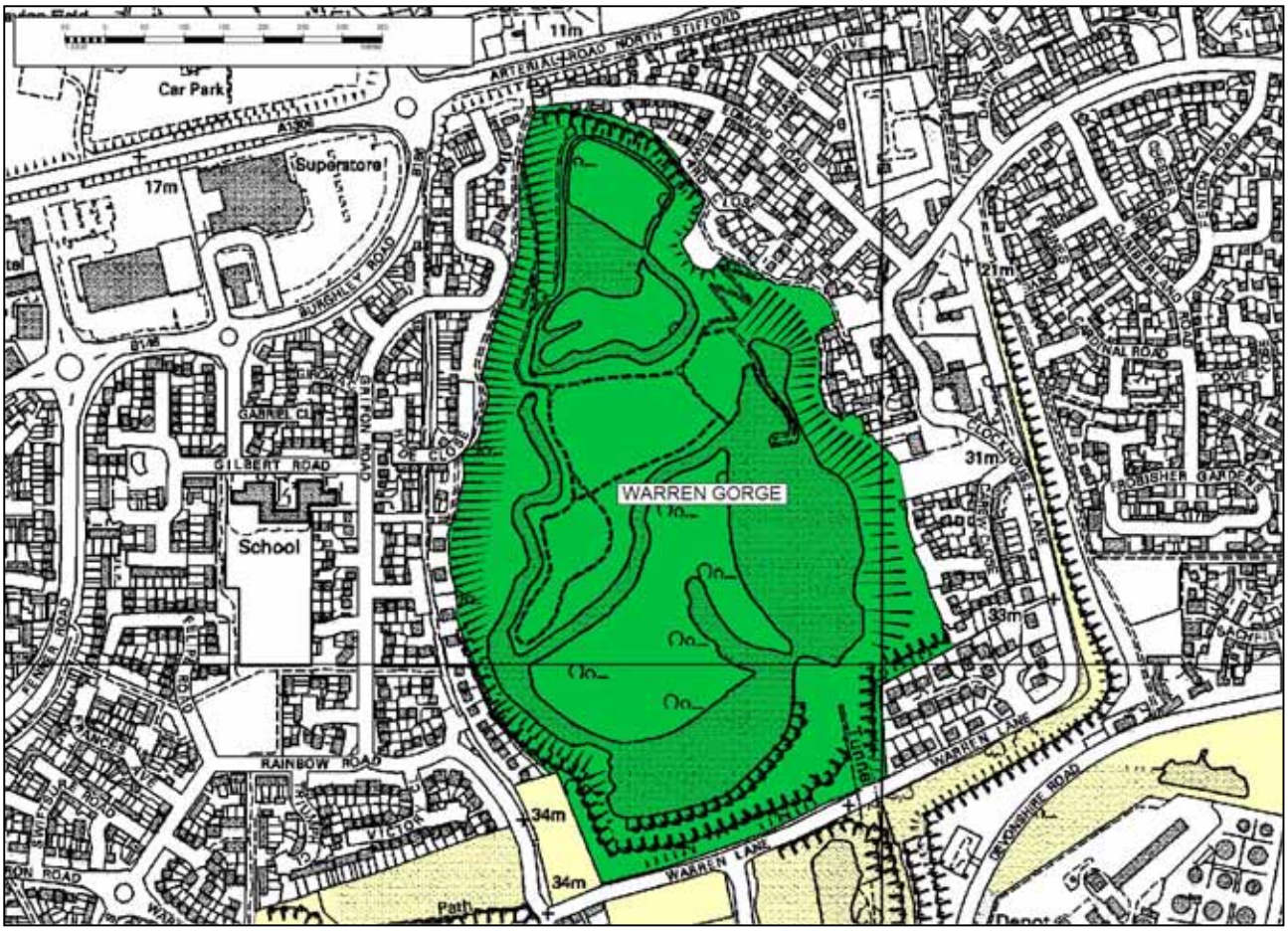
Th26. Warren Lane Grasslands (1.4 ha) TQ 597787

These two areas of brownfield habitat support an interesting assemblage of plants and an important assemblage of invertebrates. The site was formerly an outdoor pursuits centre and, following demolition, weedy rough grassland has developed. In addition, some older areas of acid grassland are of interest and lie within the remit of the Essex heathland BAP. In some areas where soil is sparse, poorly vegetated open grassland adds to the habitat diversity for invertebrates. The short acid grassland sward includes the scarce Essex plant Little Mouse-ear (*Cerastium semidecandrum*). The southern bank of the south section has been specifically engineered as an invertebrate habitat, but also has an interesting flora which includes Quaking Grass (*Briza media*), Sheep's Fescue (*Festuca ovina*) and Yellow-wort (*Blackstonia perfoliata*).

The invertebrate fauna includes scarce species from a broad spectrum of families, including the Adonis' Ladybird and a number of Essex Red Data List bees and wasps, including two nationally rare (RDB3) bees: *Nomada fulvicornis* and *Ceratina cyanea.* The first Essex specimen of the Paper Wasp *Polistes dominulus* was taken from here in 2006, although this may have been just a vagrant worker rather than proof of local breeding.

Selection Criteria: HCr19; SCr12

Condition and Proposed Management: At least part of this site may be under threat from development. Management should aim to strike a balance between maintaining areas of early-succession vegetation along with improvements to the extent of short acid grassland, which could contribute towards the Essex heathland BAP project. There is potential to increase the extent of this acid grassland sward, with the need to prevent nutrient enrichment in the soil to encourage the formation of a low, drought-stressed and flower-rich sward.



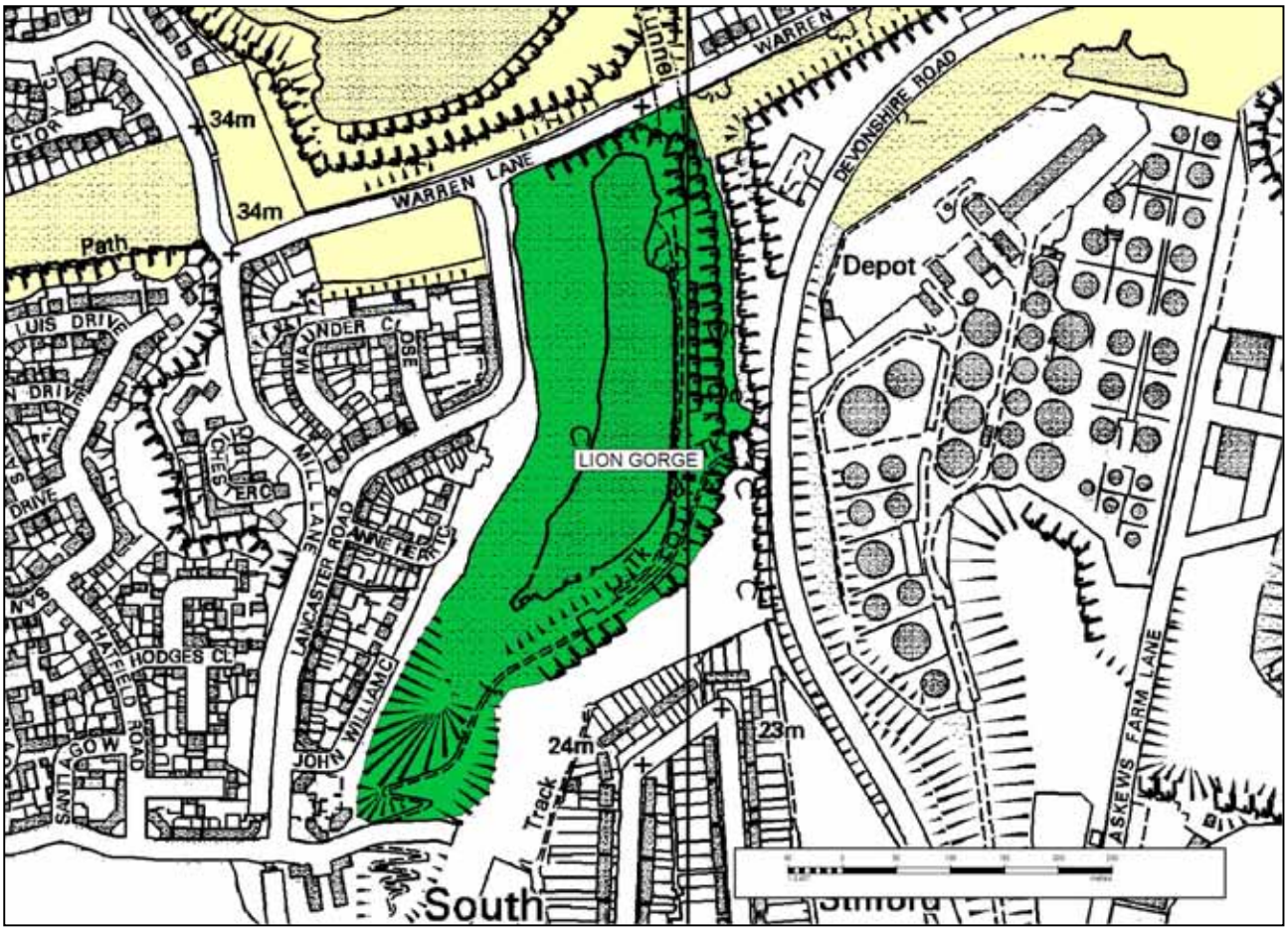
Th27. Warren Gorge (26.4 ha) TQ 598791

This abandoned chalk-pit is one of a complex of sites west of Grays that supports a relict chalk grassland flora along with developing woodlands and lakes. It is now the central hub of the Essex Wildlife Trust's Chafford Gorges nature reserve. Plants of particular importance that have been recorded here include the Nationally Scarce Round-leaved Wintergreen (*Pyrola rotundifolia*), Pyramidal Orchid (*Anacamptis pyramidalis*), Bee Orchid (*Ophrys apifera*) and Southern Marsh Orchid (*Dactylorhiza praetermissa*). Great Crested Newts have also been recorded. Translocated reptiles and Glow-worms (*Lampyris noctiluca*) have been released here.

The invertebrate fauna includes the nationally rare (Red Data Book 3) national BAP fly *Dorycera graminum* and, in 2006, the beetle *Lytta vesicatoria*, known as Spanish Fly, was recorded for the first time.

Selection Criteria: HCr2(c); HCr13; SCr11; SCr12; SCr13

Condition and Proposed Management: Management should aim to maintain the overall diversity of habitats, thereby providing habitat conditions for the invertebrate interest of the site. The increased visitor pressure that will come from it becoming an Essex Wildlife Trust reserve may have an impact upon the site.



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Th28. Lion Gorge (7.4 ha) TQ 599786

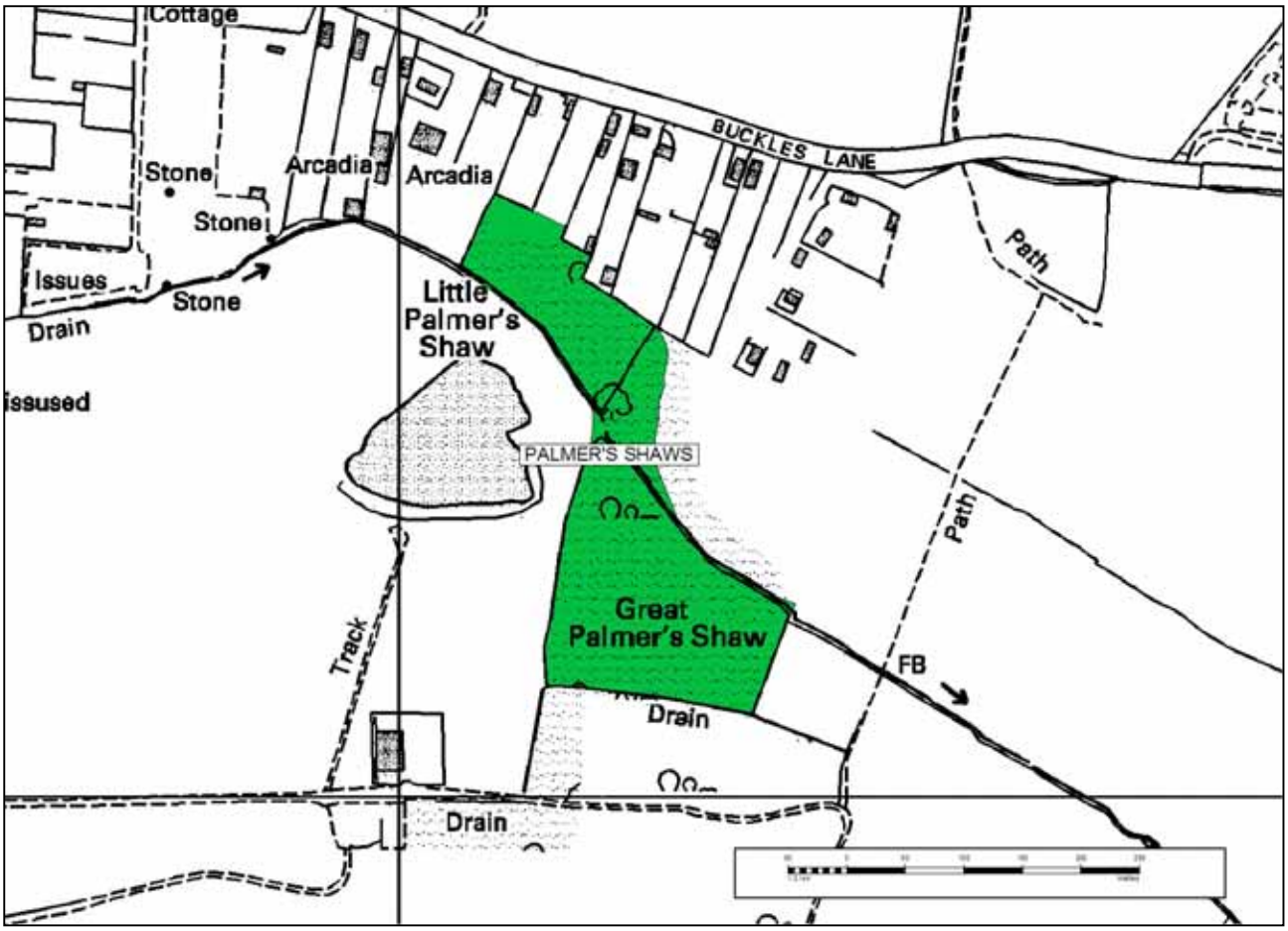
This site comprises steep, wooded chalk cliffs (resulting from quarrying) capped with sand and gravel deposits with relic grassland and scrub, forming a most unusual assemblage of habitats, similar to the nearby Essex Wildlife Trust reserve at Grays Chalk Pit SSSI. Mezereon (*Daphne mezereum*), though possibly introduced, has been recorded. Old quarry tunnels at the back of the Gorge are important for bats.

The invertebrate fauna includes five nationally rare (Red Data Book) species, including two UK BAP species: the fly *Dorycera graminum* and the bumblebee *Bombus humilis*. The list of Essex Red Data List species includes the ruby-tailed wasp *Chrysis viridula*, which parasitises the locally abundant wasp *Odynerus spinipes*.

This Site is part of the Essex Wildlife Trust's Chafford Gorges reserve.

Selection Criteria: HCr2(c); HCr6(b); SCr11; SCr12

Condition and Proposed Management: Scrub encroachment on the near-vertical sandy cliff tops will present some unique challenges in habitat management. There will be a desire to prevent too much scrub encroachment at the expense of sparse sandy grassland, although the tree roots may be helping to stabilise the slopes. The lake perimeter suffers from heavy recreational pressure.



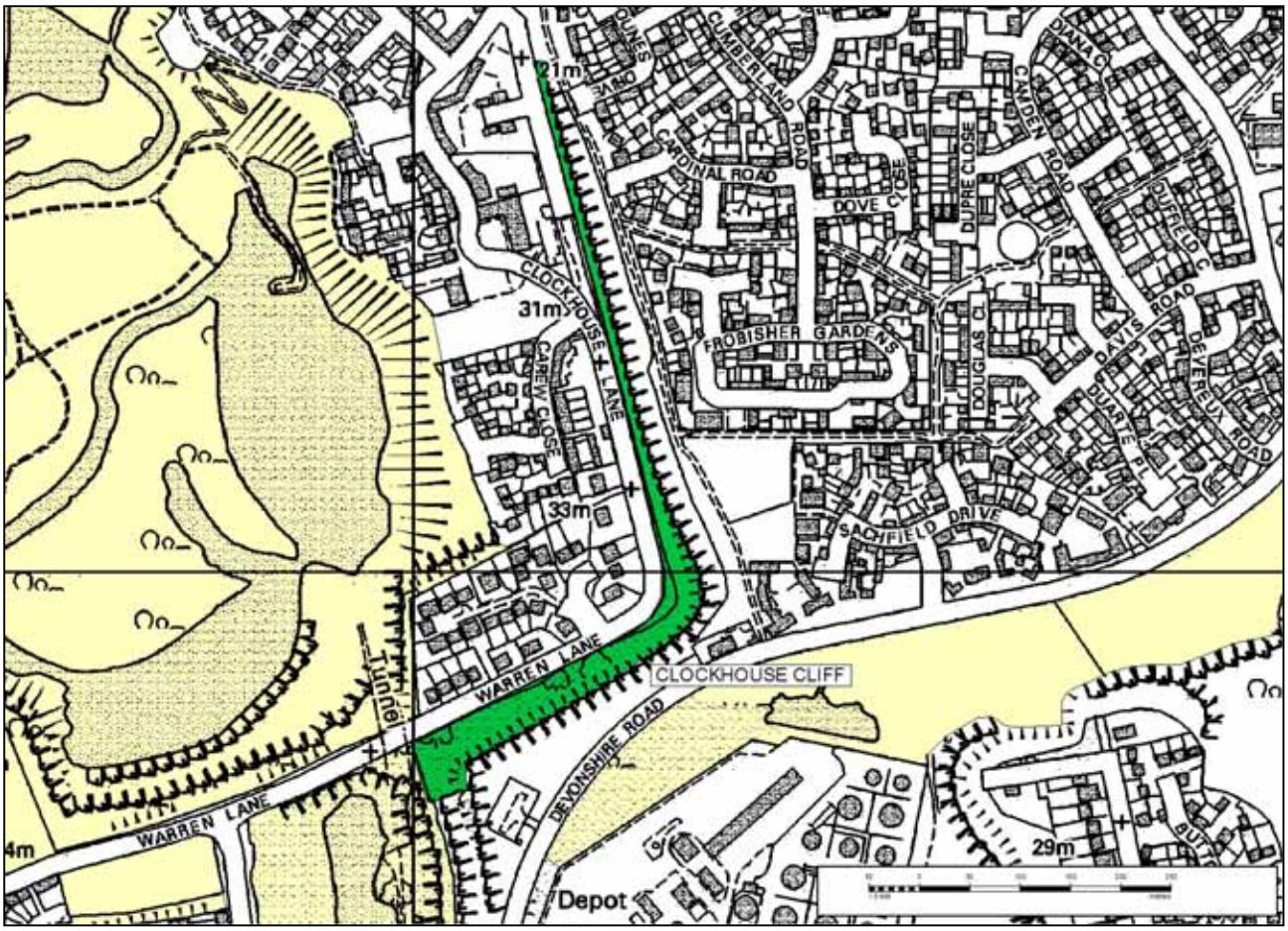
Th29. Palmer's Shaws (3.2 ha) TQ 601812

Great Palmer's Shaw is a partially neglected ancient wood of which a significant proportion has been replanted. The area of semi-natural woodland has Hazel (*Corylus avellana*) coppice, Ash (*Fraxinus excelsior*), Pedunculate Oak (*Quercus robur*) and Elder (*Sambucus nigra*) whilst the plantation is of Beech (*Fagus sylvatica*) and Pine (*Pinus* sp.). Heavy shading, particularly in the planted area, has resulted in a currently sparse ground flora typified by Ground-ivy (*Glechoma hederacea*), Bramble (*Rubus fruticosus* agg.) and Nettle (*Urtica dioica*).

Little Palmer's Shaw is an ancient wood remnant consisting of Hazel coppice with Ash and Pedunculate Oak standards is suffering from neglect, with the ground flora impoverished by the dense, shading tree canopy and the impact of children's recreation. The ground flora is rich in bryophytes but vascular plants are sparse, with typical species being Bluebell (*Hyacinthoides non-scripta*), Ground-ivy and Bramble. This Site also includes a small amount of recent secondary woodland growth that forms a "bridge" connecting these two areas of woodland.

Selection Criteria: HCr1(a); HCr2(b)

Condition and Proposed Management: These two ancient woodland remnants are in a poor condition, with heavy recreational pressure and re-stocking with exotic species detracting from the original semi-natural vegetation.



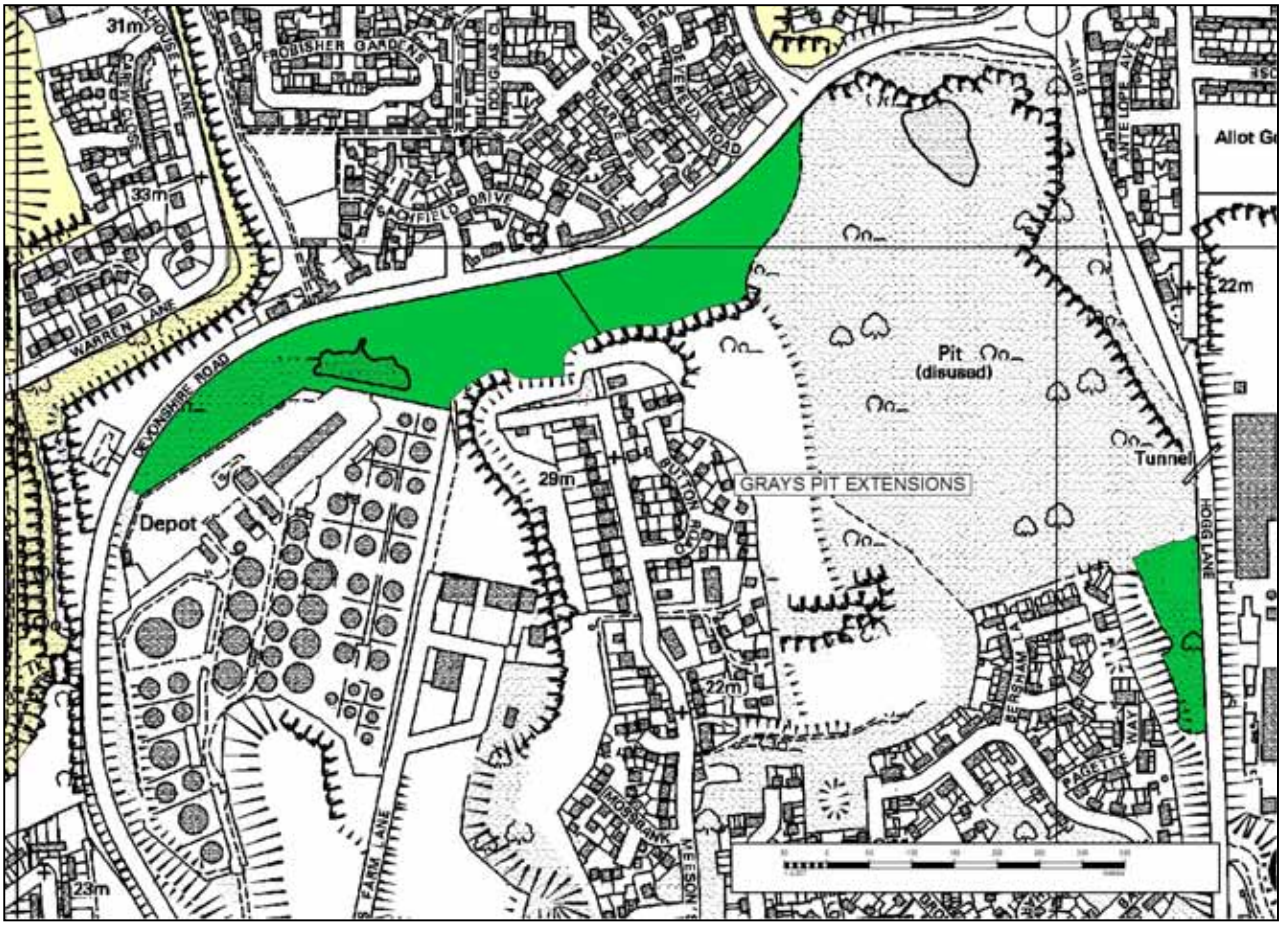
Th30. Clockhouse Cliff (1.3 ha) TQ 602790

This narrow strip of cliff-top grassland is part of the Essex Wildlife Trust's Warren Gorges nature reserve. It comprises an interesting mix of acid, sandy grassland and calcareous grassland, reflecting the underlying geology where a thin deposit of drift sand deposits overly the solid chalk that has been quarried to create this inland cliff.

Chalk grassland species, such as Yellow-wort (*Blackstonia perfoliata*), Hop Trefoil (*Trifolium campestre*) and Pyramidal Orchid (*Anacamptis pyramidalis*) grow alongside Mouse-ear Hawkweed (*Pilosella officinarum*), Common Broomrape (*Orobanche minor*), Red Bartsia (*Odontites vernus*), Wild Carrot (*Daucus carota*) and abundant Black Medick (*Medicago lupulina*). This flower-rich sward supports an interesting invertebrate fauna, in association with areas of bare sandy ground that form important nesting or hunting habitat for many species. The still limited species list for this site includes four Essex Red Data List species, including the Nationally Scarce spider-wasp *Auplopus carbonarius*, known from only a handful of sites in the county. Two of the Essex Red Data List species are nationally rare Red Data Book species.

Selection Criteria: HCr15; SCr12

Condition and Proposed Management: The site is narrow in places and has a well-used path along it, making casual visitor pressure a potential problem, although light trampling may help to maintain a low, flowery sward in places. Deliberate removal of orchid plants is also a potential problem. Scrub encroachment should be tackled by removal of the offending trees and shrubs rather than by wholesale mechanical cutting of the sward. Small patch cutting of rough grassland may be needed to restore areas of flower-rich sward.

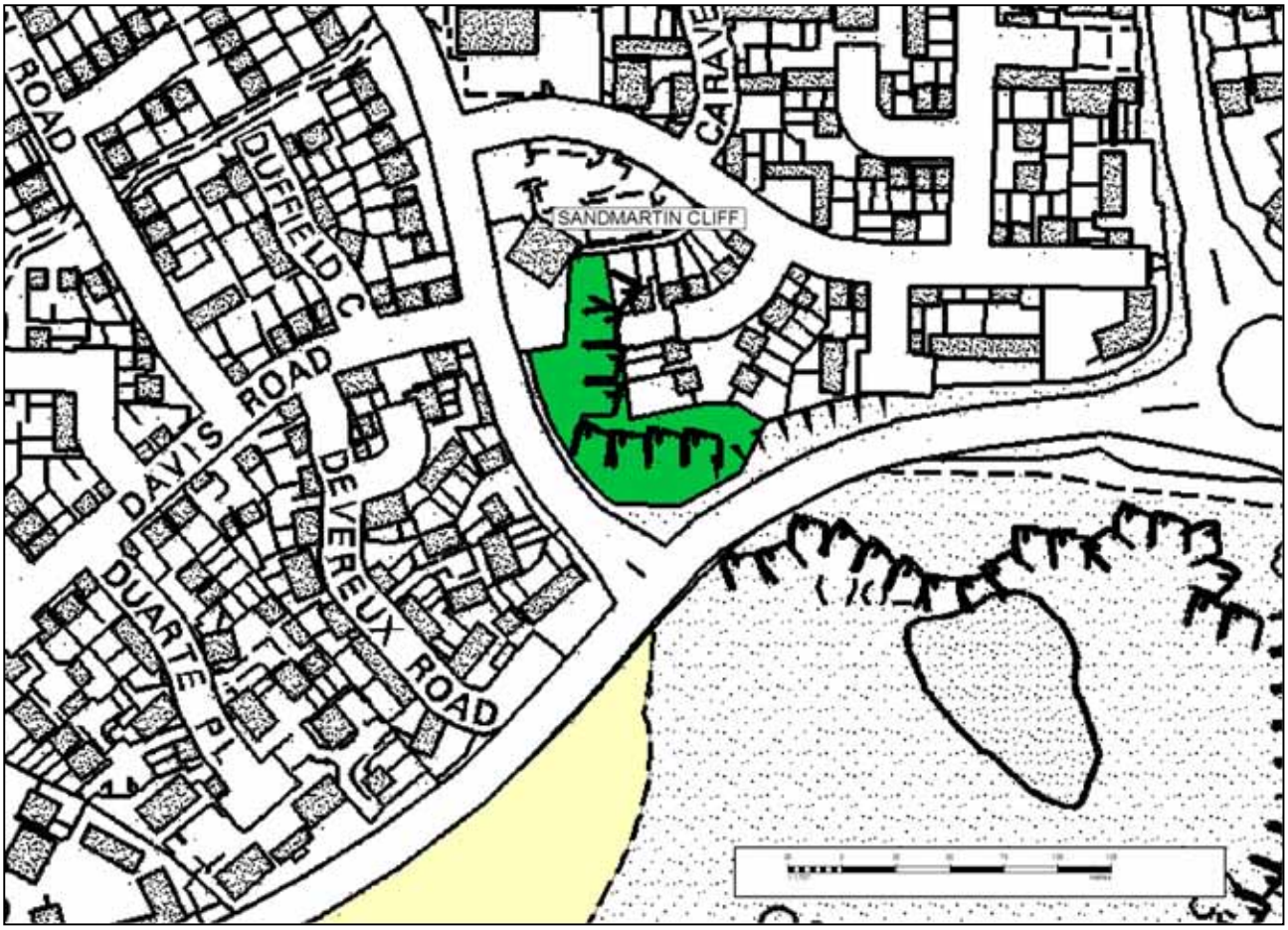


Th31. Grays Pit Extensions (5.9 ha) TQ 606789

The core of the Grays Chalk Pit nature reserve is a Site of Special Scientific interest (SSSI) and is therefore now excluded from the Local Wildlife Site network. The reserve, including the two sections of land included here, is now part of the Essex Wildlife Trust's Chafford Gorges nature reserve. The eastern section is an area of grassland lying on the chalk at the edge of the old quarry, whilst the main section to the west is more akin to brownfield land, being re-landscaped and otherwise disturbed ground. As well as being of intrinsic interest in its own right, this section provides an important ecological corridor to other Local Wildlife Sites to the west, most notably Lion Gorge and Warren Gorge.

Selection Criteria: HCr6(b); HCr13; HCr15; HCr20

Condition and Proposed Management: Whilst the main part of this site has good early successional vegetation areas, which may require periodic targeted disturbance to maintain their value, this part of the Site also suffers from uncontrolled motorbike usage, which may be potentially harmful. The spread of scrub may also be an issue, for which targeted scrub clearance (rather than large-scale flailing) should be used to bring it under control. That said, areas of scrub within this mosaic of habitats is an interesting feature in its own right, so that a balance of vegetation types needs to be struck.



Th32. Sandmartin Cliff (0.4 ha) TQ 607792

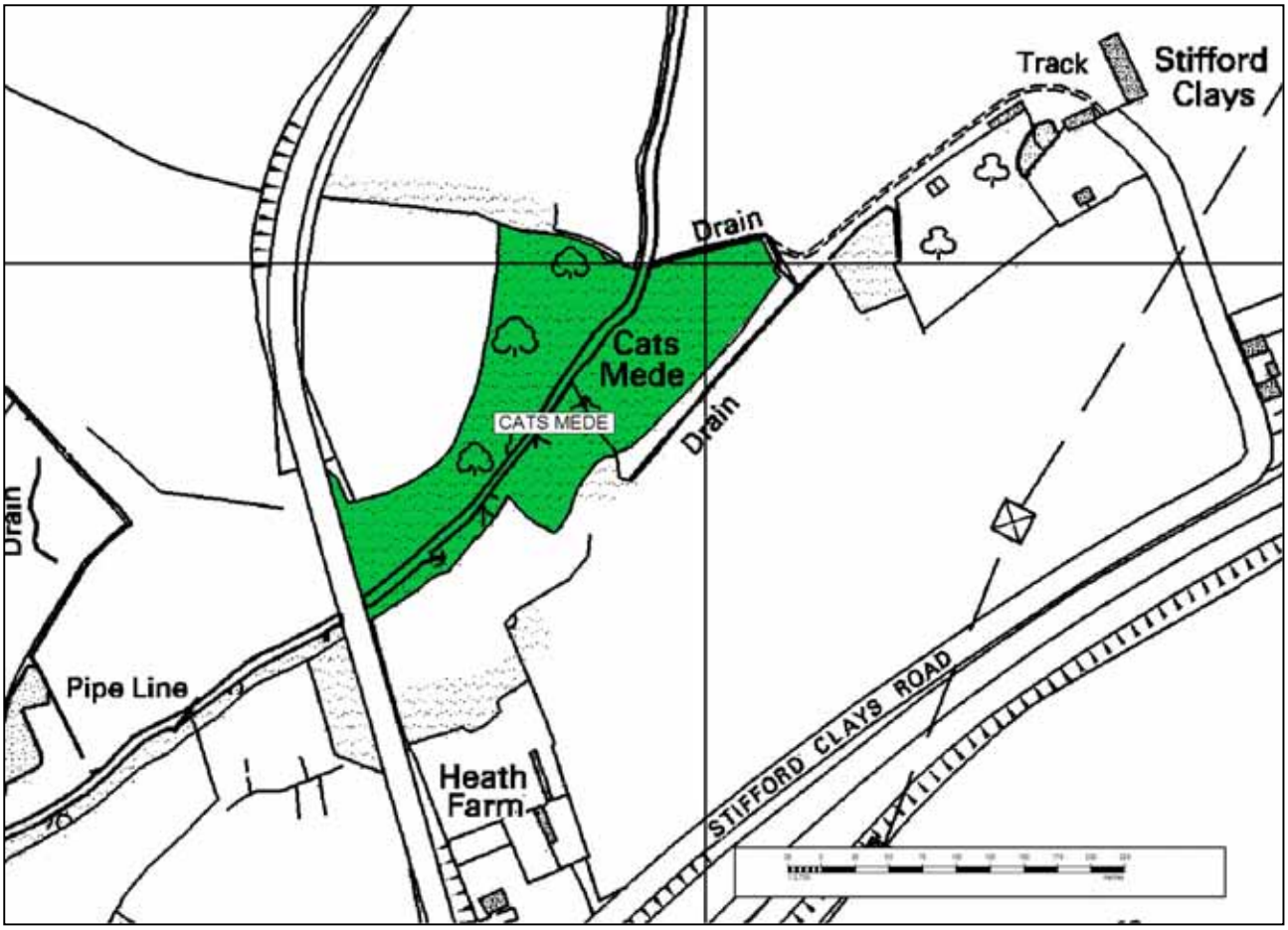
Despite its name, mirrored in the adjacent public house, this site is not thought to support breeding Sand Martins, although this was the case prior to the construction of the surrounding houses. It is part of the Chafford Gorges nature reserve.

The cliff is a small fragment of soft rock exposure that was created during extensive quarrying prior to residential development. In keeping with other such areas (e.g. Mill Wood and Pit, Th24), this cliff has developed an important invertebrate assemblage. The invertebrate fauna includes five nationally rare Red Data Book species, including the rare Essex bees *Andrena alfkenella* and *Lasioglossum brevicorne*. The ruby-tailed wasp *Chrysis viridula* is a rare Essex species that also occurs here, parasitising wasps in the Genus *Odynerus* that are abundant here. The UK BAP bumblebee *Bombus humilis* also forages here.

The floor of the Site has received translocated Pyramidal Orchids (*Anacamptis pyramidalis*), which now represent a strong if small colony of this uncommon Essex plant.

Selection Criteria: SCr11; SCr12

Condition and Proposed Management: Management issues are the uncontrolled intrusion of the public, including access from down the slope from the top of the cliff (thought to be a quick route to the pub), rank grassland growth on the floor of the site and scrub control.

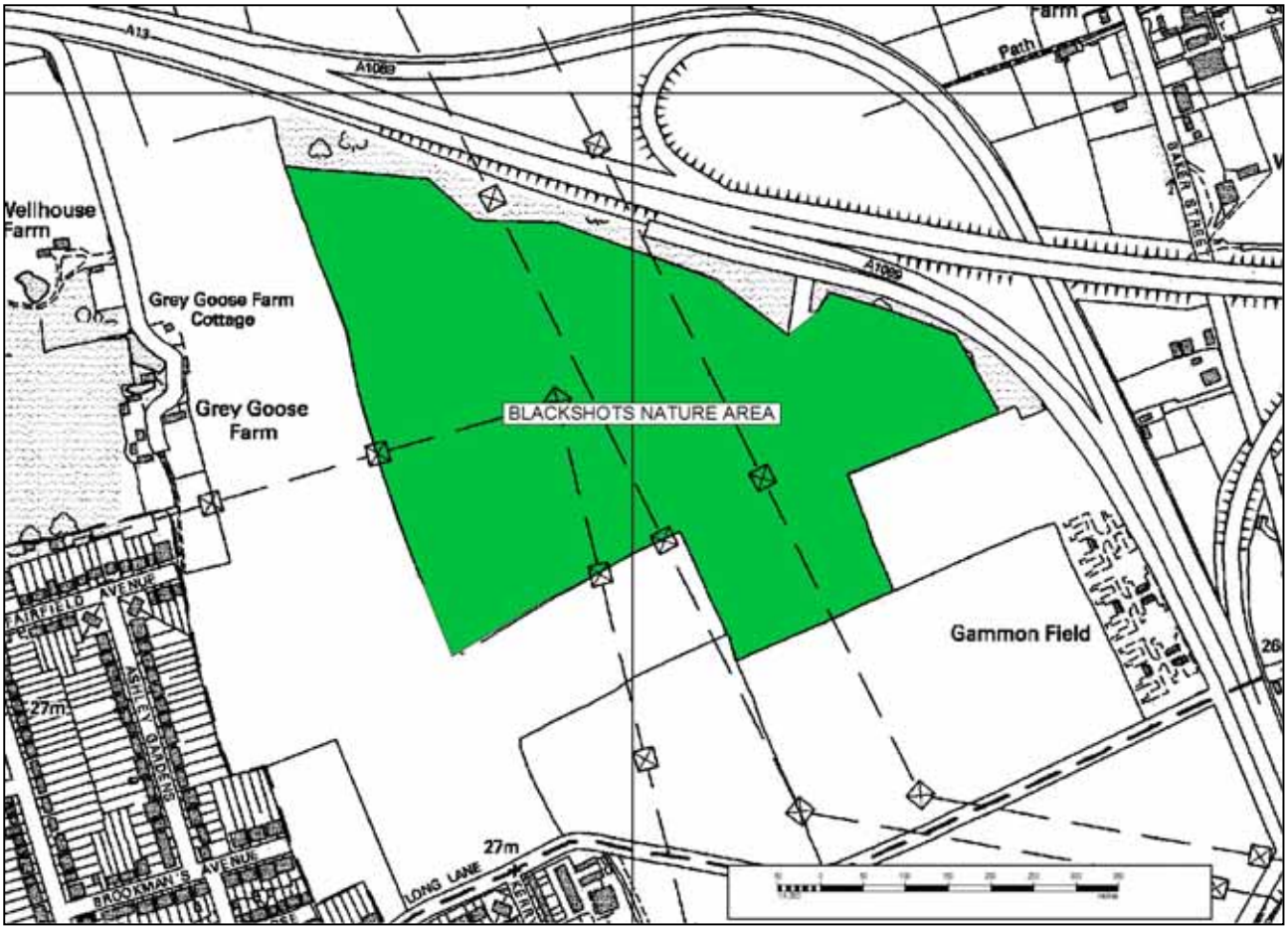


Th33. Cat's Mede (2.6 ha) TQ 609809

This ancient wood remnant, bisected by the Mar Dyke and rather open and scrubby in places, contains a wide variety of tree species including Field Maple (*Acer campestre*), Ash (*Fraxinus excelsior*), Pedunculate Oak (*Quercus robur*), Alder (*Alnus glutinosa*), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) with invading Sycamore (*Acer pseudoplatanus*) and Snowberry (*Symphoricarpos rivularis*). The site has been partially re-planted with Black Poplars (*Populus* sp.). The site currently has a poor ground flora in which Nettle (*Urtica dioica*), Ground-ivy (*Glechoma hederacea*), Bramble (*Rubus fruticosus* agg.) and Cleavers (*Galium aparine*) are the most prominent species.

Selection Criteria: HCr1(a)

Condition and Proposed Management: This ancient wood is currently is a poor condition. The wildlife value of the site would be enhanced by restoring the original semi-natural canopy of Oak, Ash and Maple and removing exotic species, such as Black Poplar, Sycamore and the highly invasive Snowberry.



Th34. Blackshots Nature Area (18.7 ha) TQ 630807

This large area of rough grassland supports an important invertebrate population, as well as providing potential nesting habitat for birds such as Skylark. The invertebrate fauna includes seven Essex Red Data List species, as well as the national BAP fly *Dorycera graminum*. At just over 18 hectares, this is the largest grassland Local Wildlife Site in Thurrock away from the coastal grazing marshes and the Mar Dyke river corridor. As well as its direct wildlife interest the site has potential as an environmental education resource and local open space.

Selection Criteria: HCr11; SCr12

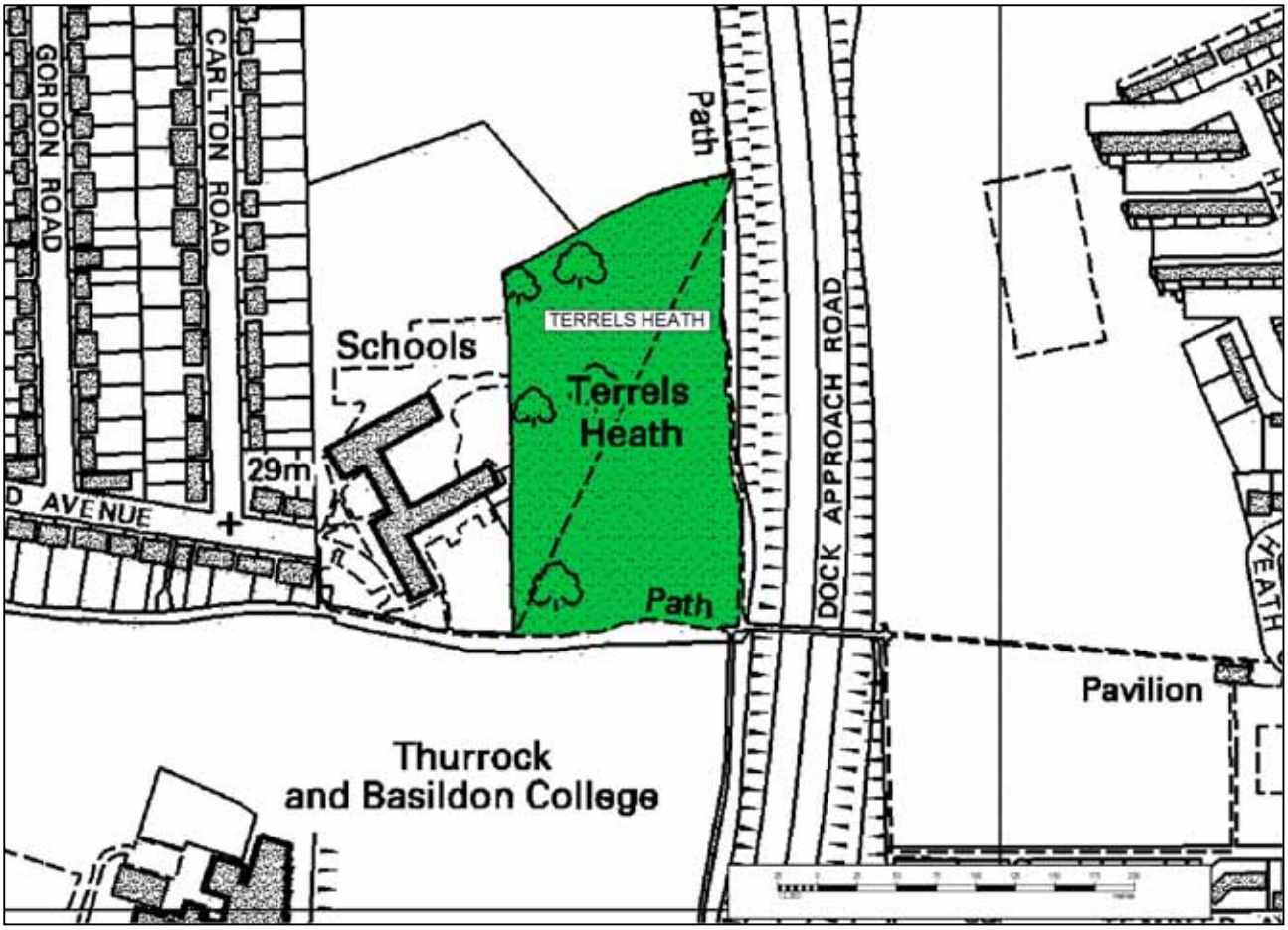
Condition and Proposed Management: Management should aim to maintain the current tall, flower-rich sward conditions, with perhaps small patch cutting where necessary to promote greater structural diversity. Scattered scrub bushes or thickets would not be detrimental to the site's ecology, but large expanses of scrub should be avoided.

Th35. Little Thurrock Reedbeds (1.4 ha) TQ 631778

Reedbeds are an Essex Biodiversity Action Plan habitat. These two beds provide good conditions for reed-dependent insects and also birds, such as Reed, Sedge and Cetti's Warbler, which favour nesting in Reed or Reed mixed with scrub bushes.

Selection Criteria: HCr21

Condition and Proposed Management: Whilst fringing scrub provides useful nesting habitat, it should not be allowed to encroach out into the reed itself. Management of the water table, human disturbance and prevention of vandal's fires will be important issues in maintaining their interest.

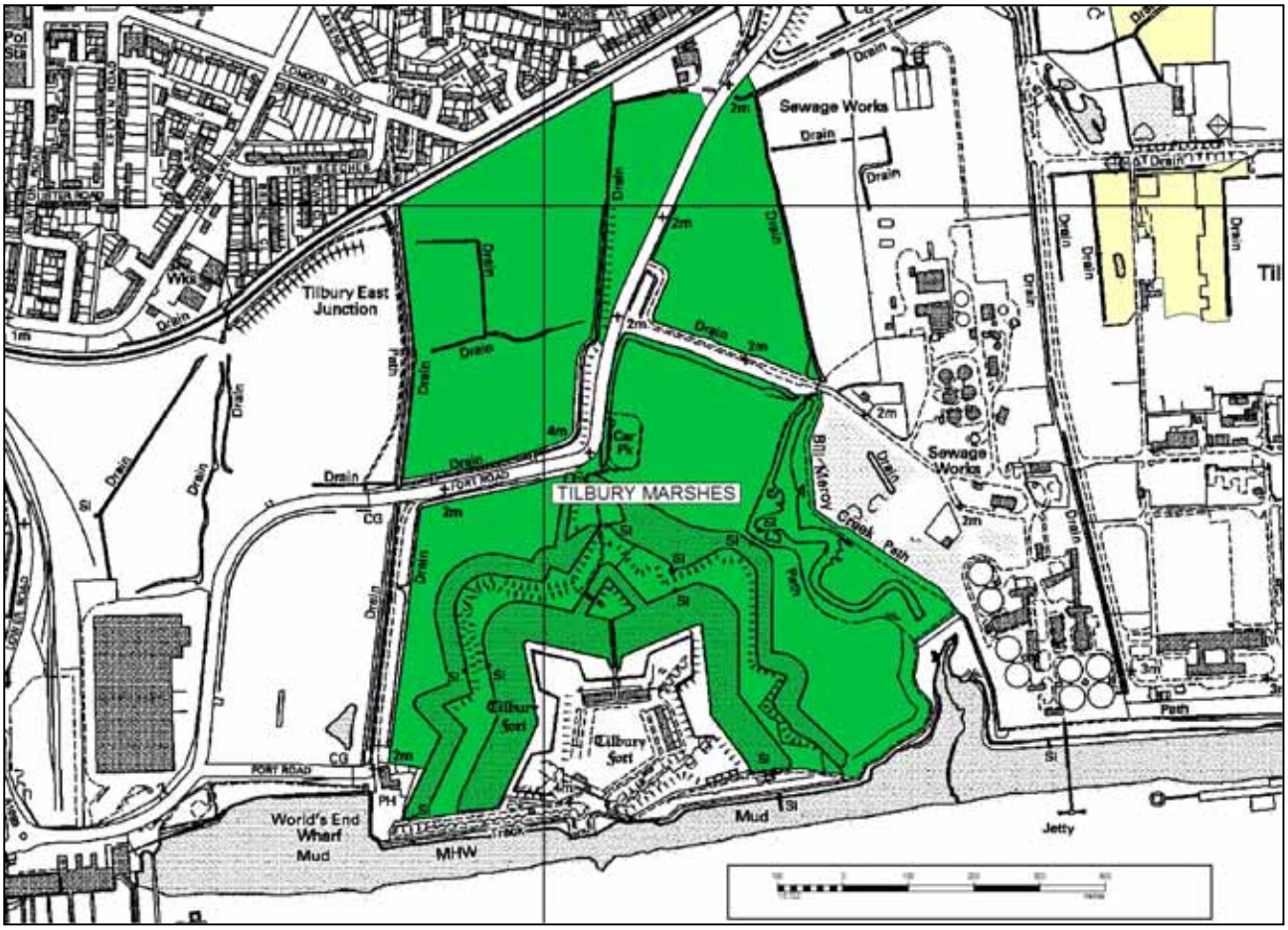


Th36. Terrels Heath (2.5 ha) TQ 638792

Terrels Heath has a high forest structure dominated by Pedunculate Oak (*Quercus robur*), with some Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Broom (*Cytisus scoparius*) and Gorse (*Ulex europaeus*) scrub with some invading Elm (*Ulmus* sp). Despite its ancient status, the ground flora is poor in indicator species and is generally grassy. The wood is used as a recreational area, which has resulted in a network of many paths and consequent disturbance to the flora.

Selection Criteria: HCr1(a)

Condition and Proposed Management: Ancient woods on acid sandy soils are invariably poorer in ancient woodland ground flora than those on damp, neutral soils. However, the flora here is particularly poor, possibly due to decades of heavy recreational pressure and the previous management to the south that has left a very sparse, open canopy. Control of the number of footpaths is desirable but is likely to prove difficult. Some re-stocking with appropriate native trees and shrubs would improve the wildlife value of this Site.



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Th37. Tilbury Marshes (39.8 ha) TQ 651757

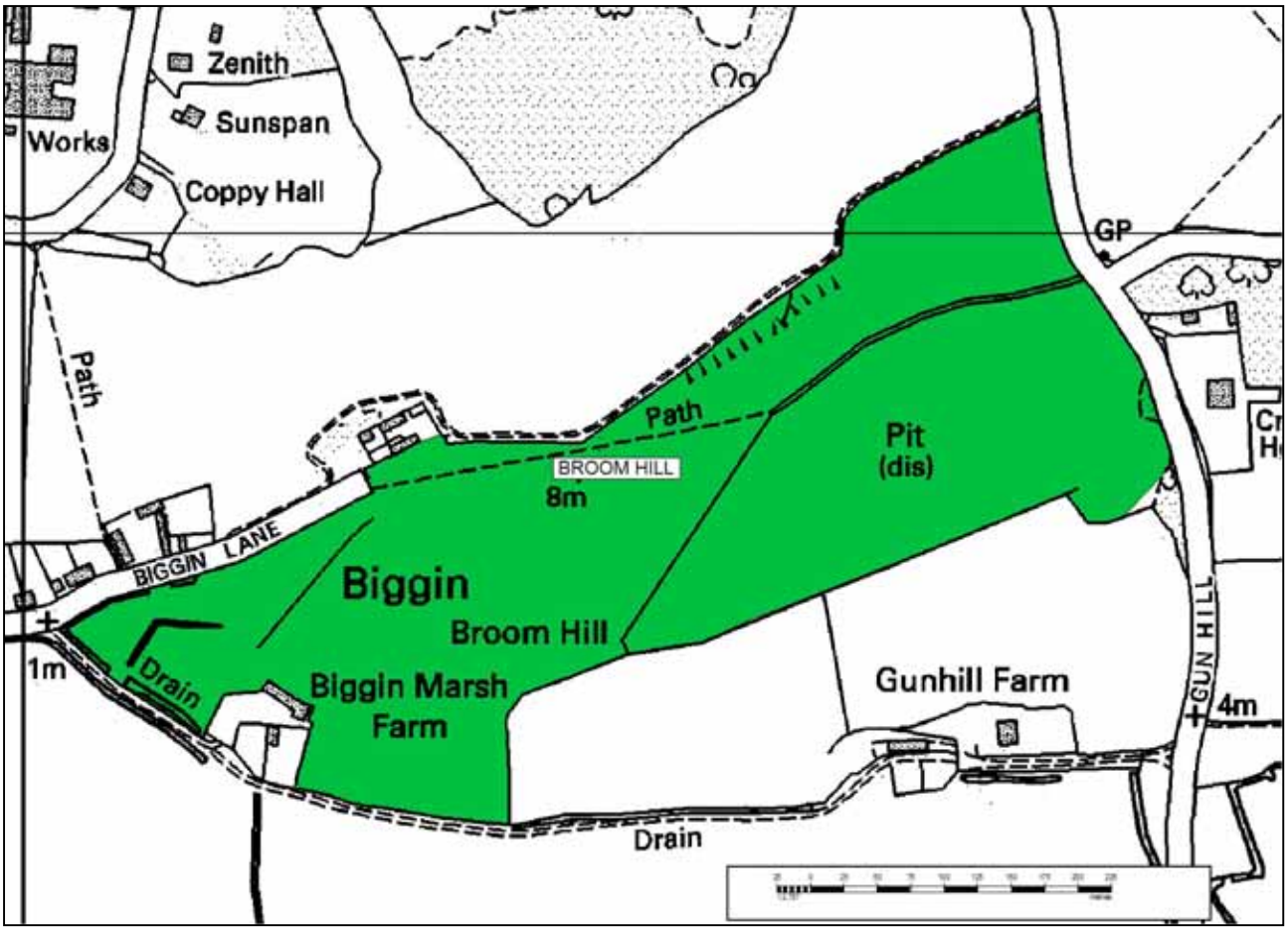
This Site comprises relict grazing-marsh, brackish ditches and the outer moats and grasslands of Tilbury Fort. The moats are prone to inundation with brackish water and, because of problems with the sluice controls are currently rather dry. These moats should be examined for invertebrates associated with saline lagoons, an Essex habitat BAP. This has had the benefit of allowing a diverse saltmarsh flora to develop, with species such as Saltmarsh Rush (*Juncus gerardii*), Glassworts (*Salicornia* spp.), Sea Aster (*Aster tripolium*), Annual Seablite (*Suaeda maritima*) and the nationally scarce Stiff Saltmarsh-grass (*Puccinellia rupestris*) and Sea Barley (*Hordeum marinum*).

The grazing land supports a good grazing-marsh flora, with many Nationally Scarce plants such as Divided Sedge (*Carex divisa*), Sea Barley, Slender Hare's-ear (*Bupleurum tenuissimum*) grassland, with some Hairy Buttercup (*Ranunculus sardous*), Lady's Bedstraw (*Galium verum*), Narrow-leaved Bird's-foot Trefoil (*Lotus glaber* [*tenuis*]), Hard-grasses (*Parapholis* sp.) and Sea-spurreys (*Spergularia* spp.).

The north-western section lies adjacent to the now-lost "Ferry Fields" grassland, an important invertebrate habitat destroyed by development, but some of the key species may survive on these remaining fragments of grassland.

Selection Criteria: HCr16; HCr28?; SCr13

Condition and Proposed Management: Such grasslands have developed under a historical regime of grazing livestock. This is evident today, but in the form of uncontrolled horse pasturing by local people. Such grazing is vital and should be continued, if better controlled. Although an important part of the historical landscape, flooding the moats would harm the developing saltmarsh vegetation.



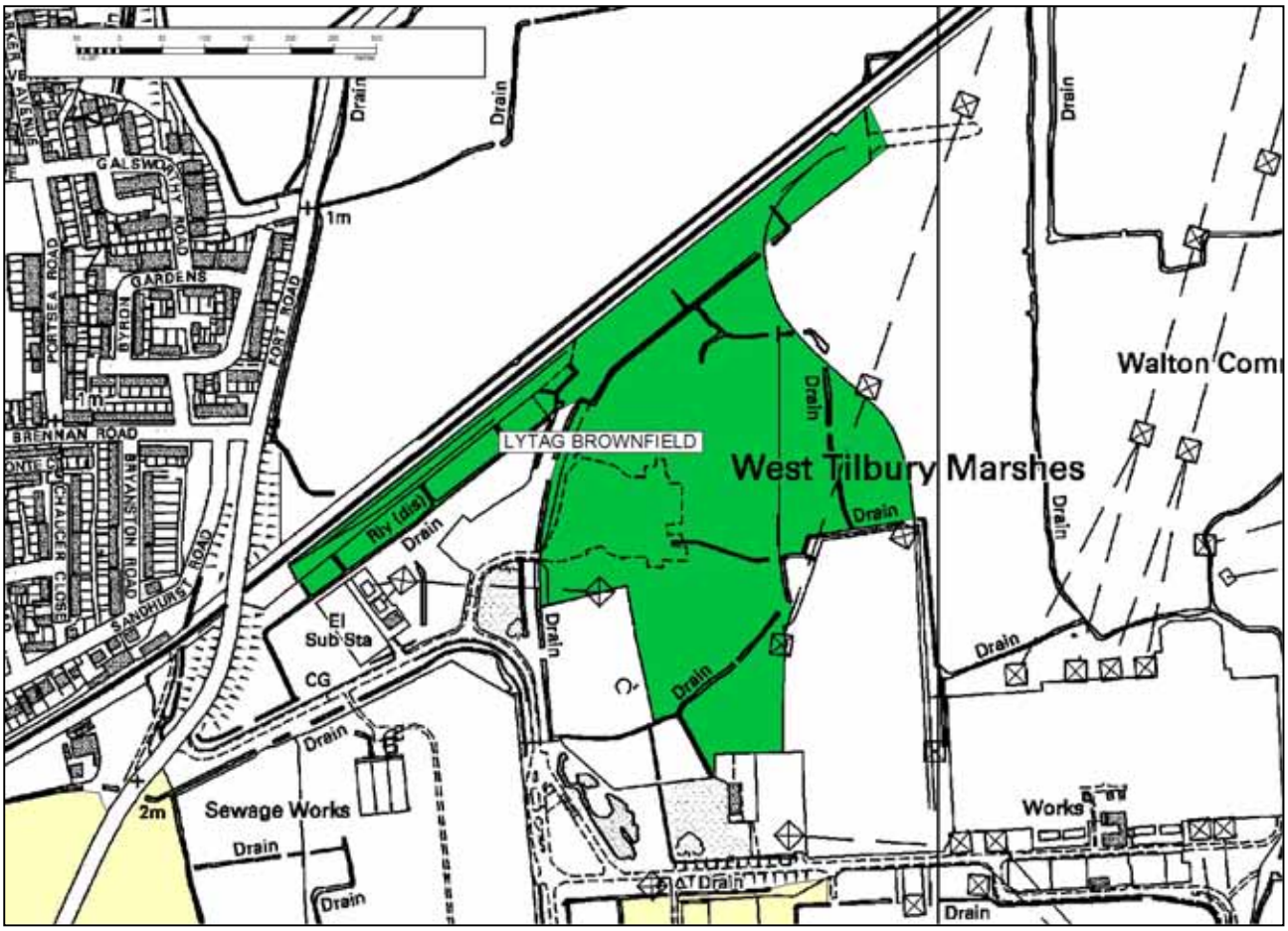
Th38. Broom Hill (11.3 ha) TQ 654778

This hilltop site, developed partly on shallow sand/gravel workings, is of interest for its ancient acid-grassland flora, particularly Autumn Squill (*Scilla autumnalis*) (one of only two sites in the county) along with Meadow Saxifrage (*Saxifraga granulata*), Hoary Cinquefoil (*Potentilla argentea*) and many legumes (*Trifolium* spp. and *Medicago* spp.). Such acid grasslands fall within the remit of the Essex Heathland BAP.

The invertebrate populations are of exceptional importance, this being one of the key Thames Terrace grassland sites within Thurrock. The invertebrate fauna includes seven nationally rare (Red Data Book) species, including the ant *Myrmica specioides*, which is normally associated with more strictly coastal grasslands, 39 Nationally Scarce species and over 120 Local species. National BAP species include the wasp *Cerceris quinquefasciata*, the Hornet Robberfly *Asilus crabroniformis* and the bumblebee *Bombus humilis*. The list of Essex Red Data List species also includes the Great Green Bush-cricket (*Tettigonia viridissima*).

Selection Criteria: HCr19; Scr11; SCr12; SCr13

Condition and Proposed Management: The maintenance of low-intensity grazing will be instrumental in maintaining this wildlife interest, with the Hornet Robberfly requiring animal dung free from insecticides for the development of its larvae. The cropping and light disturbance caused by grazing also helps to maintain the low, flower-rich sward with small areas of bare, open ground.



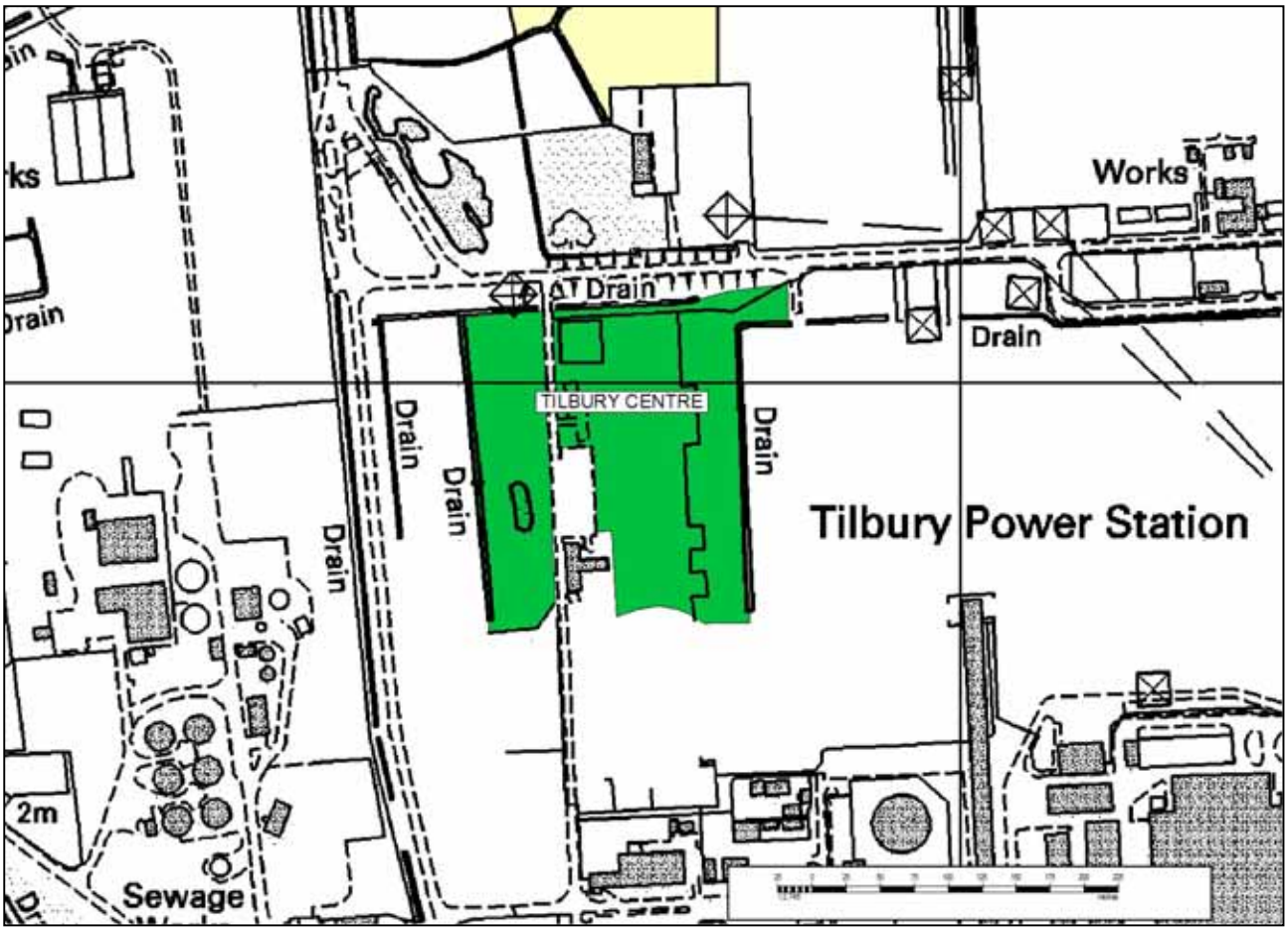
Th39. Lytag Brownfield (12.4 ha) TQ 657764

Survey work by independent ecological consultants has revealed populations of all four Essex reptiles (Adder, Grass Snake, Common Lizard and Slow-worm), making this one of the more important reptile sites in the borough. This reptile interest may spread onto land to the south-west, but survey data is lacking. Their study also reveals an extensive developing acid grassland, which falls within the remit of the Essex heathland BAP project. This acid grassland is believed to be developing on former railway sidings and post-industrial granular waste, both giving rise to freely-draining soils.

Such brownfield sites are also likely to be of interest for their invertebrate populations, but no data is currently available at present. However, given the presence of UK BAP invertebrates on similar habitats around the Energy and Environment Centre (Th40), it is likely that an important fauna will be shown to be present here.

Selection Criteria: HCr19; SCr4

Condition and Proposed Management: It is believed that much of this site is under threat of development. If possible, movement of the proposed buildings onto land of lesser ecological value closer to the power station access road would be a positive contribution to the ecology of this site. The reptile and acid grassland interest needs little other management, other than the long-term management of excessive scrub encroachment.

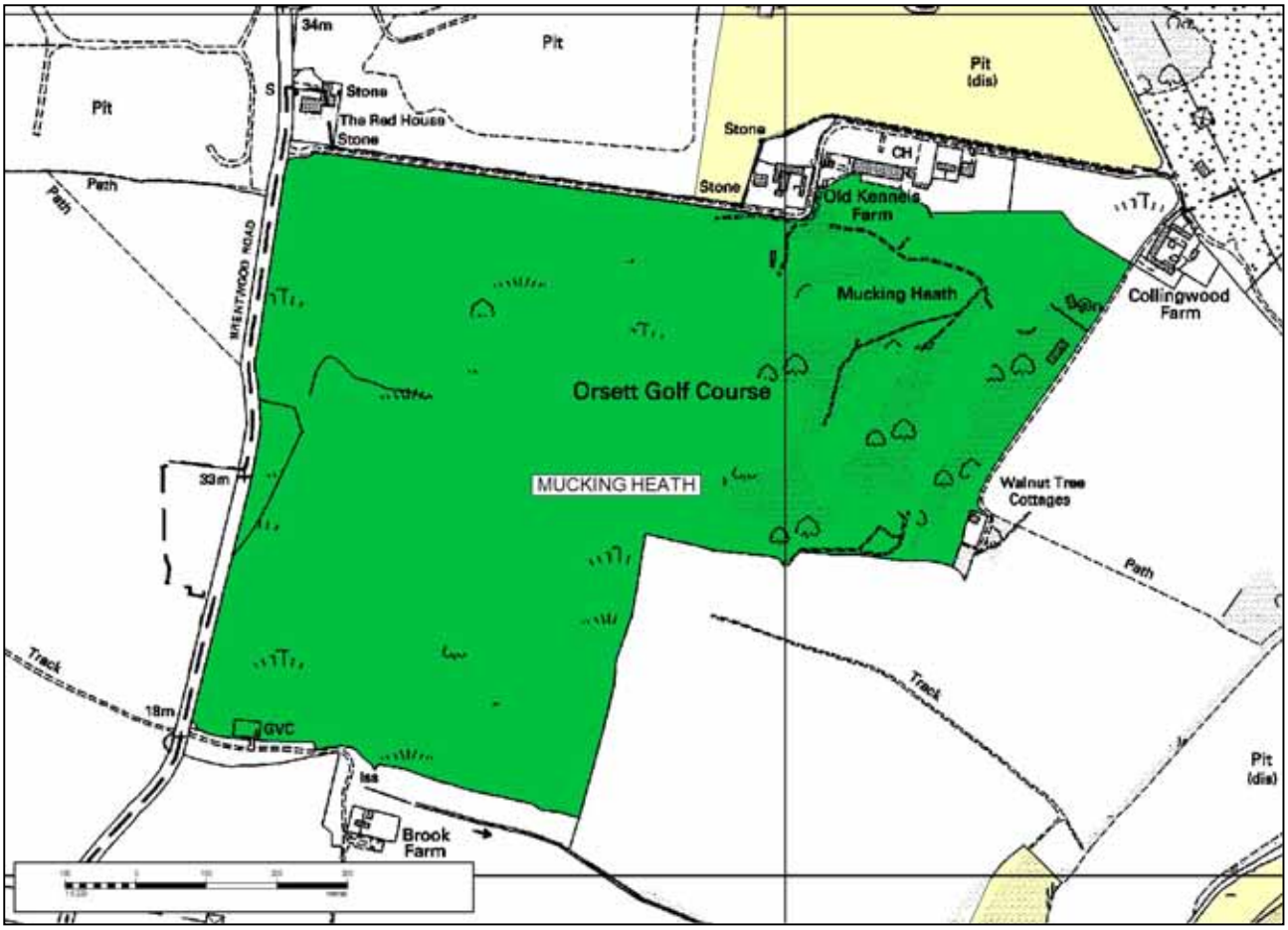


Th40. Tilbury Centre (2.8 ha) TQ 658759

This Site comprises the grounds surrounding the Tilbury Energy and Environment centre. The habitats present are a complex mosaic of grassland, flower-rich early successional/pioneer vegetation, ditches, a small reedbed and a pond, notable for its colony of Stonewort (*Chara* sp.) and the nationally rare (Red Data Book) Great Silver Beetle (*Hydrophilus piceus*). The pioneer vegetation includes abundant Bird's-foot Trefoil (*Lotus corniculatus*), on which the national BAP bumblebees *Bombus humilis* forages. Other important invertebrates have also been recorded here.

Selection Criteria: HCr20; HCr22; SCr12

Condition and Proposed Management: The early successional brownfield vegetation needs little in the way of management, beyond occasional disturbance to permit re-colonisation by pioneer plants. The pond and reedbed are maintained via a wind pump to keep the water level high.



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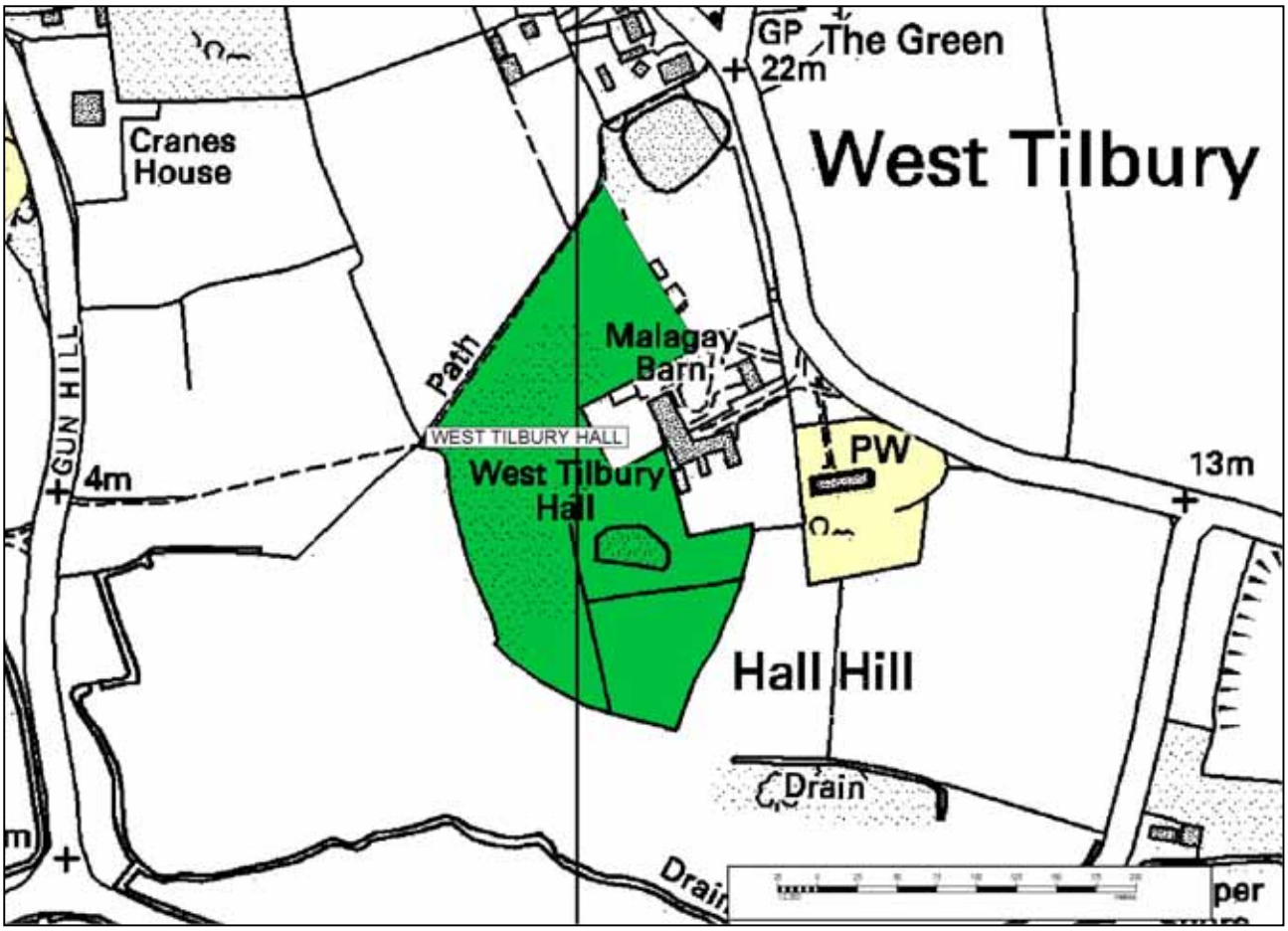
Th41. Mucking Heath (50.5 ha) TQ 656805

The rough areas of this course, constructed on relict acidic grassland/heath, are of both floristic and invertebrate interest. Of particular note amongst the flora are Green-winged Orchid (*Orchis morio*) and Autumn Squill (*Scilla autumnalis*), both Essex Red Data List species, amongst Sweet Vernal-grass (*Anthoxanthum odoratum*), Red Fescue (*Festuca rubra*), Lady's Bedstraw (*Galium verum*), Heath Bedstraw (*Galium saxatile*), Hoary Cinquefoil (*Potentilla argentea*), Field Scabious (*Knautia arvensis*), Knotted Clover (*Trifolium striatum*) and Field Wood-rush (*Luzula campestris*). The insect fauna includes 4 nationally rare, 50 Nationally Scarce and over 100 Local species.

Selection Criteria: HCr19; SCr11; SCr13

Condition and Proposed Management: The species of interest are likely to be restricted to the "rough" areas of the golf course and course management is clearly vital in maintaining this level of interest. Maintenance of low soil nutrient levels if of paramount importance.



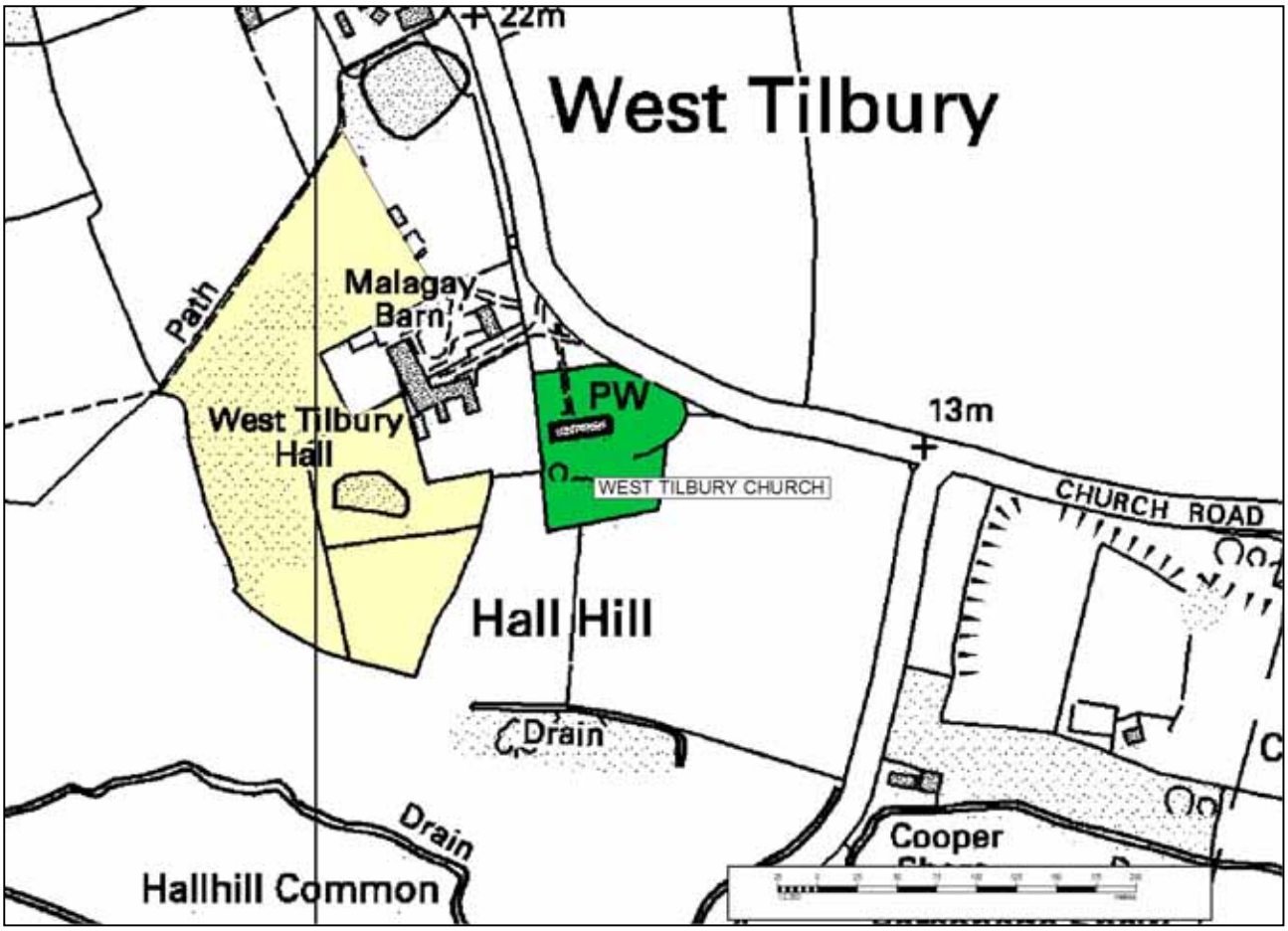
Th42. West Tilbury Hall (2.5 ha) TQ 660776

This river terrace slope site, allied to Broom Hill (Th38), has an interesting acidic grassland flora that includes Meadow Saxifrage (*Saxifraga granulata*), Wild Clary (*Salvia verbenaca*) and Lesser Calamint (*Clinopodium calamintha*), with the latter two species being included within the Essex Red Data List.

A diverse invertebrate fauna includes the nationally Rare (RDB3) bee *Andrena florea*, which is strongly associated with the flowers of White Bryony (*Bryonia dioica*) and the Nationally Scarce bee *Osmia bicolor*, which nests in empty snail shells and is therefore generally associated with chalky areas where these molluscs are most abundant. It is a rare species in Essex and is included on the Essex Red Data List.

Selection Criteria: HCr10; SCr11; SCr12; SCr13

Condition and Proposed Management: Maintenance of grazing is an important consideration with this site, or alternatively some form of cutting regime that maintains the flower-rich sward, with a mosaic of sparsely vegetated ground. During 2006 there appeared to be little ongoing management or grazing.

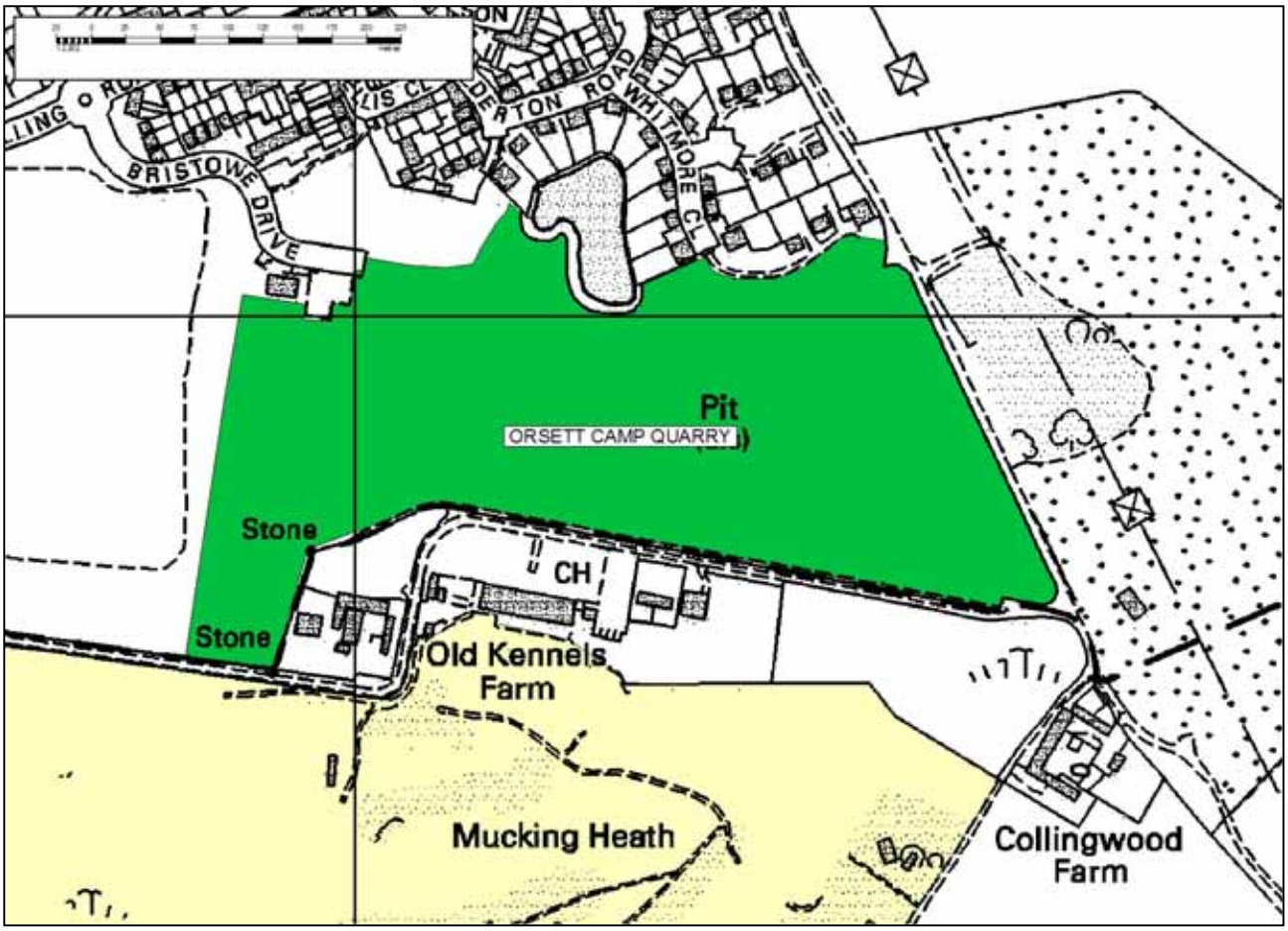


Th43. West Tilbury Church (0.5 ha) TQ 661777

This Site comprises the yard beyond the now-privately owned church and is of interest as a piece of ancient grassland and for the presence of Meadow Saxifrage (*Saxifraga granulata*), Wild Clary (*Salvia verbenaca*) and Lesser Calamint (*Clinopodium calamintha*), the latter two species being nationally restricted species locally frequent in Essex and both included in the Essex Red Data List of plants.

Selection Criteria: HCr10; SCr13

Condition and Proposed Management: This yard is in the unusual position of surrounding a private dwelling and it is likely that at some time in the future the site will effectively become a private garden, which would be beyond the normal remit of the Local Wildlife Sites project. Maintenance of the botanical interest relies on keeping soil nutrient levels low and removing the cuttings arising from grassland management.



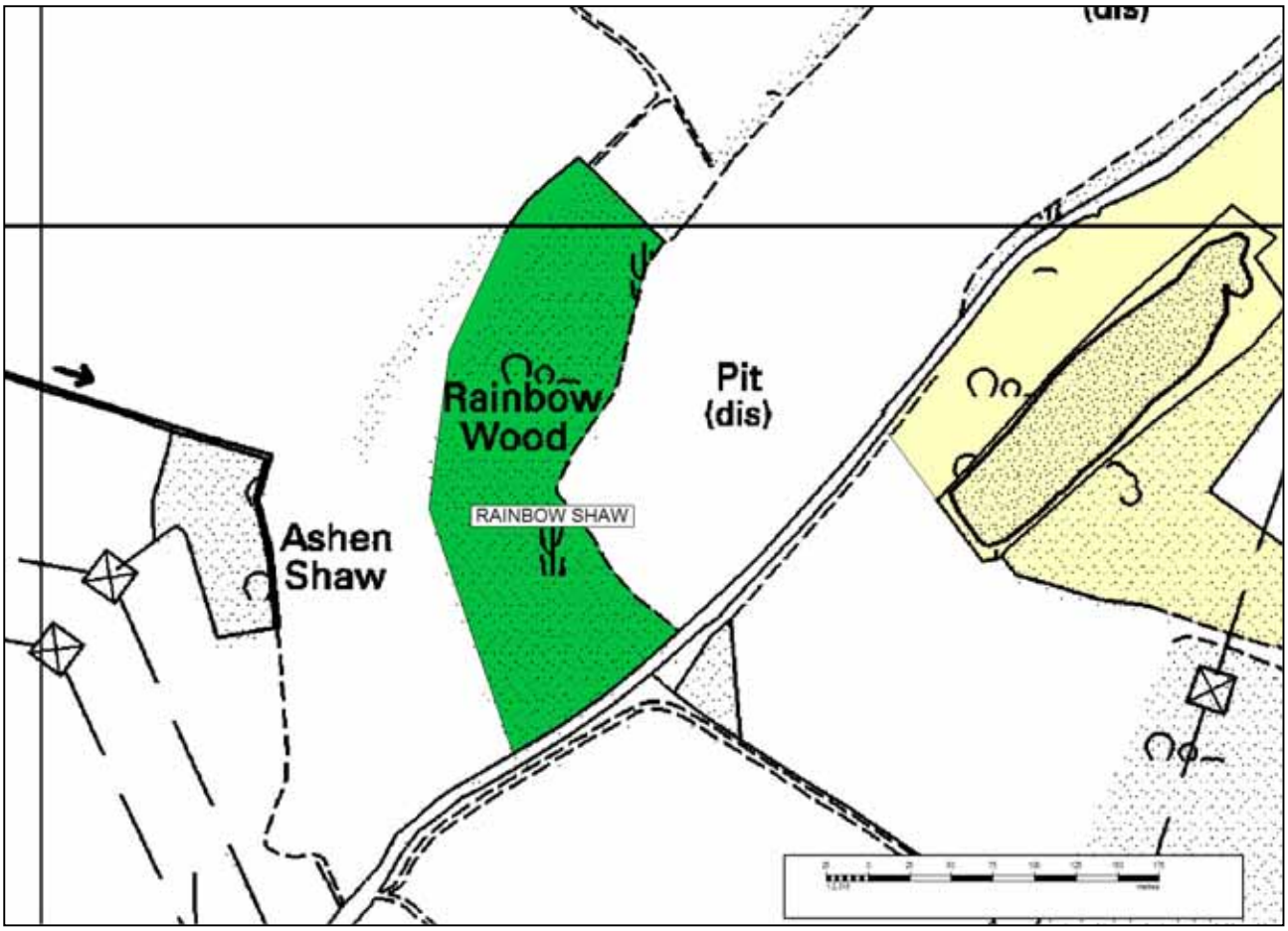
Th44. Orsett Camp Quarry (8.6 ha) TQ 661809

This former sand/gravel pit has now developed and important acid grassland flora in places, along with areas of taller grassland and scrub. Its primary importance lies in its invertebrate populations, notably the Hymenoptera (bees, ants and wasps) within which group there are at least six nationally rare Red Data Book and 16 Nationally Scarce species, including three UK BAP species: the bumblebees *Bombus humilis* and *B. sylvarum* and the digger wasp *Cerceris quinquefasciata*. The bumblebee fauna also includes the scarce and declining species *Bombus ruderarius*, which requires large expanses of flower-rich grassland in which to forage for nectar and pollen.

Within the flora, the Site is of particular note for the presence of Field Mouse-ear (*Cerastium arvense*), an extremely rare plant in Essex with only three recent records. Two Nationally Scarce plants have been recorded, of which Clustered Clover (*Trifolium glomeratum*) is particularly significant. Other species of interest include Pyramidal Orchid (*Anacamptis pyramidalis*), Upright Chickweed (*Moenchia erecta*), Subterranean Clover (*Trifolium subterraneum*) and Knotted Clover (*Trifolium striatum*). The site also has a good population of reptiles, with Adder, Common Lizard and Slow-worm known to occur here. The site has great potential for an expansion in the extent of acid grassland and thereby contributing to the Essex heathland habitat BAP.

Selection Criteria: HCr19; SCr4; SCr11; SCr12; SCr13

Condition and Proposed Management: It is believed that this site is under threat of development. If saved, efforts should be made to expand the extent of flower-rich acid grassland, whilst retaining areas of tall grassland and some scrub. Light disturbance by way of informal recreation would not necessarily be detrimental to the ecology of the site.

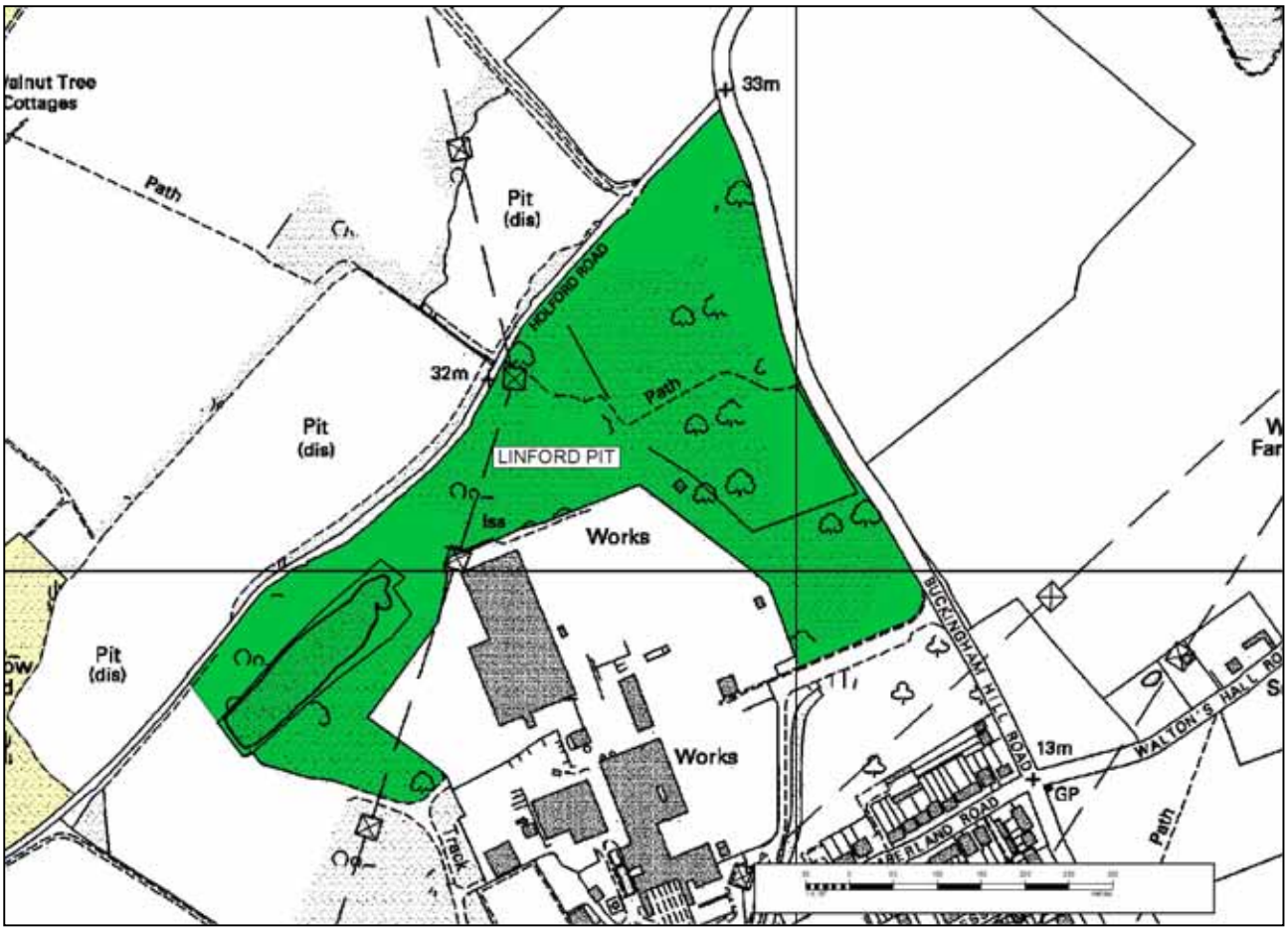


Th45. Rainbow Shaw (2.2 ha) TQ 662798

Rainbow Shaw is thought to be a small ancient woodland fragment. It is an overgrown coppice of Sweet Chestnut (*Castanea sativa*), with some Hazel (*Corylus avellana*), Field Maple (*Acer campestre*) and a canopy of Pedunculate Oak (*Quercus robur*) and some Ash (*Fraxinus excelsior*). The springtime flora is dominated by a carpet of Bluebell (*Hyacinthoides non-scripta*). The insect fauna includes Glow-worm – a very localised beetle in Essex that requires good numbers of snails as prey items for its larvae.

Selection Criteria: HCr1(b)

Condition and Proposed Management: The wood has been badly damaged by previous gale events, but it should be realised that this is a natural phenomenon that does create new habitat opportunities within the wood, including dead wood ecosystems. Given its historical management as Sweet Chestnut coppice, this management could be resumed, although promotion to high forest may be more practicable in this location.



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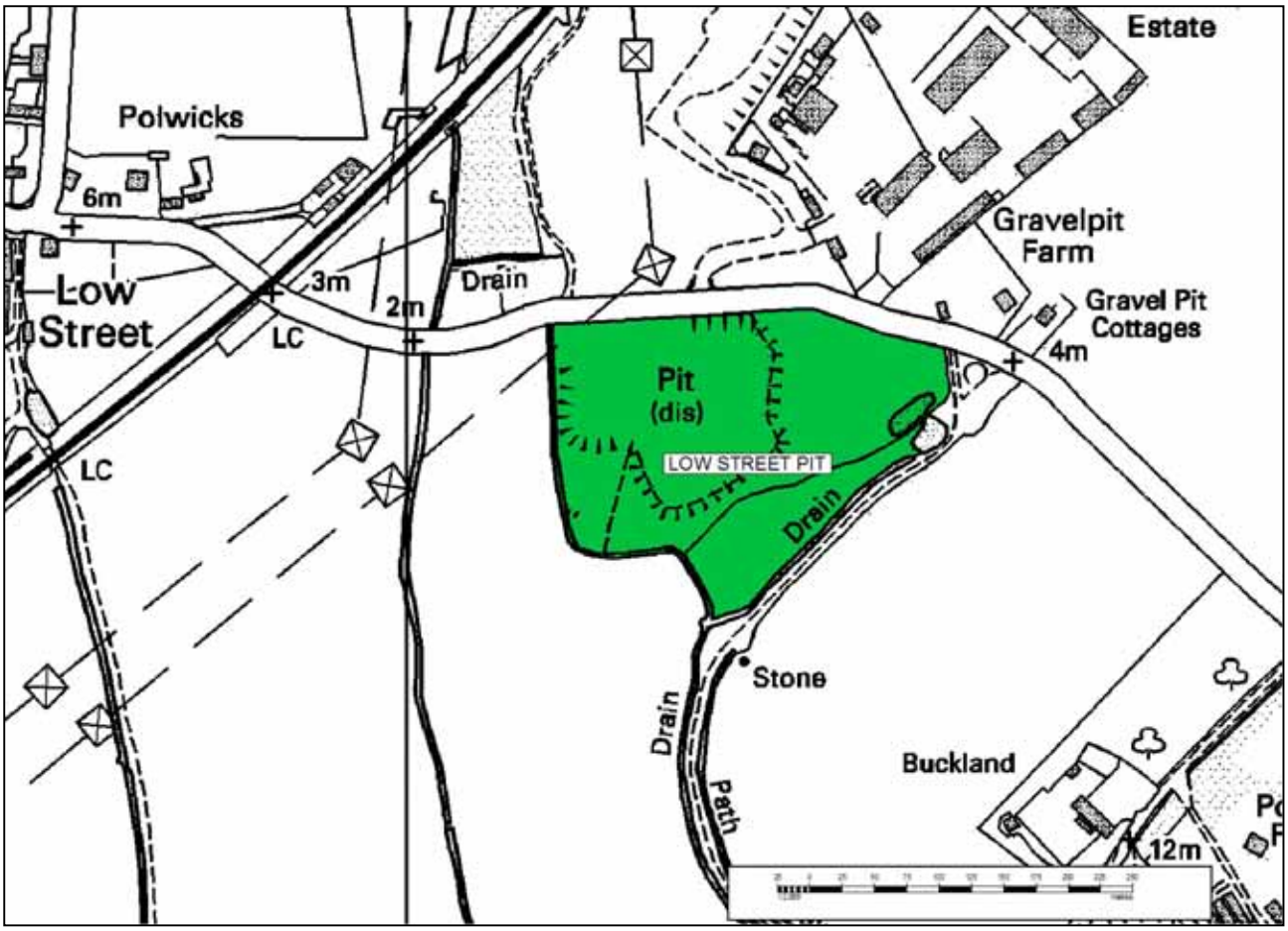
Th46. Linford Pit (14.3 ha) TQ 668802

This brownfield site supports an important invertebrate fauna and lies within a very significant cluster of such sites. The invertebrate fauna includes several nationally rare (Red Data Book) species, including the bees *Andrena florea* and *Nomada fulvicornis* (both RDB3), and the wasps *Cerceris quinquefasciata* (RDB3 and a national BAP species) and *Hedychrum niemelai* (also RDB3), as well as several nationally scarce spiders and the nationally rare fly *Myopa polystigma* (RDB3).

Selection Criteria: SCr11; SCr12

Condition and Proposed Management: The Site is suffering from extremes of management pressure. In some areas the land is completely undisturbed and scrub woodland is developing, which will shade out the areas of interest for invertebrates. In other places, very heavy use by motorbike scramblers is causing too much disturbance. Such recreational pressure would not necessarily be a bad thing, if more diffusely applied over more of the site.



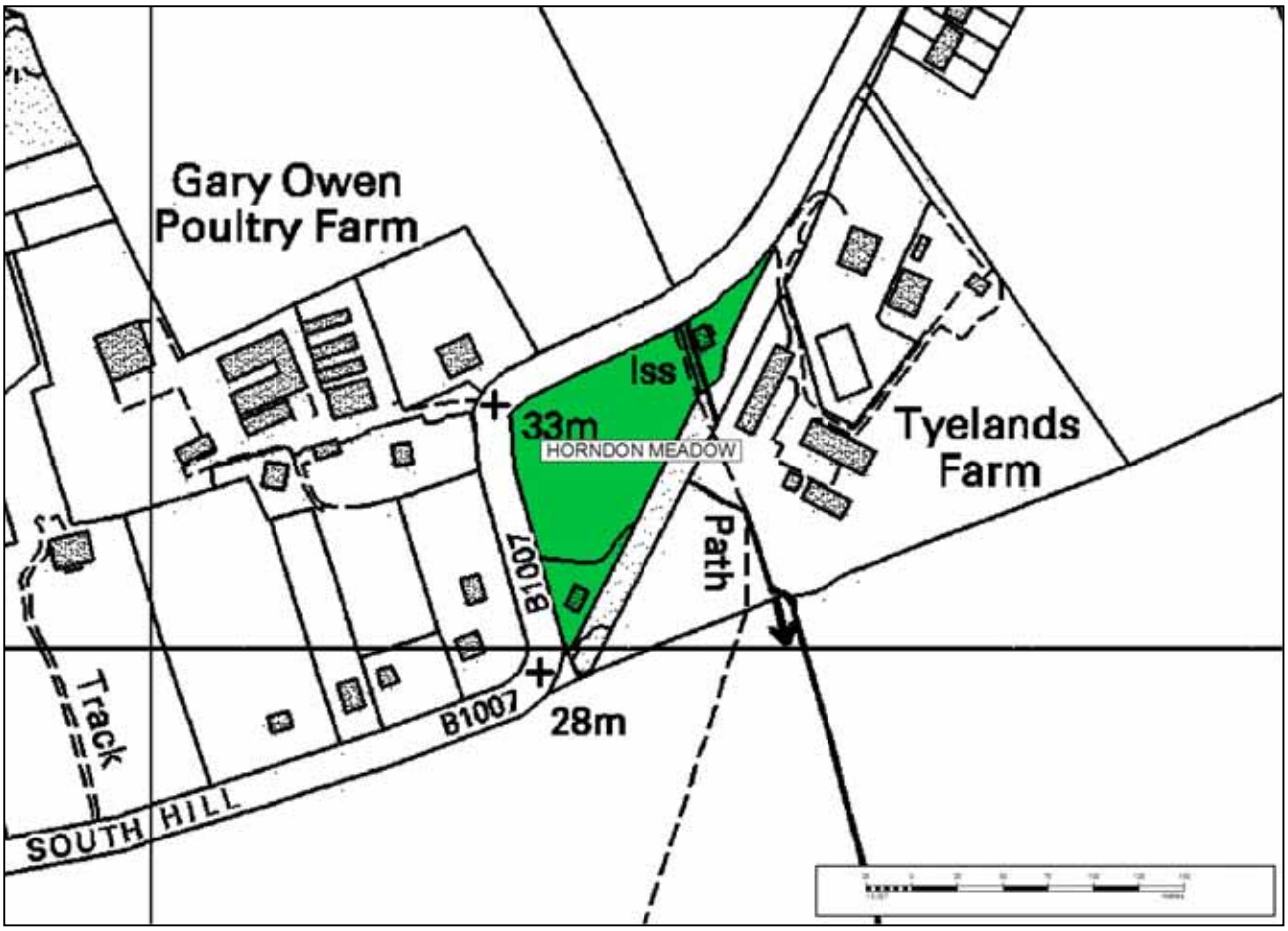
Th47. Low Street Pit (3.5 ha) TQ 672775

This is another site that lies on the regionally important Thames terrace gravels. Despite being modified by gravel extraction (which has ultimately lead to an interesting habitat diversification), remnants of old grassland remain and the site is of particular note for the locally abundant Subterranean Clover (*Trifolium subterraneum*), an Essex Red Data List plant, along with much Lady's Bedstraw (*Galium verum*) and Wild Clary (*Salvia verbenaca*) (also on the Essex Red Data List).

The national BAP Hornet Robberfly (*Asilus crabroniformis*) has been recorded from this site. There is a diverse invertebrate fauna associated with the site.

Selection Criteria: HCr11; SCr11; SCr12; SCr13

Condition and Proposed Management: The Hornet Robberfly relies on the presence of animal dung that is relatively free from insecticides and worming agents for the development of its larvae. A grazing regime would also be the most appropriate way of maintaining the floristic interest of the site.

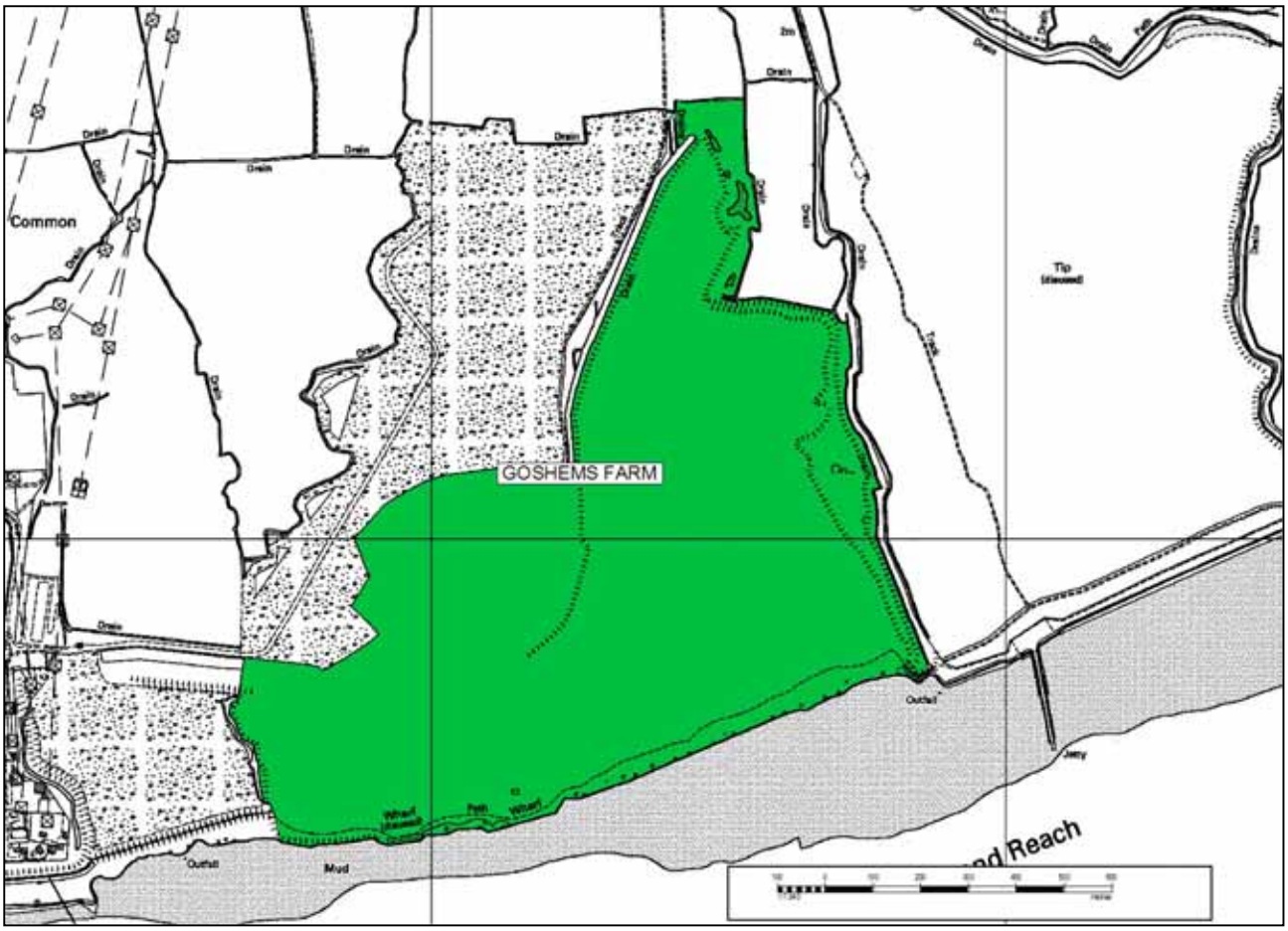


Th48. Horndon Meadow (0.7 ha) TQ 672851

This unimproved, species-rich meadow is of particular note for populations of Green-winged Orchid (*Orchis morio*), Adder's-tongue Fern (*Ophioglossum vulgatum*) and Yellow Rattle (*Rhinanthus minor*). The sward also includes abundant Black Knapweed (*Centaurea nigra*), providing an important nectar source for flying insects. The reserve is bounded by old hedgerows, which add to the habitat diversity and species complement, attracting birds and butterflies. This is an Essex Wildlife Trust nature reserve.

Selection Criteria: HCr10; Scr13

Condition and Proposed Management: This site has long been managed as a nature reserve by the Essex Wildlife Trust. Key management issues are the maintenance of a stable cutting regime, preservation of a relatively low soil nutrient regime and freedom from pesticides. It is one of the key sites for Green-winged Orchid, an Essex Red Data List species, in the south of the county.

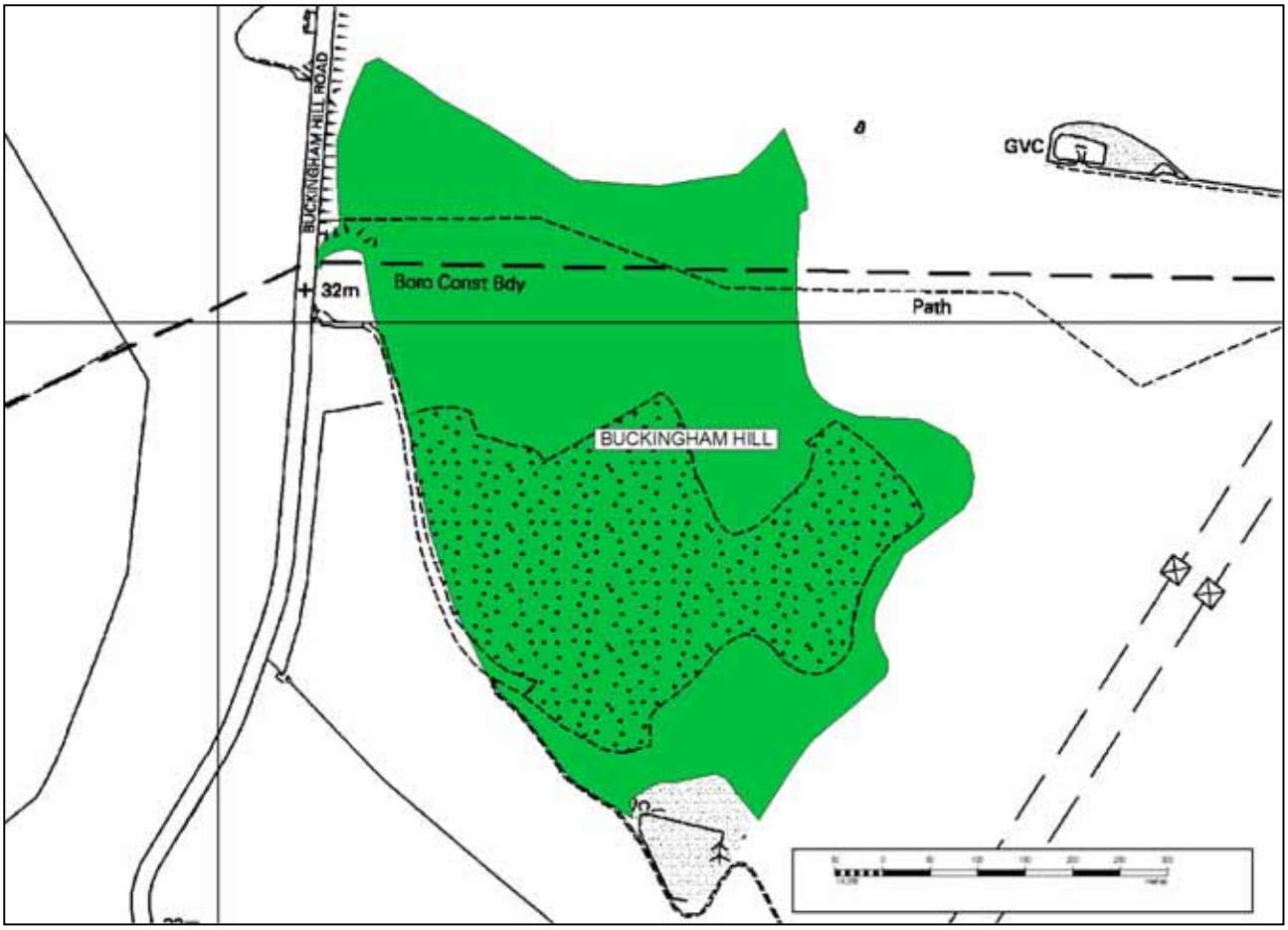


Th49. Goshems Farm (74.0 ha) TQ 674760

This old landfill areas supports two important species populations: the nationally rare Red Data Book plant Stinking Goosefoot (*Chenopodium vulvaria*) and the Hornet Robberfly (*Asilus crabroniformis*), which is the subject of a national BAP. Other plants of interest, both included within the Essex Red Data List, are the Saltmarsh (or Small Red) Goosefoot (*Chenopodium chenopodioides*) and White Horehound (*Marrubium vulgare*).

Selection Criteria: HCr20; SCr12; SCr13

Condition and Proposed Management: The Hornet Robberfly is a species associated with animal dung, in which its larvae develop. There is a reliance on such dung that is not heavily impregnated with worming agents and insecticides, so maintenance of an appropriate grazing regime is critical for this species. Stinking Goosefoot and White Horehound both favour open, disturbed areas, found in places throughout this site. However, the value of the site would be compromised by plans to "restore" the land by capping with topsoil and re-planting. Rather, management of early succession habitat should see cyclical localised ground disturbance and clearance of rank vegetation to promote areas for seed germination.

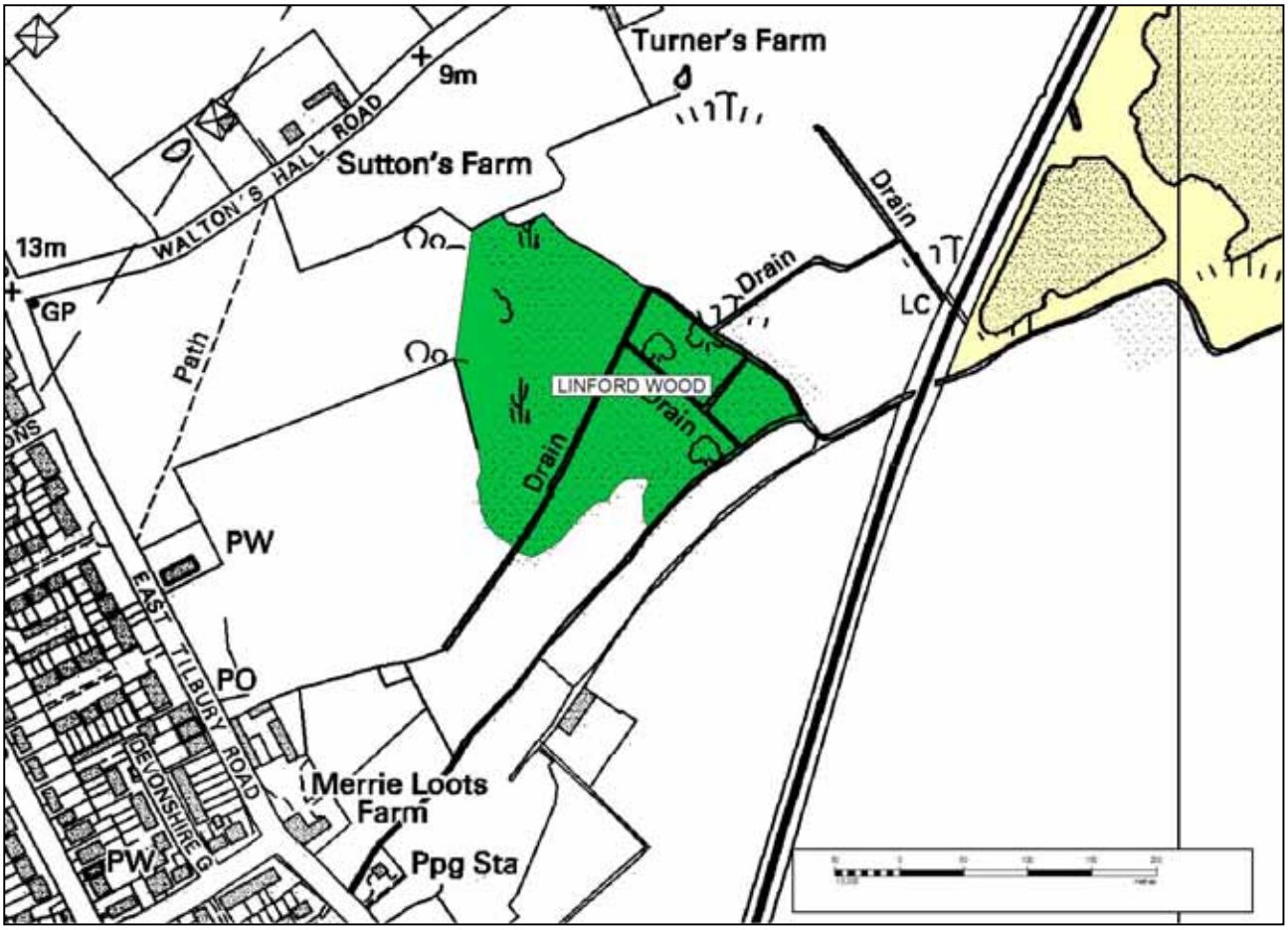


Th50. Buckingham Hill (22.9 ha) TQ 674809

This Site comprises most of the Tarmac sand pit to the east of Buckingham Hill plus a section of grassland to the north in the adjacent golf course. It has been selected in recognition of the large extent of unimproved acid grassland that is developing here, which should be seen as a contribution towards the Essex Heathland BAP project. The best areas of acid grassland are characterised by the presence of Common Bent-grass (*Agrostis capillaris*), Parsley-piert (*Aphanes arvensis* agg.), Bird's-foot (*Ornithopus perpusillus*), Early Forget-me-not (*Myosotis ramosissima*), Sheep's Sorrel (*Rumex acetosella*), Hare's-foot Clover (*Trifolium arvense*) and Clustered Clover (*Trifolium glomeratum*), this last species being Nationally Scarce and an Essex Red Data List plant, found within the golf course section of the site. The national BAP bumblebee *Bombus humilis* was also recorded from within the golf course section and is likely to be foraging extensively on the clovers that are locally abundant within the Tarmac pit. The site is likely to have a high invertebrate interest, but this does not currently form the basis of Site selection.

Selection Criteria: HCr19; SCr13

Condition and Proposed Management: There is a tendency for the acid grassland within the golf course to become infested with False Oat-grass, an indication of increased soil nutrient levels and lack of management or environmental pressure (e.g. drought). Whilst rabbit browsing may inhibit the growth of some tall grasses, this may not be enough to halt this trend. Some form of targeted patch cutting may be desirable to restore open, short sward grassland in the long-term. It is recognised that the Tarmac Pit may be extended in the future by further quarrying. However, it is also recognised that this industrial activity has inadvertently helped to create the features of interest in the first place and that this future quarrying has the capacity to further enhance this interest in the long term. Any future "restoration" of the site would be a greater cause for potential concern.



Th51. Linford Wood (3.2 ha) TQ 676797

This wood is part of a Local Nature Reserve and represents one of the few woods within the low-lying plain between West Tilbury and the estuary. It comprises a mix of Hawthorn (*Crataegus monogyna*) scrub, Elm scrub woodland (a priority scrub type within the Thames Basin Natural Area), an old willow plantation and a small area of maturing Pedunculate Oak (*Quercus robur*) wood to the south. This Site also includes a small amount of scrub encroachment into grassland along the western side of the wood.

Within the wood are a small pond and a small but interesting tall herb "fen" with much Giant Horsetail (*Equisetum telmateia*), with Angelica (*Angelica sylvestris*).

Selection Criteria: HCr2(b); HCr5; HCr6(b); HCr6(d)

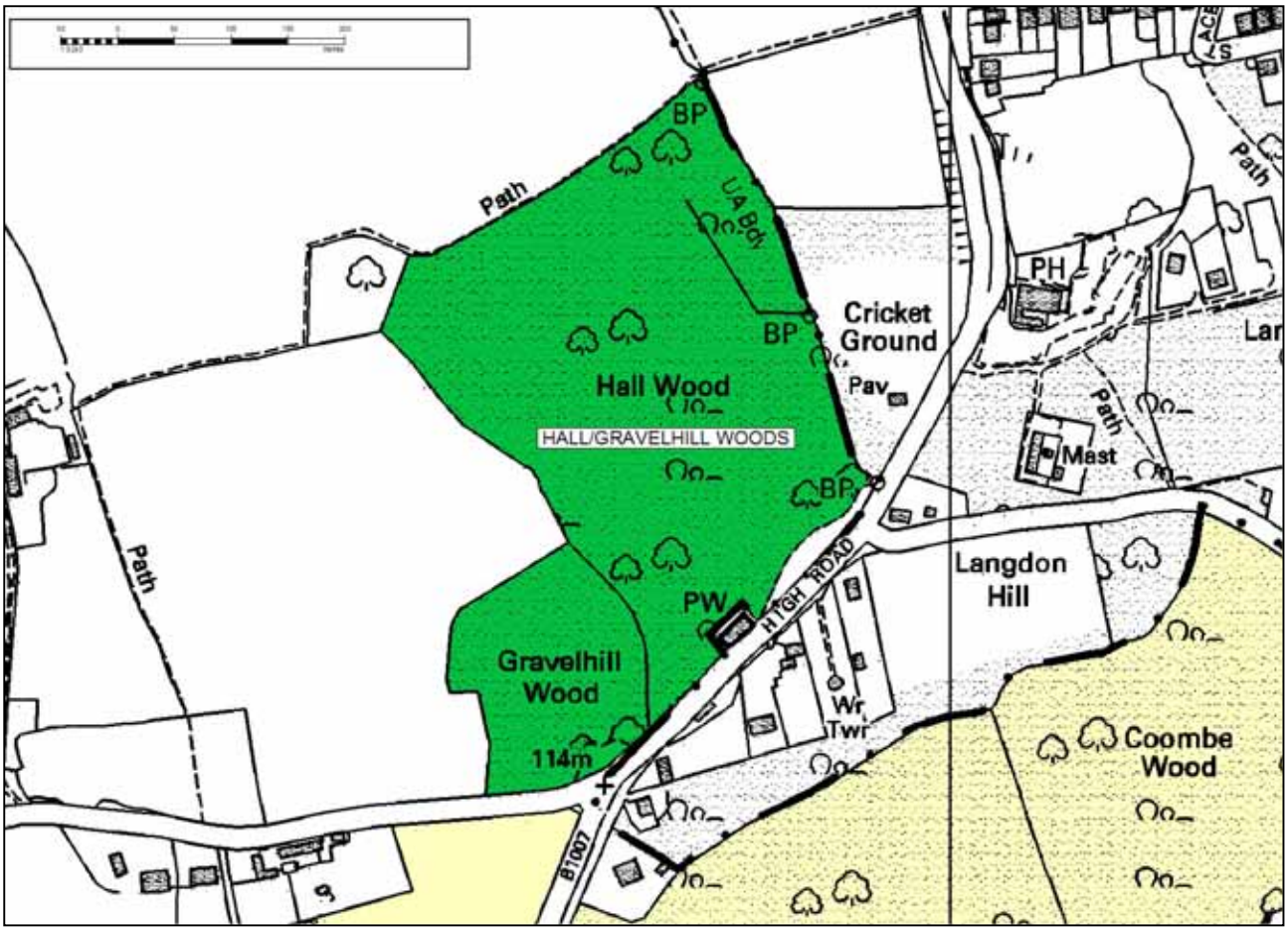
Condition and Proposed Management: The wet willow wood, pond and fen are dependent upon a high water table to maintain their vigour. Given the general decline in rainfall in recent years, this water supply is not guaranteed. Management should aim to maintain the diversity of scrub and woodland types.

Th52. Goldsmith's Meadow (3.3 ha) TQ 676862

This west-facing hill slope site is old grassland. It is of note for the presence of Harebell (*Campanula rotundifolia*), a rare plant in Essex today. The sward is a mix of Common Bent-grass (*Agrostis capillaris*), Meadow Foxtail (*Alopecurus pratensis*), Red Fescue (*Festuca rubra*), Yorkshire Fog (*Holcus lanatus*) and Timothy-grass (*Phleum* spp.). The herbage includes good quantities of Bird's-foot Trefoil (*Lotus corniculatus*), Autumn Hawkbit (*Leontodon autumnalis*), Black Knapweed (*Centaurea nigra*), Sheep's Sorrel (*Rumex acetosella*) and Clovers (*Trifolium* spp.). Numerous old ant-hills testify to the age of this pasture, which is likely to support an important invertebrate fauna.

Selection Criteria: HCr10; SCr13

Condition and Proposed Management: This site benefits from having scattered scrub bushes, but such scrub growth should not come to dominate the important grassland flora. Maintenance of a stable grazing regime will be important in keeping the floristic interest.



Th53. Hall/Gravelhill Woods (9.9 ha) TQ 678866

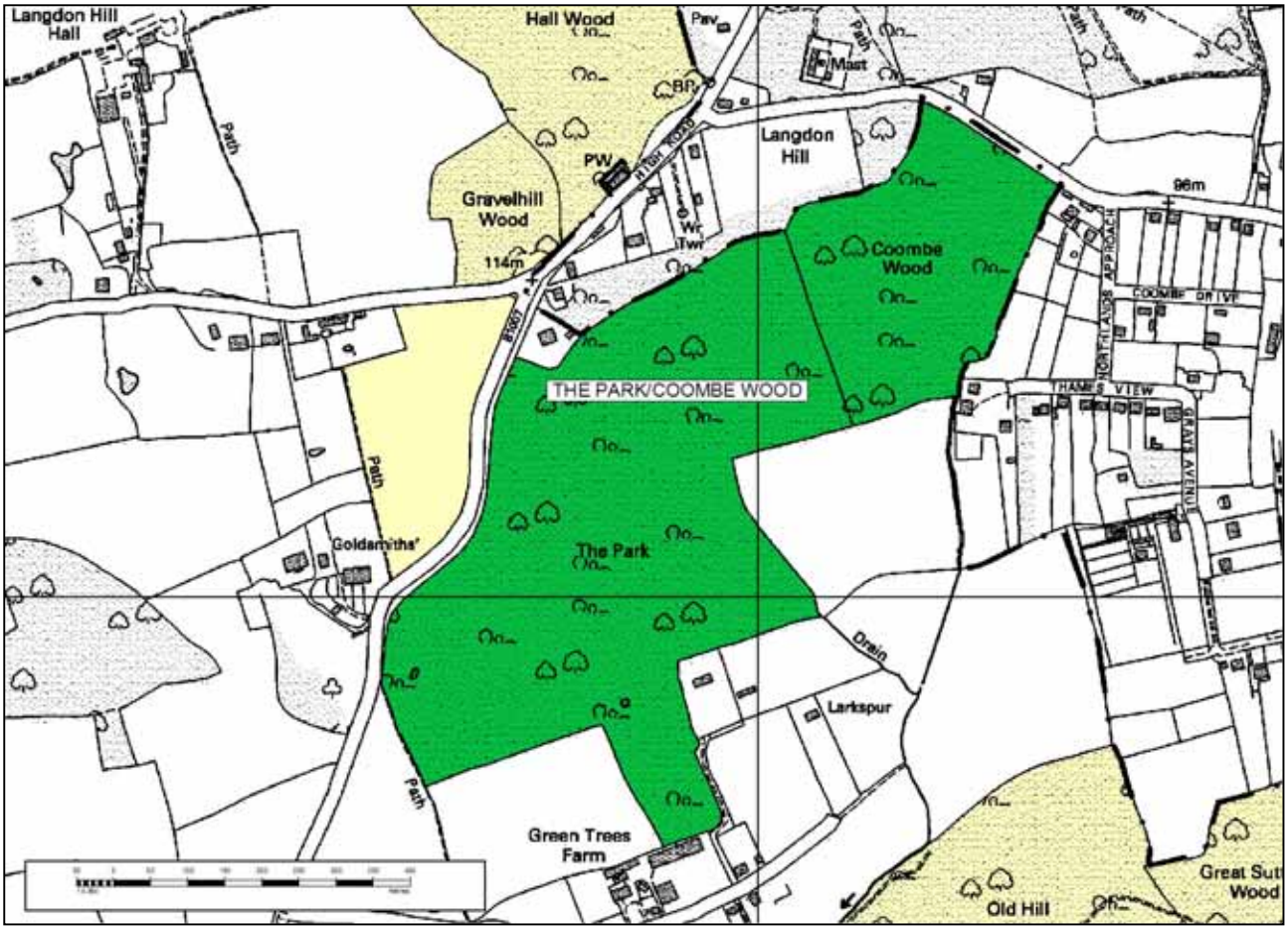
Hall Wood, a large ancient wood, has a neglected coppice-with-standards structure with Hornbeam (*Carpinus betulus*) and Hazel (*Corylus avellana*) under standards of Pedunculate Oak (*Quercus robur*), Hornbeam, Ash (*Fraxinus excelsior*) and Wild Cherry (*Prunus avium*). Sycamore (*Acer pseudoplatanus*) invasion is well advanced and is in urgent need of control. Open glades are dominated by Bracken (*Pteridium aquilinum*) and Bramble (*Rubus fruticosus* agg.), whilst the general ground flora is moderately rich and includes abundant Bluebell (*Hyacinthoides non-scripta*), Wood Millet (*Milium effusum*), Yellow Archangel (*Galeobdolon luteum*), Wood Sorrel (*Oxalis acetosella*), Violets (*Viola* sp.) and Three-veined Sandwort (*Moehringia trinervia*).

Gravelhill Wood has Hazel coppice that has been recently re-cut in places, with Pedunculate Oak and Ash standards structure. The ground layer includes abundant Bluebell and Creeping Soft-grass (*Holcus mollis*), Wood Sorrel and Wood Millet amongst a typical woodland flora.

Both woods appear to have suitable Dormouse habitat and should be surveyed for this UK BAP species.

Selection Criteria: HCr1(a)

Condition and Proposed Management: A recent resumption in coppicing has greatly benefited the diversity of the woods and should be continued. However, the recently opened coppice areas will be very susceptible to further Sycamore invasion and this infestation should be treated as a matter of urgency.



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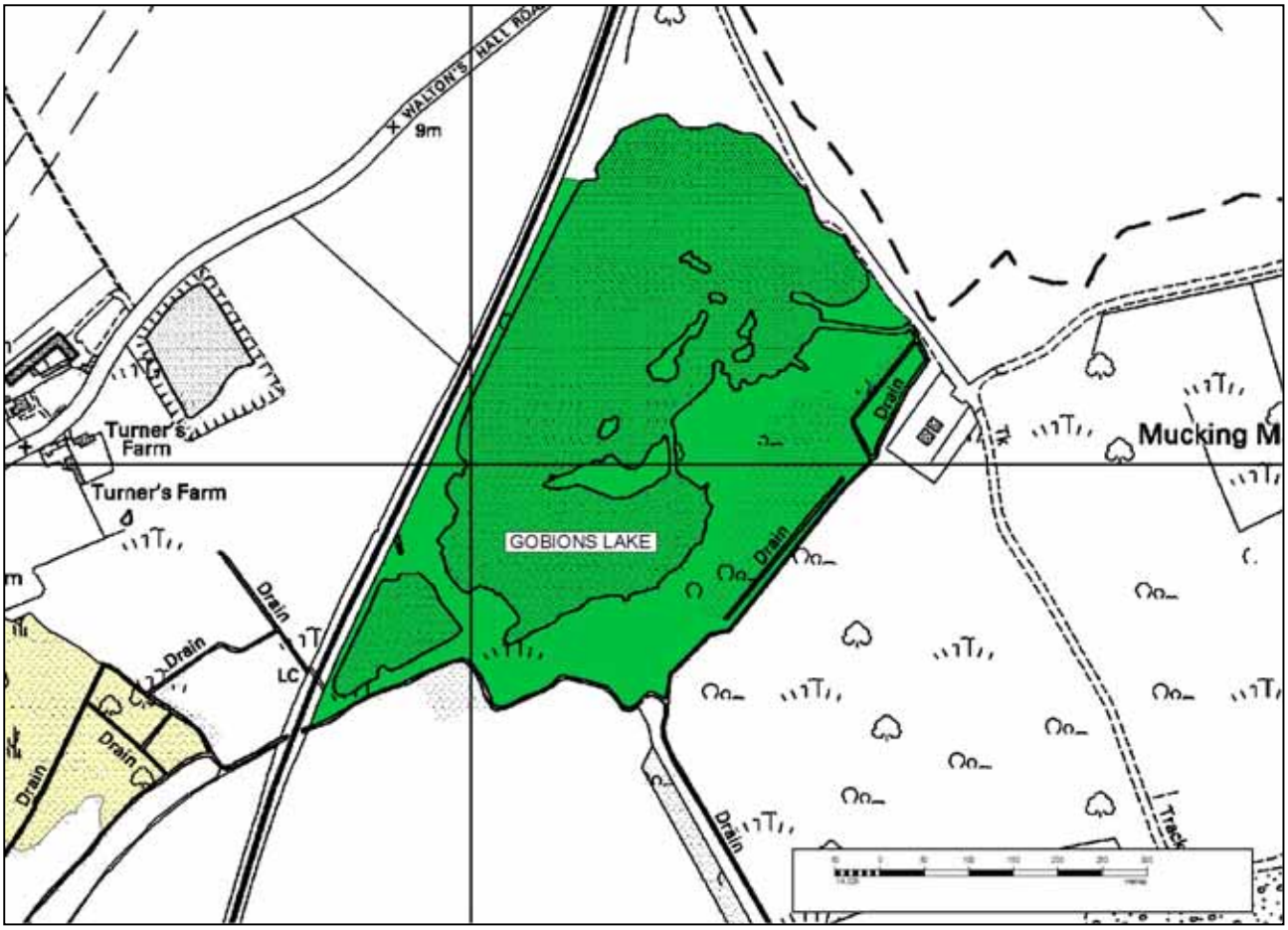
Th54. The Park/Coombe Wood (24.6 ha) TQ 679862

The Park is a large area of very diverse woodland, thought to be at least partly derived from ancient woodland, with other areas of landscape planting and spontaneous recent secondary woodland growth. The canopy and understorey mainly comprises Pedunculate Oak (*Quercus robur*), Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*), Hawthorn (*Crataegus monogyna*) and localised Birch (*Betula* spp.) as well as a large number of non-native species at low density. The varied ground flora includes abundant Bluebell (*Hyacinthoides non-scripta*), Remote Sedge (*Carex remota*), Scaly Male Fern (*Dryopteris pseudomas*), Yellow Archangel (*Galeobdolon luteum*), Primrose (*Primula vulgaris*) and locally abundant Lesser Celandine (*Ranunculus ficaria*).

Ash dominates the canopy Coombe Wood, under which there has been recent coppicing of Hazel and Wych Elm (*Ulmus glabra*). Other canopy/sub-canopy species include Field Maple (*Acer campestre*) and Pedunculate Oak. The ground flora is diverse and includes Pignut (*Conopodium majus*), Wood Millet (*Milium effusum*), Wood Meadow-grass (*Poa nemoralis*), Three-veined Sandwort (*Moehringia trinervia*) and Yellow Pimpernel (*Lysimachia nemorum*). Open glades are dominated by Bracken (*Pteridium aquilinum*) and Bramble (*Rubus fruticosus*).

Selection Criteria: HCr1(a); HCr1(b); HCr2(b); HCr2(d)

Condition and Proposed Management: The recent resumption of coppicing in Coombe Wood has seen a huge improvement to its habitat diversity and flora. Some coppicing of leggy old Hawthorn growth in the southern end of The Park would also diversify the site. The thin scatter of exotics in The Park should not be seen as detrimental, other than the onset of Sycamore invasion, which should be tackled before it becomes a serious issue.



Th55. Gobions Lake (19.1 ha) TQ 682800

This former gravel pit is now developing into a rich mosaic of habitats with a correspondingly diverse flora and fauna. The lake itself is fringed by Reedmace (*Typha latifolia*) and Common Reed (*Phragmites australis*), whilst wet grassland areas support Grass Vetchling (*Lathyrus nissolia*), Common Spotted Orchid (*Dactylorhiza fuchsii*) and Common Spike-rush (*Eleocharis palustris*). The peripheral woodland contains a rookery. Areas of willow scrub form part of the overall habitat mosaic.

Selection Criteria: HCr6(b); HCr22; HCr26

Condition and Proposed Management: An increase in the extent of Reed would be desirable, but is dependent upon management of the local water table. The depth profile of the lake is not known. Otherwise, the key management issues are freedom from pollution, including silt-laden run-off from surrounding land, and disturbance.

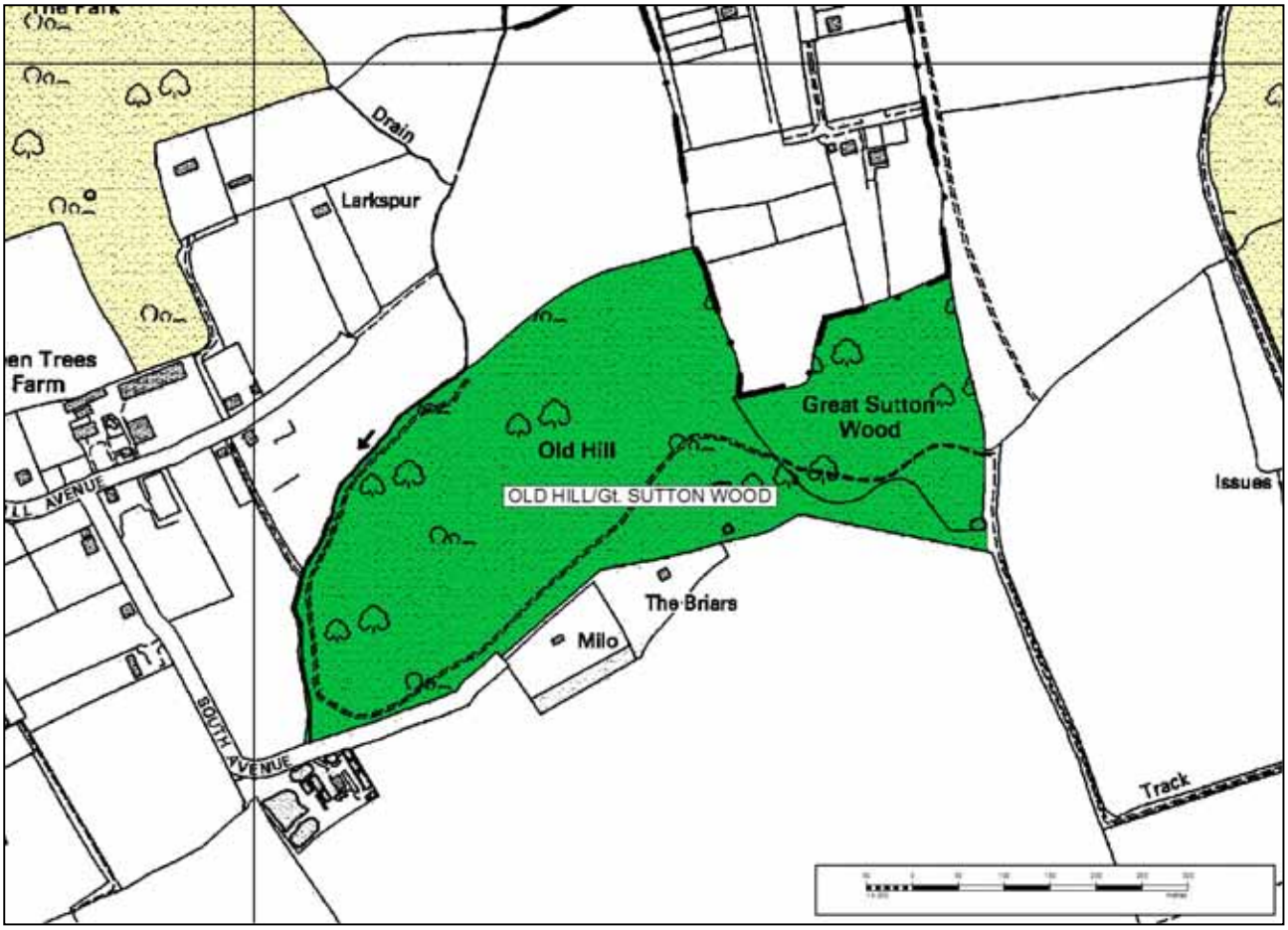
Th56. Fell-me-down Shaw (4.2 ha) TQ 683850

This wood is thought to be at least partly ancient in origin. It has a canopy of Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Field Maple (*Acer campestre*) with an understorey of Hawthorn (*Crataegus* spp.) and Elder (*Sambucus nigra*). The western arm has locally suckering Elm (*Ulmus* sp.).

The ground flora displays a typical array of woodland grasses and herbs in which Early Purple Orchid (*Orchis mascula*) is of note. Species indicative of ancient woodland include Bluebell (*Hyacinthoides non-scripta*), Wood Millet (*Milium effusum*), Three-veined Sandwort (*Moehringia trinervia*) and Midland Hawthorn (*Crataegus laevigata*).

Selection Criteria: HCr1(b); HCr2(a)

Condition and Proposed Management: The wood doubtless suffers from spray drift from surrounding fields and, being essentially linear is particularly prone to such "edge effect". As such, some buffer planting or permitted spread of secondary growth to increase the size of the wood would help. Otherwise, a policy of non-intervention is acceptable.



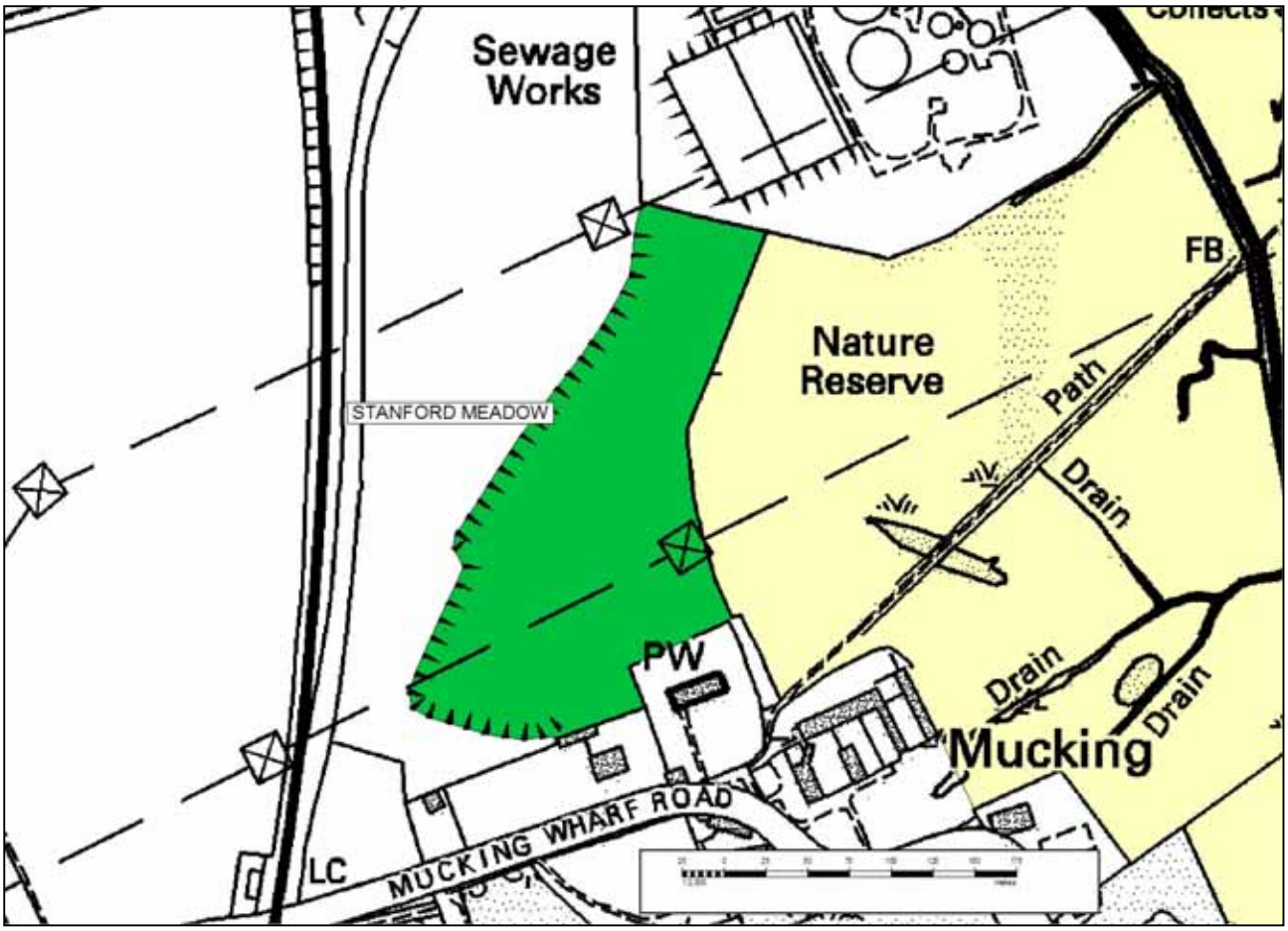
Th57. Old Hill/Great Sutton Wood (13.8 ha) TQ 683856

Great Sutton Wood has a high forest structure comprising Hornbeam (*Carpinus betulus*), Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Field Maple (*Acer campestre*) with a few multi-stemmed trees. The ground flora is variable in composition, with some areas dominated by Dog's Mercury (*Mercurialis perennis*), whilst in other places, Wood Anemone (*Anemone nemorosa*), Bluebell (*Hyacinthoides non-scripta*), Lesser Celandine (*Ranunculus ficaria*), Wood Millet (*Milium effusum*), Primrose (*Primula vulgaris*) and Red Campion (*Silene dioica*) predominate.

Old Hill is likely to have its origins as an open grassland, but bounded by ancient hedgerows. The centre of this centre is dominated by old, leggy Hawthorn (*Crataegus* spp.) scrub woodland, but around the periphery a more typical Oak/Ash woodland has developed. The ground flora here includes locally frequent Bluebell, Hairy St John's-wort (*Hypericum hirsutum*), Dog's Mercury (*Mercurialis perennis*), Primrose, Lesser Celandine and Common Dog-violet (*Viola riviniana*). Of particular note on the boundary ditch banks are small populations of two rare Essex ferns: Hart's-tongue (*Phyllitis scolopendrium*) and Soft Shield-fern (*Polystichum setiferum*).

Selection Criteria: HCr1(a); HCr2(b); HCr2(c); SCr13

Condition and Proposed Management: Management of the canopy to reduce the shading would benefit the flora considerably in Great Sutton Wood and would add to habitat diversity within the Hawthorn scrub woodland of Old Hill. This latter cutting might stimulate the re-growth of grassland species on the summit of the hill from its former grassland state, which might be worth preserving as an open glade.

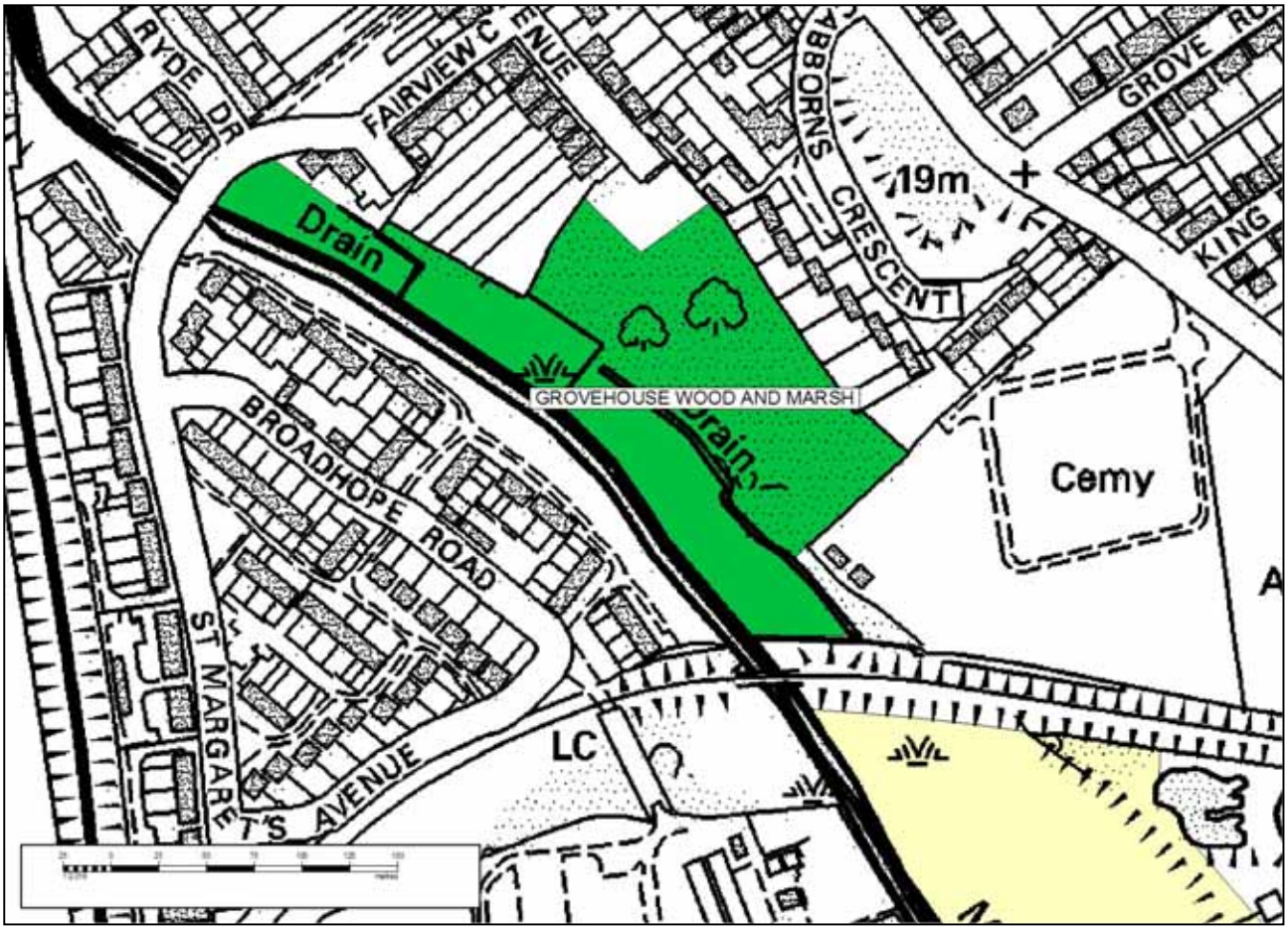


Th58. Stanford Meadow (2.6 ha) TQ 685813

This marshy grassland forms a natural extension to the adjacent Stanford Warren Wetland (Th60) to the east. It comprises relatively unimproved wet rush-pasture – a rare grassland type in Essex. Characteristic species include Plicate Sweet-grass (*Glyceria plicata*) along with Crested Dog's-tail (*Cynosurus cristatus*), Tufted Hair-grass (*Deschampsia cespitosa*), Sea Club-rush (*Scirpus maritimus*) and Soft Rush (*Juncus effusus*). Lesser Water-parsnip (*Berula erecta*) and Divided Sedge (*Carex divisa*) have been recorded.

Selection Criteria: HCr10

Condition and Proposed Management: Good habitat conditions depend on the continuation of grazing and the maintenance of a relatively high water table. The site could benefit from ongoing water table management in the adjacent Stanford Warren Wetland.



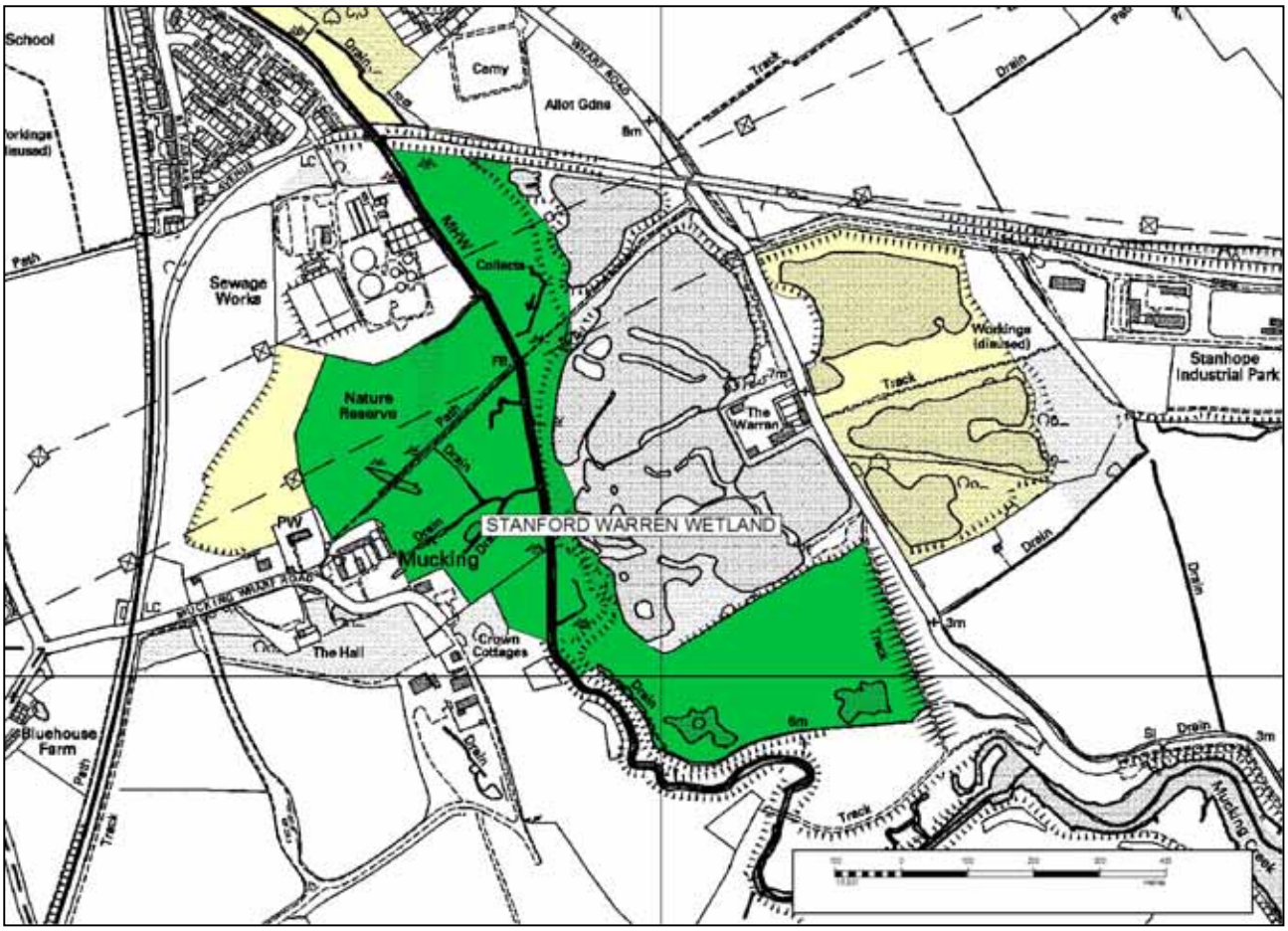
Th59. Grovehouse Wood and Marsh (2.3 ha) TQ 685818

Grovehouse Wood comprises mainly Elm scrub woodland, which is a priority community type for the London Basin Natural Area. There is an open canopy of Pedunculate Oak (*Quercus robur*), whilst the sub-canopy also includes Ash (*Fraxinus excelsior*), Field Maple (*Acer campestre*), Hazel (*Corylus avellana*) and Holly (*Ilex aquifolium*). The ground flora has a typical composition for a secondary woodland.

Between the wood and the river is an area of swamp and wet woodland. There is an area of dense Reed (*Phragmites australis*) bed to the south-east, grading into willow (*Salix* spp.) scrub to the north-west. Cetti's Warbler was recorded from this habitat in 2006 and the combination of habitats also attracts both Reed and Sedge Warbler.

Selection Criteria: HCr5; HCr6(d); HCr22

Condition and Proposed Management: The Elm wood suffers somewhat from disturbance by children at play, although it is hoped that its recent adoption under a management agreement by the Essex Wildlife Trust will provide better wardening of the site and therefore reduce damage. The reedbed and wet willow wood is likely to be undergoing change following the installation of a downstream tidal barrier, which has altered the tidal regime in the river. Some coppicing of large willows may be beneficial to maintaining the open nature of the site, whilst also encouraging low, dense scrub growth for nesting birds.

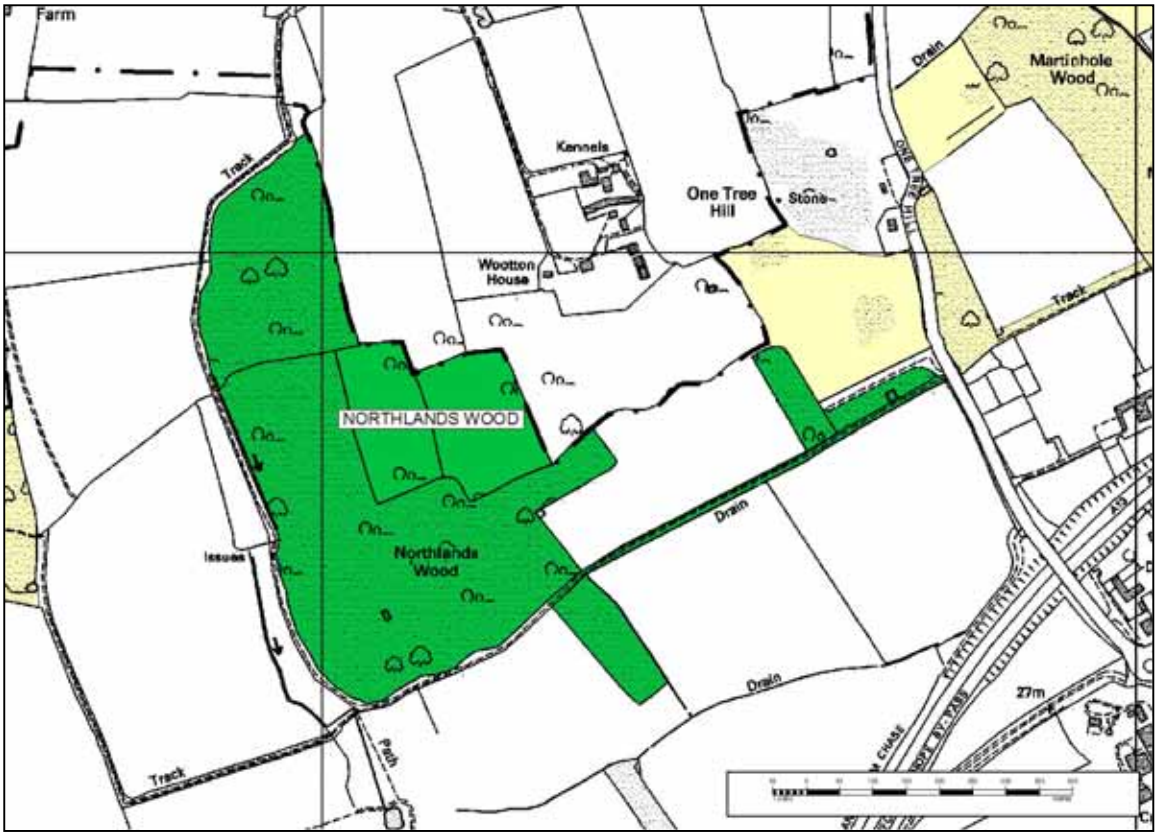


Th60. Stanford Warren Wetland (20.9 ha) TQ 687813

The majority of this site is the Essex Wildlife Trust's Stanford Warren reserve, but it also includes other areas of Common Reed (*Phragmites australis*) and wet grassland where Reed is spreading. The reedbed at Stanford Warren is the largest in Essex with important populations of reed-feeding moths and other insects. The site is also of ornithological interest due to the regular presence of Water Rail and Bearded Tit. Cetti's Warblers were holding territories in 2006. Drier parts of the site support an important population of Adders.

Selection Criteria: HCr21; HCr22; SCr10

Condition and Proposed Management: Recent management has sought to gain better control over the water table, to promote and maintain a higher water table, which should, in turn, promote better Reed growth. Maintenance of small areas of open water will also be important as feeding areas for the more significant breeding birds.



Th61. Northlands Wood (19.8 ha) TQ 691857

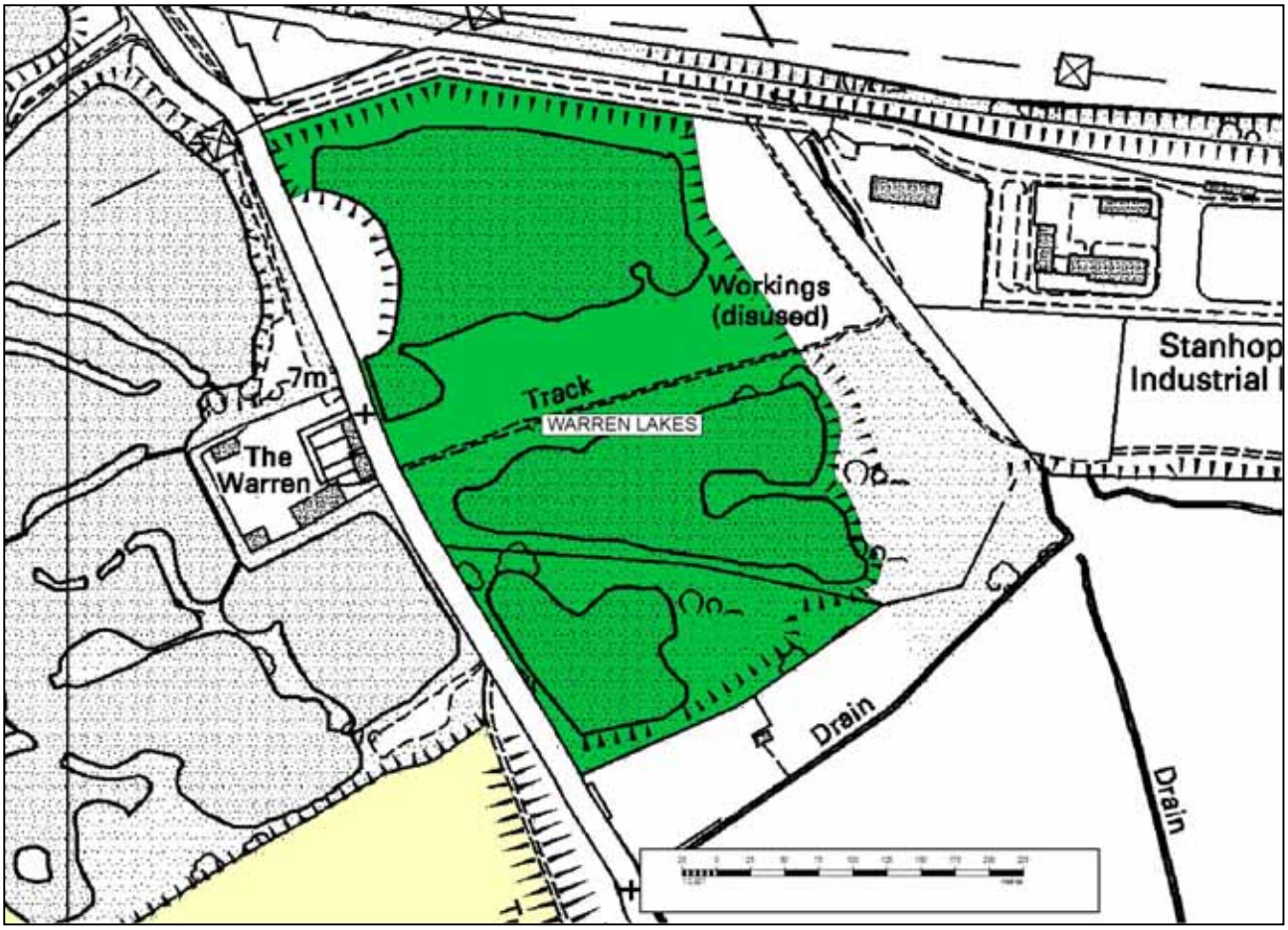
This Site comprises the ancient northlands wood, a large section of immediately adjacent recent woodland and a section of lane connecting to two other small woods close to One Tree Hill. It should also be viewed in the context of the Martinhole Wood complex (Site Th65.)

Northlands Wood is a high forest of Pedunculate Oak (*Quercus robur*) and Hornbeam (*Carpinus betulus*) with some Ash (*Fraxinus excelsior*) and Hazel (*Corylus avellana*) to the south, with some multi-stemmed trees from coppice. A small section to the south has been recently coppiced, whilst linear "coppice" plots have been cut along rides in the north, which attracts a good variety of butterflies. The flora is very rich, particularly in ancient wood plants, such as Wood Anemone (*Anemone nemorosa*), Spurge-laurel (*Daphne laureola*), Midland Hawthorn (*Crataegus laevigata*), Wood Spurge (*Euphorbia amygdaloides*), Bluebell (*Hyacinthoides non-scripta*), Hairy St. John's-wort (*Hypericum hirsutum*), Wood Melick (*Melica uniflora*), Dog's Mercury (*Mercurialis perennis*), Wood Millet (*Milium effusum*), Three-veined Sandwort (*Moehringia trinervia*) and Wild Service Tree (*Sorbus torminalis*). A small pond adds to the habitat diversity of this site.

To the north-east, recent woodland has a canopy and flora very similar to that of Northlands Wood. The lane leading eastwards from Northlands wood has been planted in part, but nevertheless provides a useful woodland wildlife corridor to other woods to the east. The woods adjacent to the car park here have a canopy of oak, Ash and Field Maple (*Acer campestre*) over localised suckering Elm (*Ulmus* sp.) scrub. The typical woodland ground layer includes ancient woodland plants, such as Bluebell and Dog's Mercury.

Selection Criteria: HCr1(a); HCr2(b); HCr2(d); HCr9(a)

Condition and Proposed Management: This Site is one part of an important chain of woods in the One Tree Hill/Langdon Hills area. Where old coppice is evident this could be re-started, to diversify woodland structure, otherwise a policy of non-intervention high forest is acceptable. There is a reasonable quantity of Hazel coppice in the south of Northlands Wood.

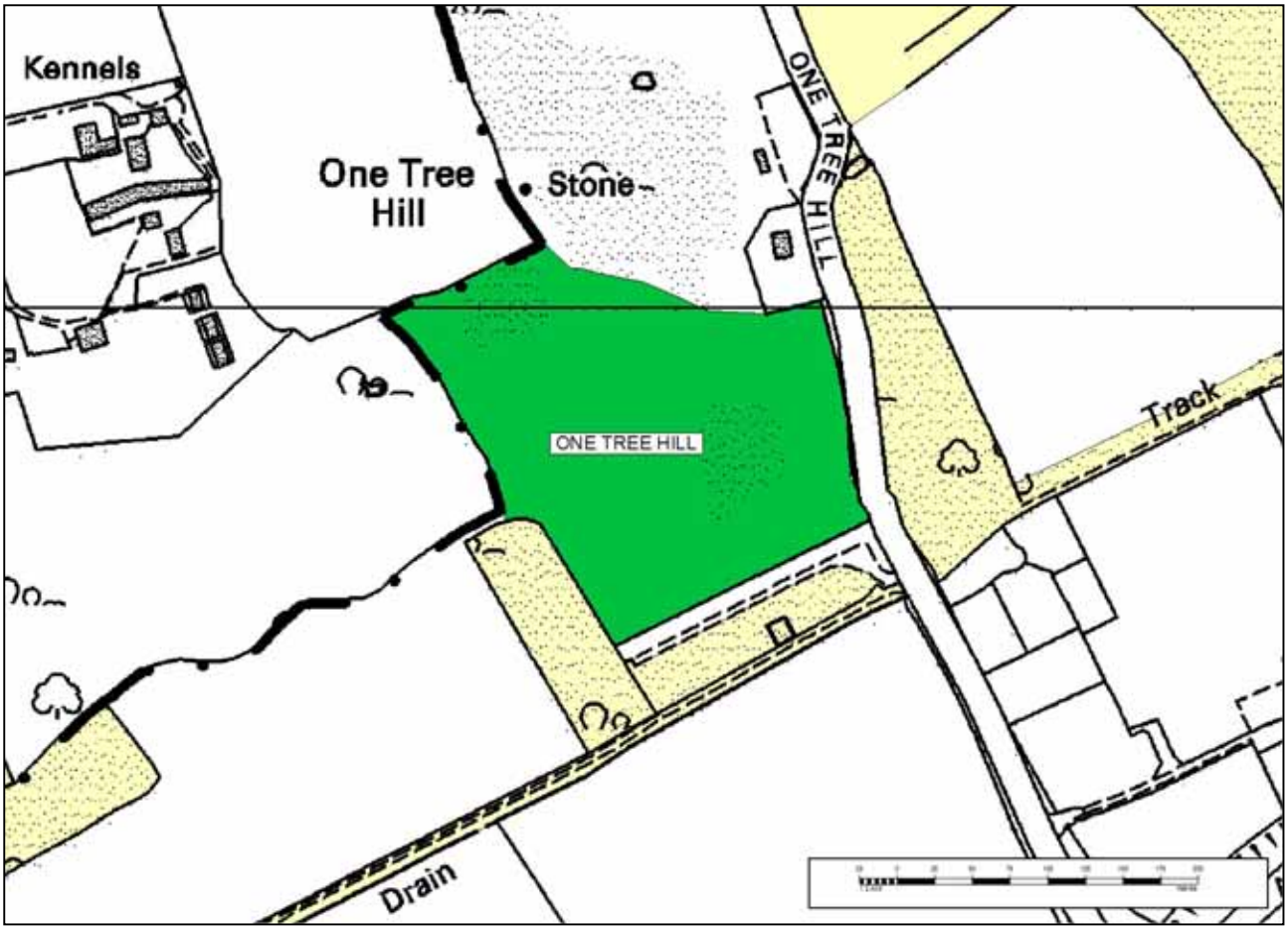


Th62. Warren Lakes (9.8 ha) TQ 693814

This Site comprises three of the relatively quiet and less used fishing lakes either side of Wharf Road. They have been selected for the wet woodland habitat that fringes the lakes, along with small pockets of Common Reed (*Phragmites australis*) and the uncommon Grey Bulrush (*Schoenoplectus tabernaemontani*) that diversify the wetland habitat. The terrestrial scrub and grassland surrounding the lakes provides complementary habitat. Some areas are developing an acid grassland sward that could contribute towards the Essex heathland habitat BAP. Here, characteristic species include Hare's-foot Clover (*Trifolium arvense*), and Common Bent-grass (*Agrostis capillaris*). The lakes provide useful "loafing" grounds and nesting habitat for a variety of wildfowl.

Selection Criteria: HCr5; HCr6(b); HCr22

Condition and Proposed Management: Management should aim to maintain the mosaic of wet willow wood, reedbed, open water and terrestrial scrubby grassland. Revetting of the lake banks should be avoided.



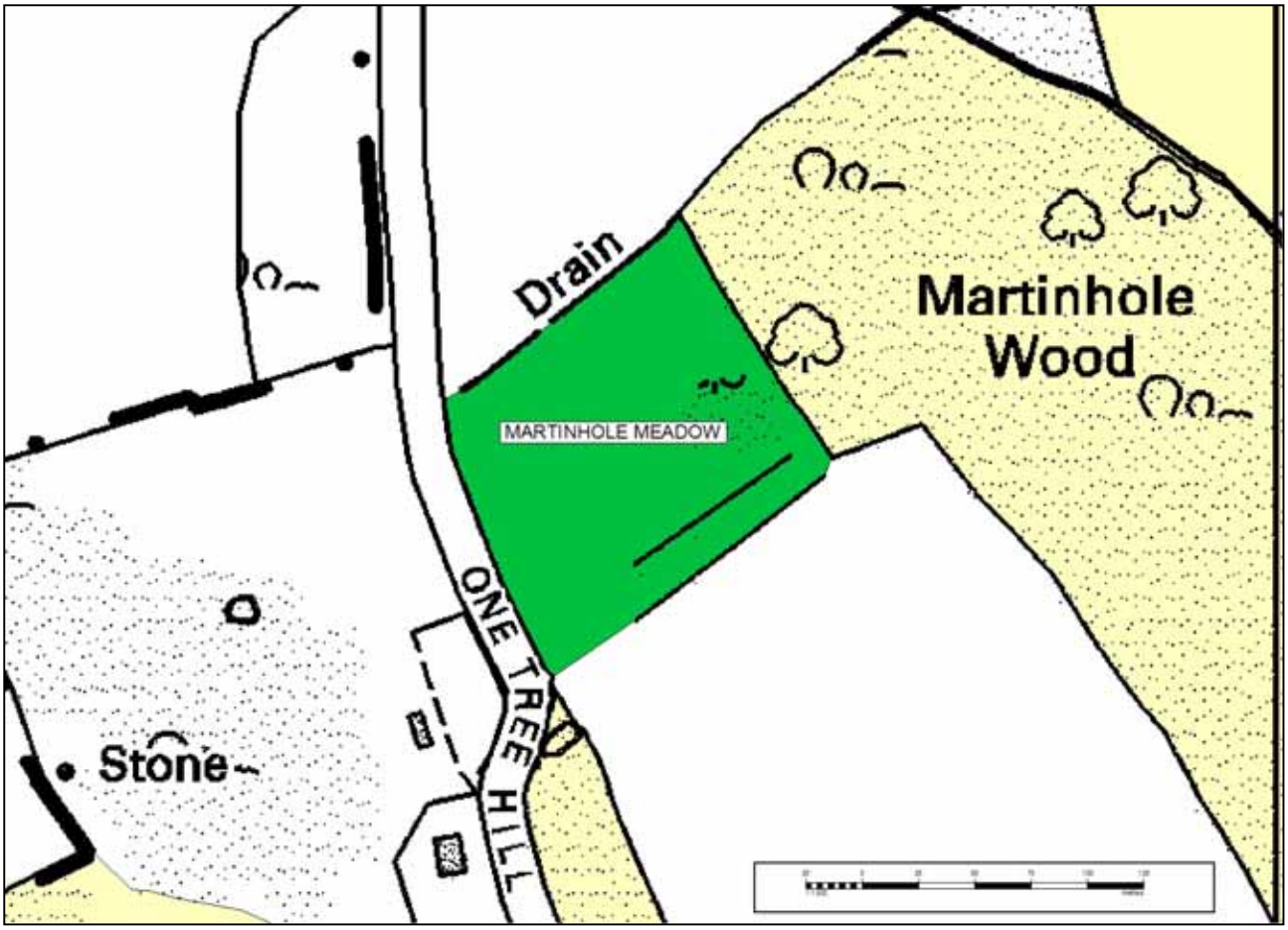
Th63. One Tree Hill (3.3 ha) TQ 696859

One Tree Hill grades from heavily trampled acid-grassland at the summit to a lusher, taller sward on more neutral pH soils down slope. The acid grassland supports such characteristic species as Sand-spurrey (*Spergularia rubra*), Mouse-ear Hawkweed (*Pilosella officinarum*) and Sheep's Sorrel (*Rumex acetosella*) amongst Common Bent-grass (*Agrostis capillaris*). The species-rich lower slope has been augmented by seeding in species such as Sulphur Clover (*Trifolium ochroleucon*) and Yellow Rattle (*Rhinanthus minor*), but is characterised by abundant Black Knapweed (*Centaurea nigra*) and widespread White Clover (*Trifolium repens*), Bird's-foot Trefoil (*Lotus corniculatus*), Agrimony (*Agrimonia eupatoria*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Quaking Grass (*Briza media*), Lady's Bedstraw (*Galium verum*) and Meadow Barley (*Hordeum secalinum*).

This flower-rich sward should provide good foraging ground for a variety of butterflies, bumblebees and other insects.

Selection Criteria: HCr11

Condition and Proposed Management: Whilst occasional mowing and use for informal recreation are not necessarily detrimental to these grasslands, care should be taken to ensure that excessive visitor pressure does not bring about a degradation of their current conservation value. The extent of acid grassland is particularly precarious and efforts to extend and enhance it would be desirable. For the whole site, preservation of a low soil nutrient level is important in maintaining the floristic diversity.



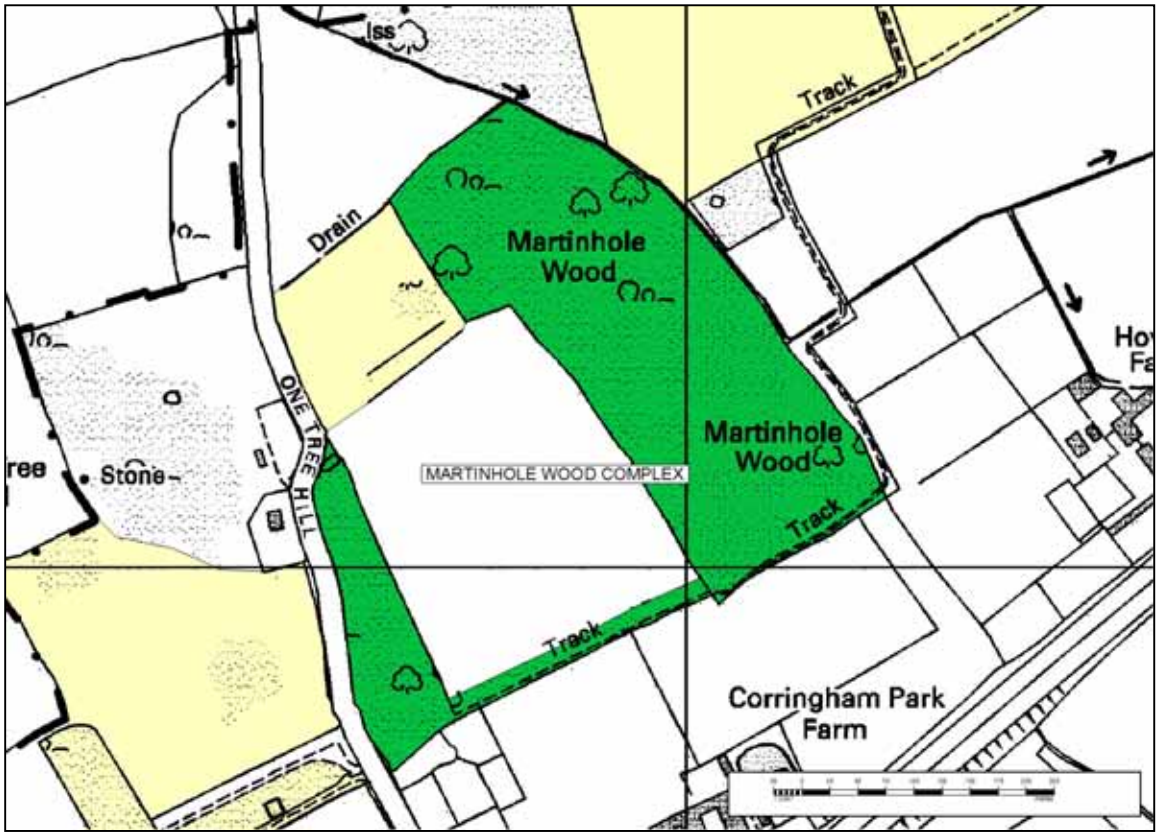
Th64. Martinhole Meadow (1.3 ha) TQ 697862

The meadow to the east of the road is of particular interest for the presence of Yellow Rattle (*Rhinanthus minor*), Green-winged Orchid (*Orchis morio*) and Quaking Grass (*Briza media*). The general sward is characterised by the presence of Sweet Vernal-grass (*Anthoxanthum odoratum*), Common Bent-grass (*Agrostis capillaris*), Black Knapweed (*Centaurea nigra*), Crested Dog's-tail (*Cynosurus cristatus*), Yorkshire Fog (*Holcus lanatus*), Common Cat's-ear (*Hypochaeris radicata*), Clovers (*Trifolium* spp.) and Meadow Barley (*Hordeum secalinum*). Common Spotted Orchid (*Dactylorhiza fuchsii*) is also present.

This meadow effectively forms an extension to the SSSI field to the north (part of the Basildon Meadows SSSI).

Selection Criteria: HCr10; SCr13

Condition and Proposed Management: Management should aim to keep soil nutrient status low. Late hay cropping would appear to be the best means of doing this, but cutting at other times of year should always involve removal of the cut material.



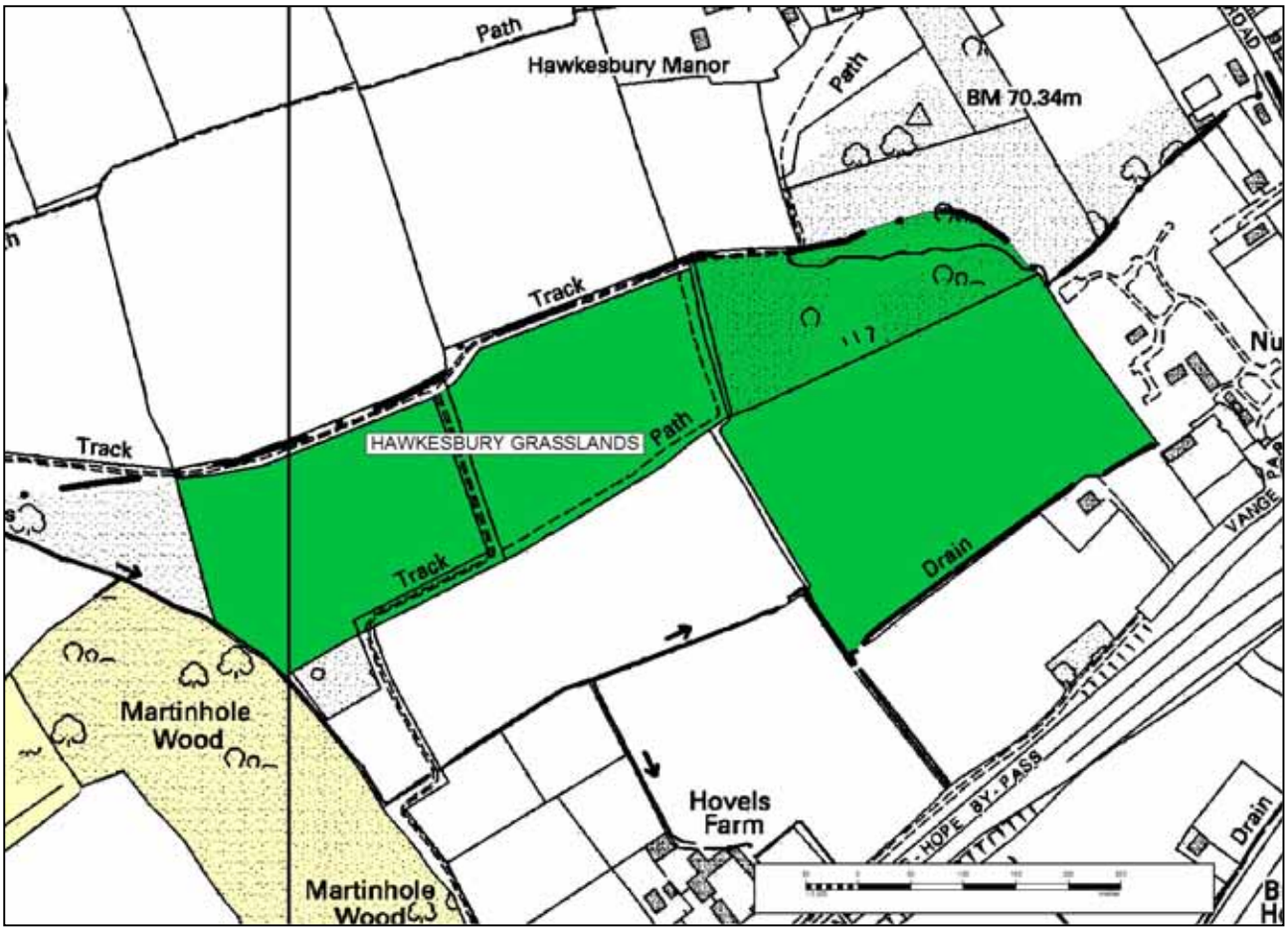
Th65. Martinhole Wood Complex (7.0 ha) TQ 700860

Martinhole Wood is an overgrown Hornbeam (*Carpinus betulus*) coppice with many multi-stemmed trees, especially to the north, and some old Hazel (*Corylus avellana*) coppice. Standards trees are mainly Pedunculate Oak (*Quercus* robur) and Ash (*Fraxinus* excelsior), whilst Field Maple (*Acer campestre*), Midland Hawthorn (*Crataegus laevigata*) and Wild Service Tree (*Sorbus torminalis*) occur in the understorey. The flora includes many ancient woodland plants, such as Spindle (*Euonymus europaeus*), abundant Bluebell (*Hyacinthoides non-scripta*) and Wood Anemone (*Anemone nemorosa*), locally frequent Dog's Mercury (*Mercurialis perennis*), Hairy St. John's-wort (*Hypericum hirsutum*), Wood Millet (*Milium effusum*), Primrose (*Primula vulgaris*) and Three-veined Sandwort (*Moehringia trinervia*). The scarce Essex fern Soft Shield-fern (*Polystichum setiferum*) occurs sparingly in the eastern boundary stream ditch. This is an Essex Red Data List plant.

The wood adjacent to One Tree Hill road is possibly ancient. It has a canopy of Pedunculate Oak and Ash, with some Hornbeam centrally. The very rich ground flora and scrub layer includes Midland Hawthorn, Dog's Mercury, Wood Millet, Three-veined Sandwort, Lesser Celandine (*Ranunculus ficaria*) and Red Campion (*Silene dioica*). A small pond at the northern end adds to the habitat diversity. The strip of wood connecting this wood to Martinhole Wood comprises a belt of Hawthorn (*Crataegus monogyna*), Field Maple, Ash, Dogwood (*Cornus sanguinea*), Blackthorn (*Prunus spinosa*) and many other trees and shrubs at lower density.

Selection Criteria: HCr1(a); HCr1(b); HCr9(a)

Condition and Proposed Management: Of concern in the smaller section of wood is the currently small quantity of Sycamore (*Acer pseudoplatanus*) and also Snowberry (*Symphoricarpos rivularis*). Both are highly invasive species that can spread to the detriment of the native flora. Extensive re-coppicing in Martinhole Wood would diversify the habitat structure.



Th66. Hawkesbury Grasslands (13.5 ha) TQ 703865

The two meadows to the east of Martinhole Wood retain a very diverse grassland flora, despite an uphill struggle to control scrub encroachment. Of particular note amongst the ground flora are Corky-fruited Water-dropwort (*Oenanthe pimpinelloides*) – one of only a few sites for this species in the county; Pepper Saxifrage (*Silaum silaus*), Common Sedge (*Carex nigra*), Yellow Rattle (*Rhinanthus minor*) and Fairy Flax (*Linum catharticum*). The sward comprises at least 12 species of grass, with abundant Meadow Barley (*Hordeum secalinum*), Crested Dog's-tail (*Cynosurus cristatus*) and Yorkshire Fog (*Holcus lanatus*).

The north-eastern section, part of "Hawkesbury Bushes", has become badly scrubbed up although recent management appears to be at least re-establishing a series of paths through the site. The remaining grassland retains a good diversity of flowering plants as a nectar resource for insects. Typical species include Black Knapweed (*Centaurea nigra)*, Wild Carrot (*Daucus carota*), Lady's Bedstraw (*Galium verum*), Bird's-foot Trefoil (*Lotus corniculatus*) and clovers (*Trifolium* spp.). The meadow to the south provides additional flower-rich foraging habitat for the diverse invertebrate fauna.

The butterflies are of particular interest, with the Essex Red Data List Marbled White and Grizzled Skipper being of particular note.

Selection Criteria: HCr11; HCr12; SCr12; SCr13

Condition and Proposed Management: Scrub encroachment is a big problem across most of the site. Flailing the meadows doubtless removes the tall scrub growth but it also destroys the grassland infrastructure that is important to many invertebrates. It may be better to consider a more labour-intensive "spot-treatment" or uprooting of the scrub bushes, so that in future years less overall cutting will be required.

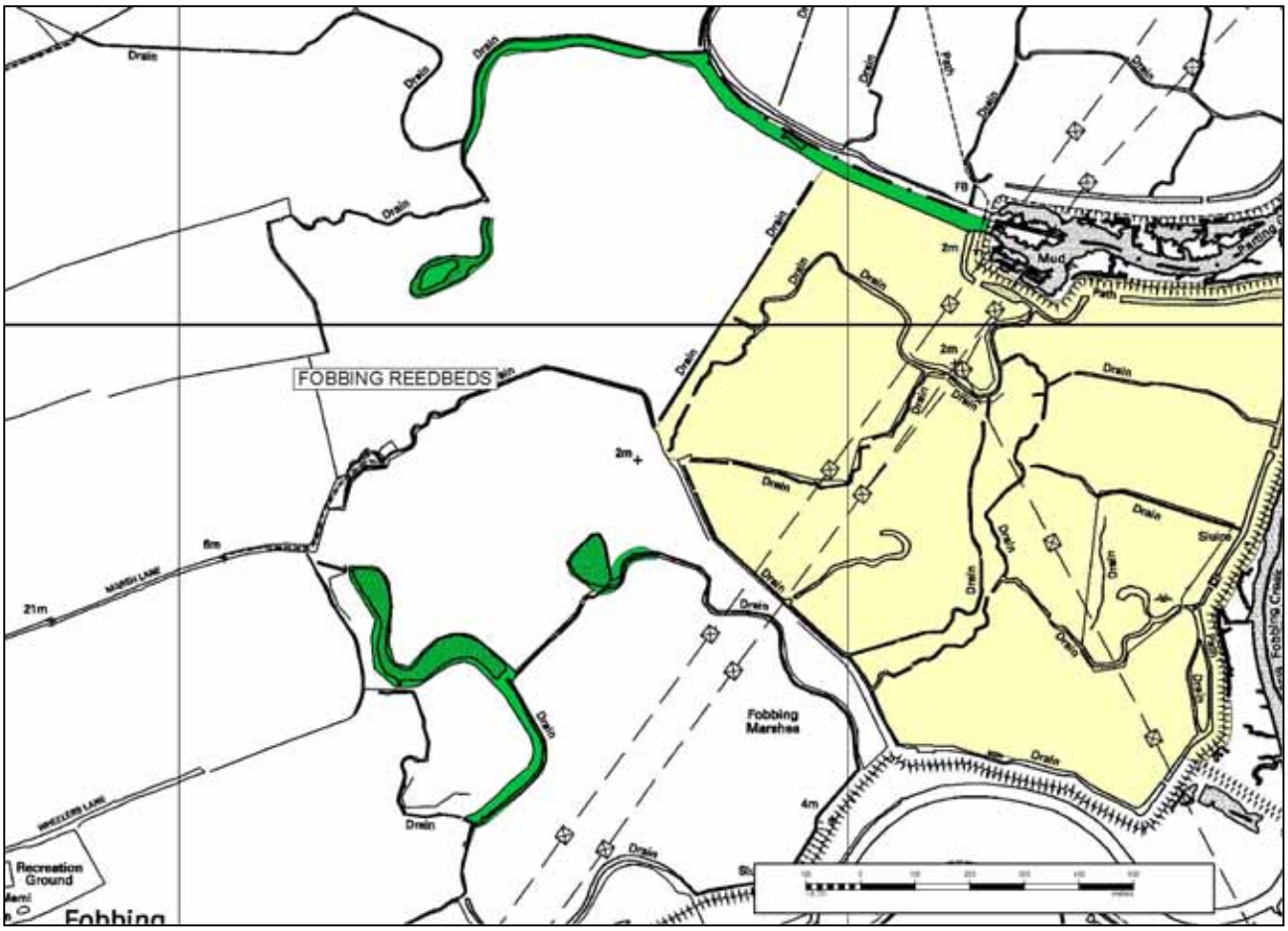
Th67. Vange Depot (7.1 ha) TQ 710860

This largely disused water company site supports a very diverse flora and fauna. The covered reservoir is of note for the large population of Green-winged Orchid (*Orchis morio*) and also a small population of the Nationally Scarce ant *Ponera coarctata*. Two former lime sludge lagoons support a sparse flora capable of surviving an extremely harsh growing medium. The most notable species here is the Nationally Scarce Round-leaved Wintergreen (*Pyrola rotundifolia*), a rare species with only a handful of recent records in Essex. Other chalk grassland plants include Yellow-wort (*Blackstonia perfoliata*) and Ploughman's Spikenard (*Inula conyzae*). A small area of Red Bartsia in this lagoon area attracts two national BAP bumblebees: *Bombus humilis* and *B. sylvarum*, although this area probably only represents a small part of their foraging territory. As such, their presence is of more peripheral conservation interest rather than one of the selection criteria.

The long pond along the southern margin of the site supports a small population of Great Crested Newts, whilst the rough grassland across the site supports an exceptional reptile assemblage, with a high density of Adders, very large numbers of Slow-worm and also Common Lizard and Grass Snake. The scrub woodland appears to be favoured as a resting area by Woodcock.

Selection Criteria: SCr4; SCr12; SCr13

Condition and Proposed Management: At least part of this site is being considered for development. At present Essex and Suffolk Water are managing the covered reservoir sympathetically, with cutting delayed until after the orchid flowering period. The Great Crested Newt pond is in need of considerable improvement, with currently low water quality, large quantities of plant detritus and little aquatic vegetation. The main reptile areas need little management, other than periodic scrub control.

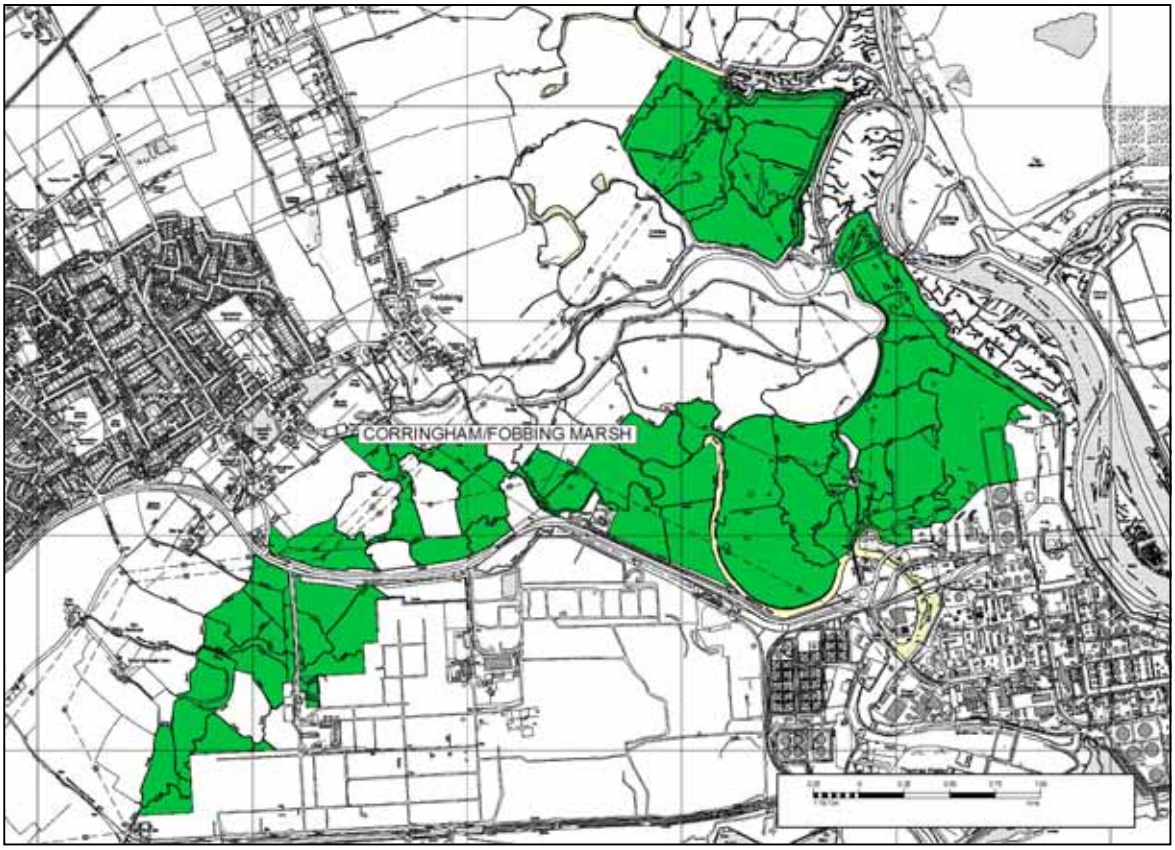


Th68. Fobbing Reedbeds (4.9 ha) TQ 724850

These beds of Common Reed (*Phragmites australis*), adjacent to the Fobbing Marshes nature reserve, are of importance as a scarce habitat upon which many animal species are dependent, such as Reed Warbler and reed-feeding moths. Reedbeds are an Essex BAP habitat. Part of the Parting Gut bed to the north lies in Basildon District. Fringing willows (*Salix* spp.) add to the habitat diversity and may help to attract birds such as Sedge and Cetti's Warblers.

Selection Criteria: HCr21

Condition and Proposed Management: Management should aim to strike a balance between large stands of dense reed growth, with small areas of open water and scattered marginal willows in places. Cutting of the reed to re-invigorate growth will not be economically viable here but may be a useful conservation tool.



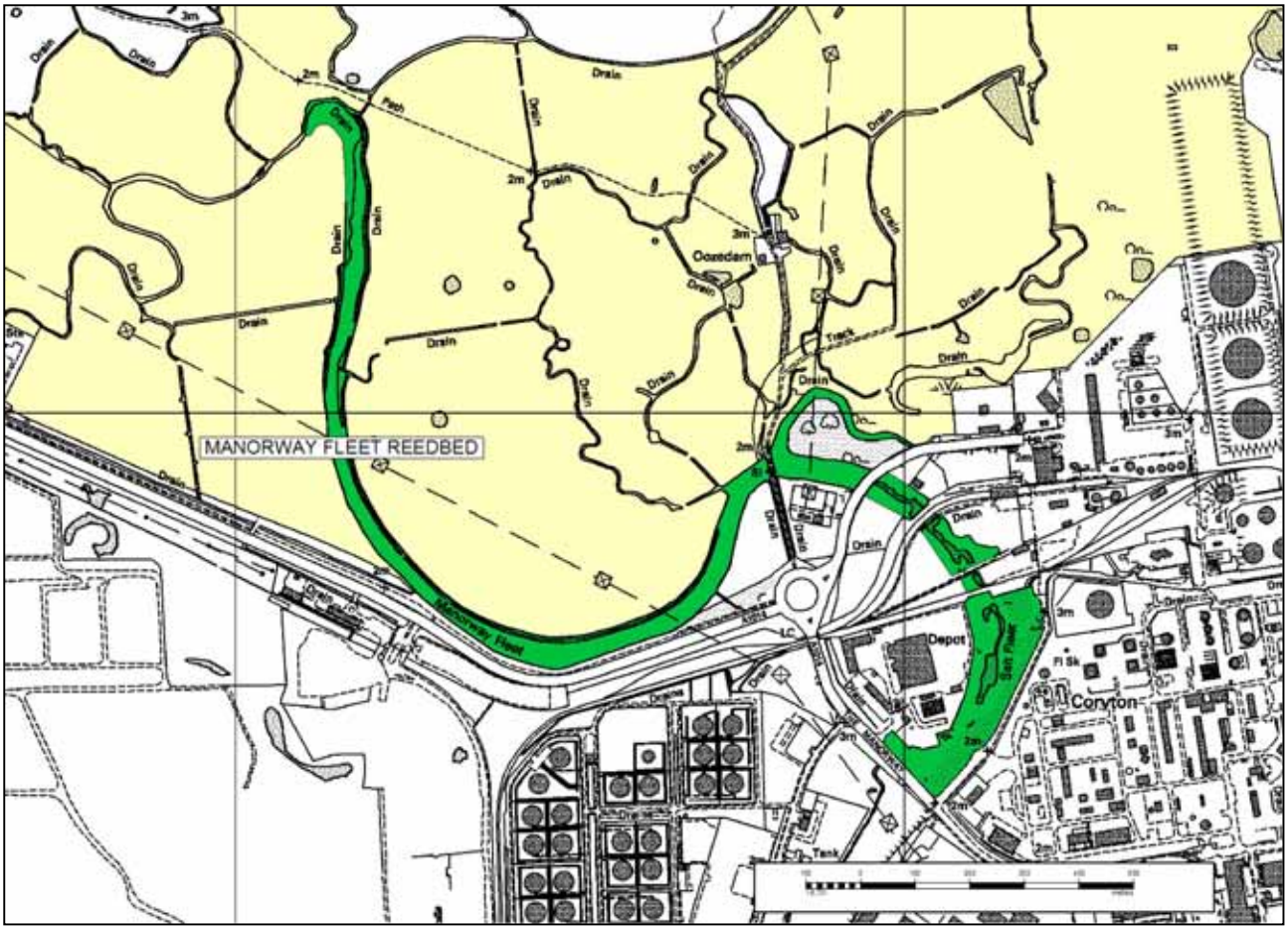
Th69. Corringham/Fobbing Marsh (307.2 ha) TQ 727834

This Site comprises one of the largest areas of relict grazing-marsh in south Essex. It includes an area of brownfield grassland at the eastern end, which now supports a grassland sward that allows it to contribute to the overall ecology of the site in a similar way to the marsh that was lost during its creation. The northern section of the Site comprises the Essex Wildlife Trust's Fobbing Marsh nature reserve. The Site as a whole lies either side of part of the Vange and Fobbing Marshes SSSI and supports many of the interesting species found there, including the nationally rare and legally protected Least Lettuce (*Lactuca saligna*). Other Nationally Scarce plants that are found here include Sea Barley (*Hordeum marinum*), Slender Hare's-ear (*Bupleurum tenuissimum*), Sea Clover (*Trifolium squamosum*) and Stiff Saltmarsh-grass (*Puccinellia rupestris*). The national scarcity of this habitat makes the conservation of all remaining areas a high priority. The site also includes water bodies in the north-east corner that could be taken to be within the broad remit of the Saline Lagoon habitat BAP.

Even moderately well improved coastal grasslands are of value for over-wintering wildfowl and waders, with the extent, continuity and management of the sward being more important than the species composition for many species. In addition, this is one of the sites for breeding Stonechat (an Essex Red Data List bird) in the county. The invertebrate fauna includes many Essex Red Data List species from across the broad spectrum of families. This includes a significant population of the UK BAP bumblebee *Bombus humilis.* The ditch fauna is likely to be of interest but has not been studied.

Selection Criteria: HCr16; HCr28; SCr10; SCr11; SCr12; SCr13

Condition and Proposed Management: Maintenance of an appropriate grazing regime, in association with some hay cropping, is essential to the ecology of such sites. The maintenance of a relatively low winter sward is important in attracting wintering wildfowl and waders, often more so than the species composition of the sward. Trampling of stock is instrumental in creasing an open sward structure that is needed for seed germination of Least Lettuce. The breadth of wildlife importance, covering flora, birds and invertebrates highlights the value of this site.



Th70. Manorway Fleet Reedbed (9.5 ha) TQ 733827

This reedbed is one of the largest stands of continuous reed in the borough. Reedbed is an Essex BAP habitat and supports a suite of dependent insects and breeding birds. During 2006, territories for Cetti's, Reed and Sedge Warblers were noted. The site forms an integral part of the Corringham/Fobbing Marsh Site, but is highlighted separately to emphasise this extensive BAP habitat.

Selection Criteria: HCr21

Condition and Proposed Management: The strength of reed growth will be linked to long-term groundwater regimes, particularly at the upper end of the watercourse. Reed cutting is unlikely to be economically viable for thatching, but may be a useful conservation tool to re-invigorate reed growth.

APPENDIX 7

TABLES AND MAPS OF POTENTIAL LOCAL WILDLIFE SITES

Within the tables and maps, sites are identified with a five-digit code e.g. 5780/1.

The first four digits (5780) identify the 1km Ordnance Survey square in which the site is centred. The second number is the unique identifier within that square.

ID	NAME	SUMMARY	MANAGEMENT	BIODIVERSITY ISSUES	SURVEYS
5777/2	West of M25, south of railway	Rough grassland with some ditches	Grazing is likely to be beneficial	Brownfield wildlife land; potential for UK BAP invertebrates, Grass Snake, Adder	Surveys for reptiles, Water Voles and invertebrates recommended
5578/5	Woodland north of Hollow Cottages	Secondary woodland supports Buttoned Snout (UK Priority BAP moth); small area of orchard	Manage area of hops for Buttoned Snout	National BAP priority moth, Buttoned Snout (Hypena rostralis); Small old orchard; reptiles present. Potential for bats, Hedgehog and Song Thrush	Map extent of hop and monitor Buttoned Snout population
5578/6	Former oil depot off Botany Way	Classic brownfield site: demolished oil storage depot now with ruderals, scrub and bare ground.	Maintain early successional vegetation	Brownfield land, likely to be of value for invertebrates	Surveys recommended for invertebrates, reptiles and flora
5677/1	North of London Road, Purfleet	Chalky banks surviving adjacent house development. Some interesting chalk flora survives and would be worthy of retention	Retain in current condition	Potentially calcareous grassland	General wildlife survey needed
5678/6	Part of Purfleet Chalk Pits Geological SSSI	Geological exposures; potential for interesting chalk flora and invertebrates within sandy components of cliffs	Topography makes management hazardous but scrub may need controlling	Potential for national BAP invertebrates, Glow-worm, calcareous grassland. Brownfield land.	Surveys of flora and invertebrates would be desirable.
5678/9	South of North Road path	Brownfield land	Non-intervention	Potential for UK BAP invertebrates and Glow-worm	Invertebrate and flora surveys strongly recommended
5680/1	Grasslands either side of Aveley Bypass	Rough, interesting-looking horse paddocks. May have associations with Thames Terrace grasslands.	Horse-grazed. Localised disturbance in southern field around barn area	Possibly Thames Terrace grassland?	General wildlife survey recommended, especially flora and invertebrates
5776/2	Seawall at west end of Vopak site	Flower-rich seawall with lots of invertebrate activity	Modify mowing regime to avoid cutting during the summer.	Potential for BAP invertebrates and Adder	Invertebrate survey recommended
5777/1	west of M25, south of London Road West Thurrock	Short perennial vegetation with scattered scrub; classic brownfield site	Scrub growth may need controlling	BAP bumblebees or other invertebrates are a strong possibility on this brownfield wildlife land	Surveys for invertebrates and reptiles recommended

ID	NAME	SUMMARY	MANAGEMENT	BIODIVERSITY ISSUES	SURVEYS
5777/3	Three sections of waste ground adjacent to Oliver Close	Waste ground with potential for brownfield invertebrate interest; reptiles potentially also present	Maintain status quo, pending survey work	Brownfield land: potential for UK BAP invertebrates	Invertebrate and reptile surveys recommended
5777/4	Land by Stonehouse corner	Rough, weedy grassland with several ditches and an area of waste ground in south-west corner.	Maintain status quo, pending wildlife surveys	Potential for UK BAP invertebrates, Water Vole, Adder and Grass Snake	General wildlife survey strongly recommended
5780/1	north of southern section of Low Well Wood	Area of flower-rich short perennial vegetation presumed to be the result of ground disturbance during motorway construction.	Maintain as form of acid grassland by removing areas of rich soil and lush plant growth	Could be considered to be a type of acid grassland and hence lies within lowland heathland Essex HAP	Surveys of flora and invertebrates desirable
5780/3	Land south of Hangman's Wood	Old sand pits with woodland, lake and acid grassland	Manage western pit as wet woodland; enhance reed growth in eastern lake	Brownfield wildlife land and wet woodland; possibly reedbed, Grass Snake	General wildlife survey recommended
5780/4	Stifford Road Pasture	Horse-grazed pasture. Looks to be old grassland and could be Thames Terrace grassland	Some horse grazing is likely to be beneficial	Possibly Thames Terrace grassland, Skylark, invertebrates	Surveys of flora and invertebrates recommended
5876/2	Land adjacent to Vopak terminal	Flower-rich ruderal vegetation across brownfield site; likely to be good for invertebrates.	Maintain status quo, pending wildlife surveys	UK BAP invertebrates likely to be present; possibly Skylark, Adder, Grass Snake, Glow-worm	General wildlife survey recommended
5876/3	Land around West Thurrock power station	Large area of brownfield land, derelict buildings etc.	Maintain status quo, pending wildlife surveys	Brownfield wildlife land; possibly Black Redstart, Adder, Grass Snake, Glow-worm and UK BAP invertebrates	General wildlife survey strongly recommended
5876/5	Waste ground over entrance to channel rail link tunnel	Brownfield ruderal vegetation.	Keep as early succession habitat	Brownfield wildlife land; potential for UK BAP invertebrates	Invertebrate survey recommended
5876/6	Land off Oliver Road	Waste ground brownfield site	Maintain status quo, pending wildlife surveys	UK BAP invertebrates could be present on brownfield land	Invertebrate survey recommended
5878/1	Waste ground in Lakeside retail complex	Large area of tall ruderals and developing rough grassland	Maintain early successional vegetation as a brownfield site education resource	UK BAP invertebrates could be present on brownfield land	Detailed invertebrate survey recommended

ID	NAME	SUMMARY	MANAGEMENT	BIODIVERSITY ISSUES	SURVEYS
5882/2	Between M25 and Arisdale Avenue	Large area of woodland, lake and some rough grassland	Maintain status quo, pending wildlife surveys	Wet woodland and brownfield land; potential for UK BAP invertebrates and Grass Snake	General wildlife survey needed
5977/1	St Clements Churchyard, West Thurrock	Old churchyard grassland, being badly invaded by Hemlock.	Cut patches in late autumn or early spring and REMOVE cuttings.	Lowland grassland broad HAP	Survey of invertebrates recommended, given adjacent area of interest (5977/3)
5977/2	National Grid land, West Thurrock Power Station	Ruderal and short perennial vegetation	Maintain in early-succession habitat	UK BAP invertebrates could be present on brownfield land	Invertebrate survey recommended
5977/3	Rough ground south of St Clements Church	Scrub strip to west, tall ruderal brownfield habitat to east.	Reduce amount of scrub; maintain early successional habitats	UK BAP invertebrates could be present on brownfield land	Re-survey invertebrate interest and survey for reptiles
5980/2	south of Back Lane	Weedy acid grassland, possibly with some chalk influence?	Maintain mosaic of early successional vegetation and flowery grassland	Flower-rich grassland/brownfield land; potential for invertebrates, including Glow-worm, and Adder	Survey of flora and invertebrates recommended
5980/3	Stifford Hill Pastures	Interesting-looking hillslope grasslands; acid grassland sward in part.	Maintain light horse grazing	Thames Terrace grasslands? Potentially Hornet Robberfly	General survey needed
5980/4	land north of Birchfield	Western half comprises brownfield derived from demolition of buildings; the remainder is rough grassland	Maintain vegetation diversity	Brownfield land: could have invertebrate interest	Surveys of flora, invertebrates and reptiles recommended
5980/5	Pasture north of Dog and Partridge pub	Horse-grazed pasture, with locally frequent Fiddle Dock	Maintain appropriate level of horse grazing	Thames Terrace grassland; potentially Hornet Robberfly	General wildlife survey desirable
5981/1	Land north of Buckles Lane	Brownfield habitats; known to be reptiles present	Maintain habitat diversity	BAP invertebrates could be present; reptiles known to occur; potential for Great Crested Newts in lake or one of several ponds; possibly Adder and Grass Snake	Surveys needed for invertebrates, reptiles, Great Crested Newts

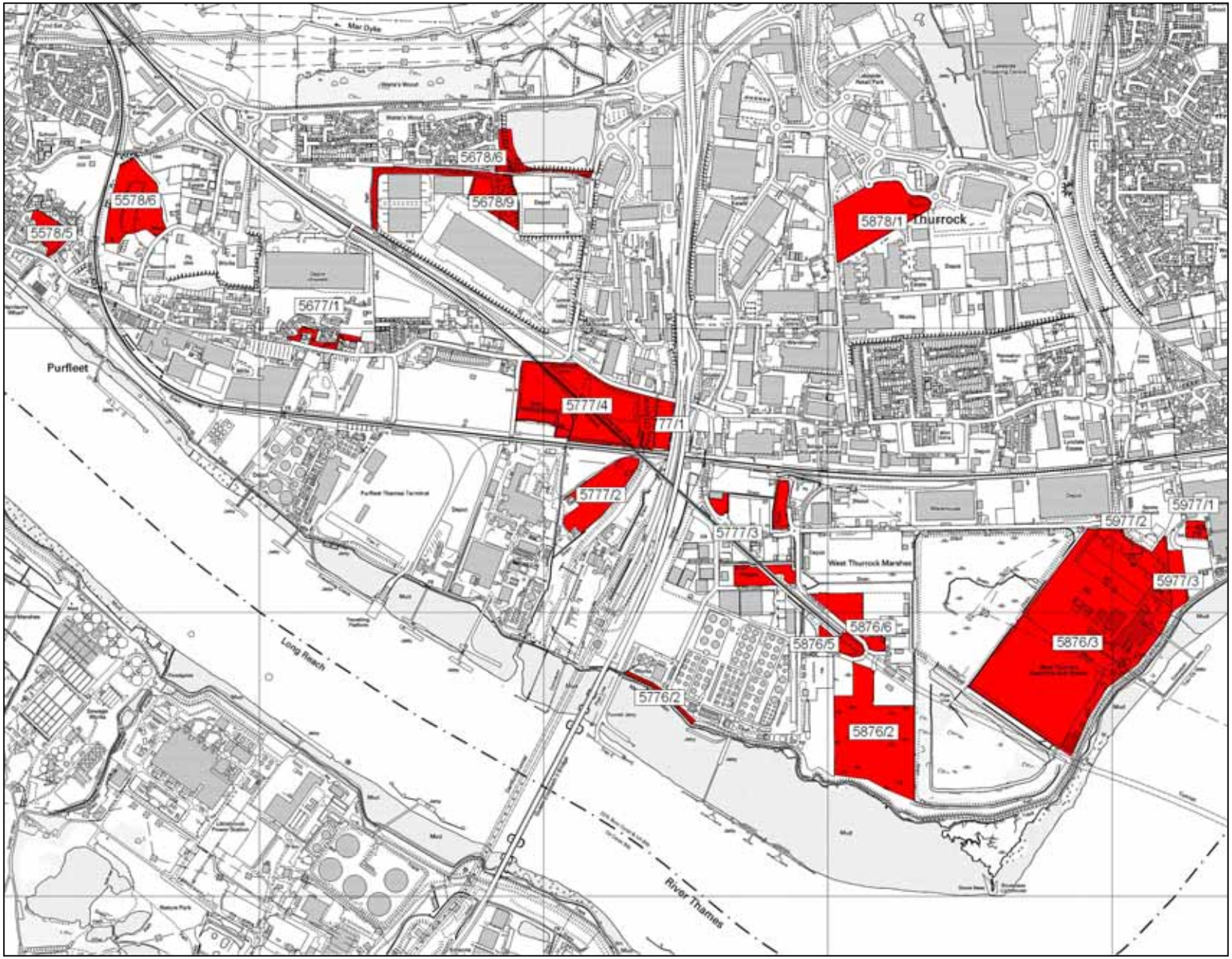
ID	NAME	SUMMARY	MANAGEMENT	BIODIVERSITY ISSUES	SURVEYS
6078/4	Devonshire Road grasslands	Flowery rough grassland. Known to support reptile populations from time of road construction	Prevent excessive scrub growth over species-rich grassland. Do not cut grassland during summer months and cut then in rotational patchwork	Brownfield wildlife land; possibly Glow-worm, Grass Snake, Adder and UK BAP invertebrates	General wildlife survey recommended
6080/2	St Mary's North Stifford churchyard	Very closely mown grassland with few areas of tall vegetation. some acid grassland in places	Grassland cutting should remove cuttings and be done on a patchwork basis, cutting early or late in year.	Lowland grassland broad HAP; potential for bats	Survey flora earlier in year, before cutting takes place
6081/10	Mar Dyke north of Cats Mede	River channel with stepped profile. Some emergent vegetation.	Maintain open central channel and dense marginal vegetation as cover for Water Voles	Potentially Water Voles, Grass Snake	Water Vole survey desirable
6178/2	Land west of Cromwell Road; part of UCS site GTH 24	Brownfield habitat as part of industrial complex in old chalk pit	non-intervention, pending survey work	Brownfield wildlife land	Surveys needed for invertebrates, reptiles. Flora survey also desirable
6179/1	Land off Hogg Lane	Woodland and more open fringes to old chalk quarry	Retain any areas of open grassland by removing encroaching scrub	Brownfield wildlife land; possibly Glow-worm, calcareous grassland	General wildlife survey recommended
6181/3	Mar Dyke east of Grangewaters	Generally good emergent vegetation	Maintain open central channel and dense marginal vegetation as cover for Water Voles	Potentially Water Voles, Grass Snake	Water Vole survey desirable
6182/1	Mar Dyke north-east of Grangewaters	River channel bordered by planted broadleaved wood on northern side and grassy margins more immediately on either bank.	Maintain open central channel with dense marginal vegetation as cover for Water Voles	Potentially Water Voles, Grass Snake	Water Vole survey desirable
6182/2	Part of Mar Dyke	River channel with marginal scrub and some emergent vegetation	Enhance marginal vegetation but keep central channel open	Potentially Water Voles, Grass Snake	Water Vole survey desirable
6182/3	Lakes north of Grangewaters	Old mineral extraction site, now flooded and surrounded by rough grassland and scrub	Maintain habitat diversity, with flower-rich grassland, scrub and open water habitats	Brownfield wildlife land: possibly Great Crested Newt	General wildlife survey recommended

ID	NAME	SUMMARY	MANAGEMENT	BIODIVERSITY ISSUES	SURVEYS
6184/1	Mar Dyke, Bulphan Fen	River channel with stepped profile to eastern side. Broad grassy margins	Maintain open central channel with dense marginal vegetation	Potentially Water Voles, Grass Snake	Water Vole survey desirable
6277/1	Little Thurrock Marshes	Remnant grazing marsh.	Grazing would be most appropriate management	Coastal grazing marsh; possibly BAP invertebrates, Water Vole, Skylark	General survey of all major groups required
6283/1	Mar Dyke, Orsett Fen	River channel with wide stepped profile on eastern side.	Maintain central open channel, with dense marginal growth	Potentially Water Voles, Grass Snake	Water Vole survey
6283/2	Mar Dyke north of Orsett Fen	River channel with more basic V-shaped profile	Maintain central open channel and enhance marginal vegetation, if possible. Shading from adjacent plantation is an increasing issue	Potentially Water Voles, Grass Snake	Water Vole survey desirable
6284/1	Mar Dyke	River channel with abundant emergent vegetation	Maintain open central channel with dense marginal vegetation	Potentially Water Voles, Grass Snake	Water Vole survey desirable
6287/1	Lower Shaw	Apparently Oak wood with scrubby understorey.	Enhance structural diversity	Possibly small ancient woodland remnant	Research into ancient status would be useful.
6377/1	Tilbury Marshes	Former coastal grazing marsh, now largely arable land. Interesting ditch flora and fauna?	Restoration to grassland needed.	Potential to restore significant area of coastal grazing marsh grassland; Water Voles are possible	Survey needed of ditch flora and fauna
6377/3	Land surrounding Karting Stadium	Rough grassland with scattered scrub, small bare areas and small area of sedge. Potentially diverse wildlife interest	Limit scrub encroachment, maintain rough grassland, ruderal and bare ground mosaic	Brownfield wildlife land; possibly Skylark, Adder, BAP invertebrates	General wildlife survey recommended, but especially reptiles, invertebrates and flora
6380/3	Neville's Farm, Baker Street	Derelict land with soil scraping and previous demolition, now developing as brownfield site	Non-intervention, pending survey work	Possibly Brownfield wildlife land, BAP invertebrates	Surveys of flora, reptiles and invertebrates recommended
6477/1	Hob Hill	Looks to be old grassland. Could be of interest for invertebrates and flora	horse grazing is probably best management	Thames Terrace grasslands; possibly Skylark	Survey of flora and invertebrates strongly recommended

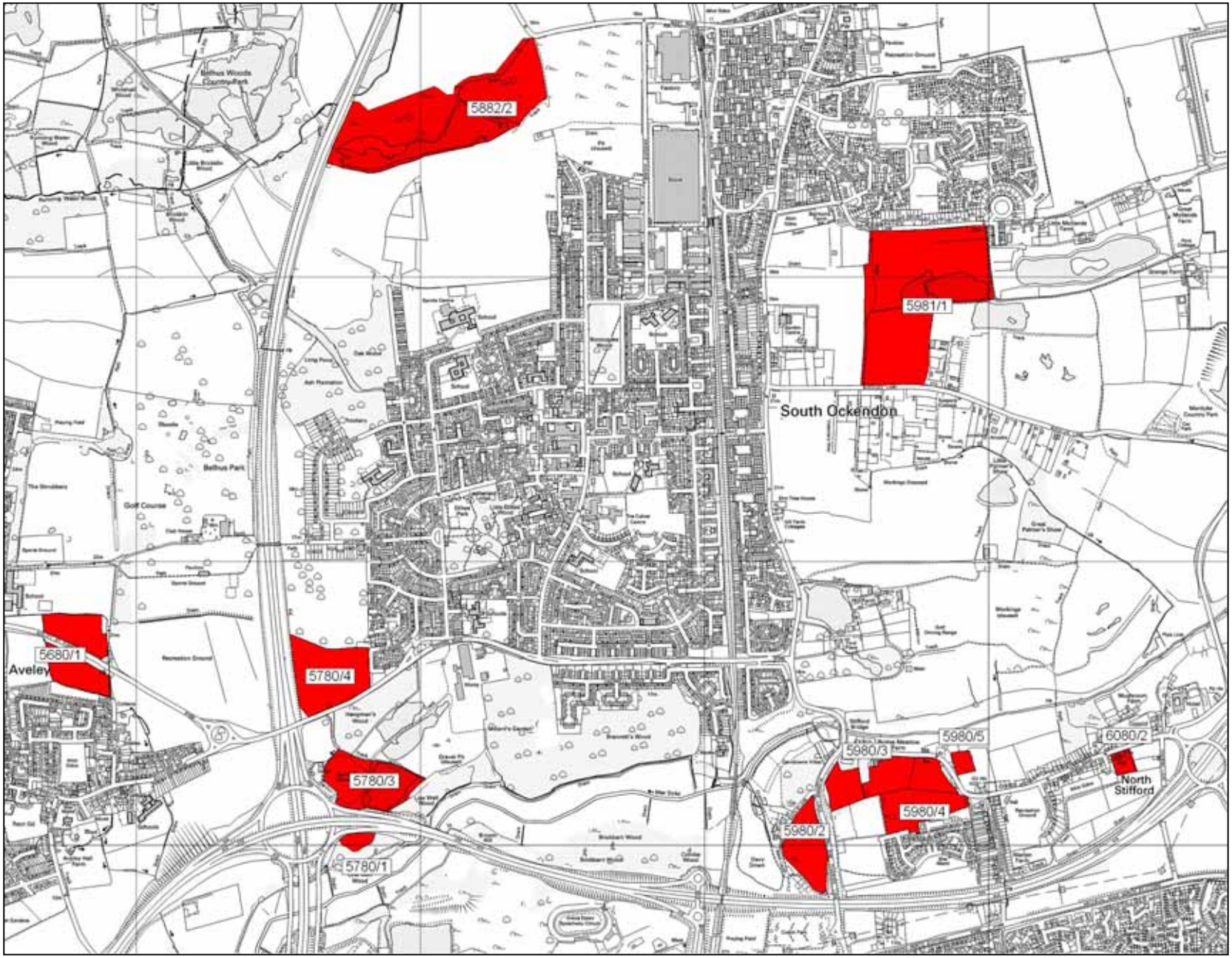
ID	NAME	SUMMARY	MANAGEMENT	BIODIVERSITY ISSUES	SURVEYS
6478/1	Pit north of Sandy Lane	Classic brownfield site - old sandpit with chaotic topography and sparse vegetation cover	Maintain status quo	Brownfield land: big potential for UK BAP invertebrates	Surveys of flora and invertebrates strongly recommended
6478/2	Hutts Hill	Heathy rough grassland with scrub woodland and Bracken. Some areas of tall ruderal	Maintain open nature with scattered trees and bushes	Thames Terrace grassland; possibly BAP invertebrates	Detailed survey of flora, reptiles and invertebrates recommended
6575/1	Inner grasslands of Tilbury Fort	Species-rich grassland in places and includes locally frequent Wild Clary.	Some areas would benefit from less harsh mowing regime, without detracting from the neat appearance of the inner fort.		Flora survey in spring could yield additional species of interest, as would invertebrate survey
6677/4	Scout Camp site, West Tilbury	Grassland and trees/scrub located in shallow pit	Maintain mosaic of bare ground, tall grass and trees	Brownfield wildlife land, Thames Terrace grasslands; possibly Hornet Robberfly	General survey recommended
6680/1	Holford Road Wood	Oak-Ash woodland with Hawthorn and Elder.	Manage as high forest	Despite poor condition, this may be an ancient woodland fragment: more research needed. Possibly Glow-worm (known to be in nearby Rainbow Shaw)	Documentary research into status required.
6680/3	South of Orsett golf course	Acid grassland flora?	Enhance flower-rich acid grassland	Lowland heathland/acid grassland, Thames Terrace grassland; possibly Adder, Skylark	General wildlife survey should be a high priority
6777/4	Bowaters	Grassland and scrub associated with old war-time emplacements and pits.	Prevent excessive scrub growth	Brownfield wildlife land, Thames Terrace grassland? Possibly Adder, Grass Snake, bats; 2-3 ponds present, so Great Crested Newt could be an issue	General survey recommended, including flora, Great Crested Newts and invertebrates
6876/1	St Catherine's Church, East Tilbury	Old churchyard. Moderately species-rich grassland, including Wild Clary, Lesser Calamint and Lady's Bedstraw	Remove cuttings when mown and cut late or very early	lowland grassland	Invertebrates and further floral studies desirable

ID	NAME	SUMMARY	MANAGEMENT	BIODIVERSITY ISSUES	SURVEYS
6879/2	south-west corner of Mucking Tip	Tall ruderal and rough grassland with bare ground	Maintain as early successional vegetation	Brownfield wildlife land; possibly Adder, Grass Snake, Skylark and UK BAP invertebrates	Surveys recommended for invertebrates, reptiles and flora, plus Great Crested Newts if lake holds water
6881/2	Shell Angling Lake	Large fishing lake with complex of islands. Rather heavily trampled and with most banks revetted.	Limit fishermen's access and remove bank revetments to some islands	Brownfield wildlife land. Supports fringes of wet woodland type habitat; Great Crested Newts?	Great Crested Newt survey may be needed
6882/1	St Margaret's Church, Stanford-le-Hope	Regularly mown yard, important flora noted in 1991 survey	Cut in patches early winter and remove cuttings	Lowland grassland	Re-visit when flora has re-grown
6978/2	Rough grassland surrounding disused sewage works	Rough grassland and ruderal brownfield habitat	Maintain status quo	Brownfield wildlife land. Could be of interest for BAP invertebrates, Skylark, Adder and Grass Snake	Reptile and invertebrate surveys
6978/3	Restored sections of gravel pit, east of East Tilbury	Rough grassland and tall ruderal vegetation	Maintain mosaic of grassland and early succession vegetation	Brownfield wildlife land. Could be of interest for BAP invertebrates, Skylark, Adder and Grass Snake	Surveys recommended for reptiles, invertebrates, flora, breeding birds
6981/4	Rough ground in Stanhope Industrial Park	Brownfield habitats.	non-intervention, pending survey results	Brownfield wildlife land; possibly Adder and BAP invertebrates	Invertebrate and reptile surveys recommended
6985/5	Wood between Northlands Wood and A13	Probably old but not necessarily ancient wood, derived from two parallel ancient hedges?	Coppice Hawthorn?	Ancient/species-rich hedges form long axes	Research into true status of wood is desirable
6986/5	Lane to Hawkesbury Bushes	Species-rich grass margins to track with surfaced central bridleway; moderate mix of trees and shrubs in the hedges	Do not permit surfaced path to spread any wider. Manage grass margins in strip sections to keep floristic diversity.	Ancient/species-rich green lane	Invertebrate survey would be of interest
6986/7	Wood north of Martinhole Wood	Presumed mature recent woodland. Some ancient woodland plants spilling over from Martinhole Wood	Enhance structural diversity		General wildlife survey recommended

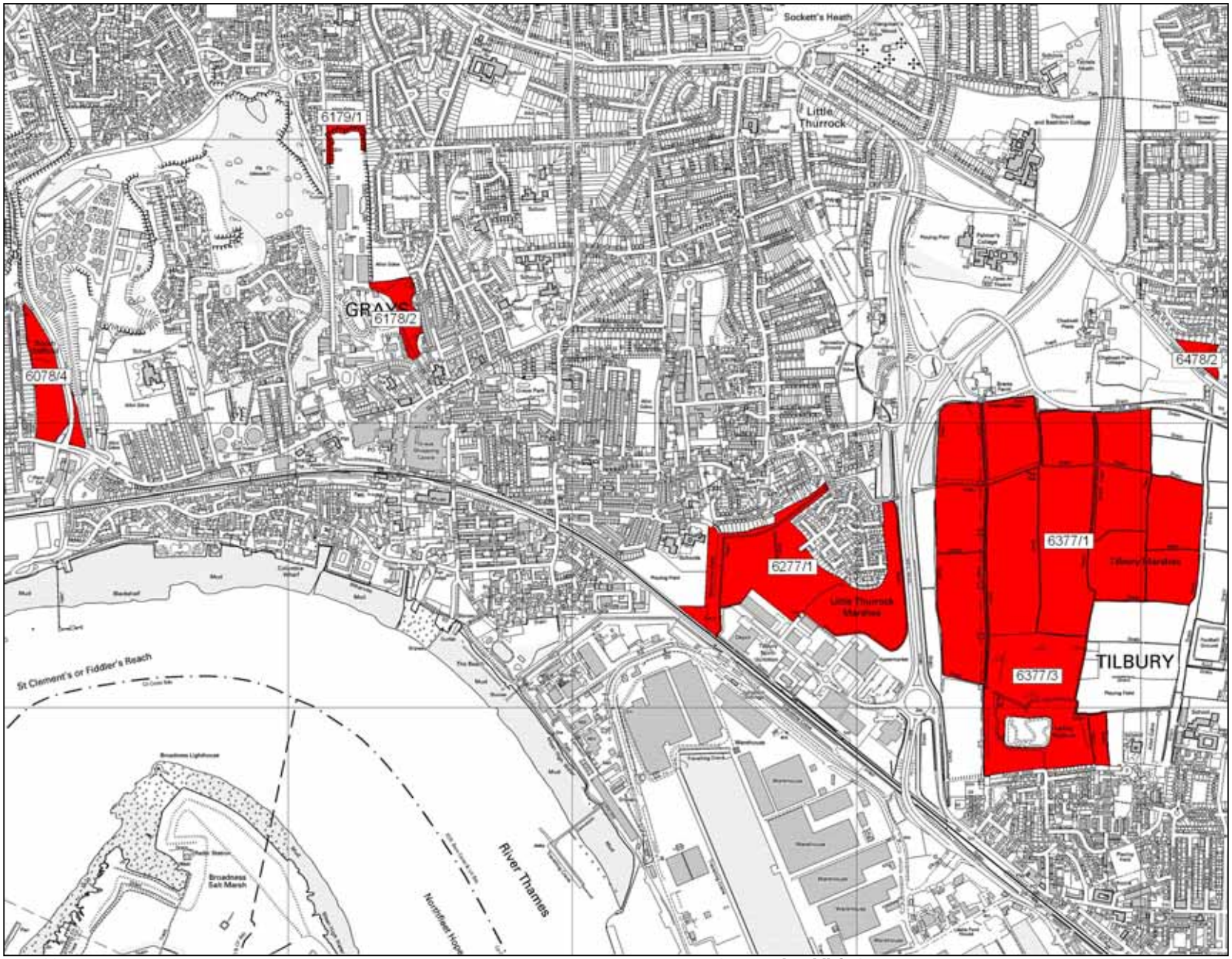
ID	NAME	SUMMARY	MANAGEMENT	BIODIVERSITY ISSUES	SURVEYS
6986/9	Meadow east of One Tree Hill	Rather grass-dominated sward with Red and White Clover being the only prominent herbs.	Increase in herb diversity would be desirable. Manage as tall grass meadow and not cut in height of summer.	Clovers might attract UK BAP bumblebees from adjacent areas; possibly Skylark	Invertebrate survey desirable
7084/1	Land opposite "Austonia"	Old survey notes large swamp-bed of Reedmace and Reed at eastern end, with oil-polluted pond centrally and Oak/Hawthorn wood to west.	Manage for habitat diversity	Reedbed?	Detailed survey and soil analysis required.
7181/1	Waste ground east of Earls Hope	Rough grassland and ruderals developed on brownfield land	Maintain mosaic of grassland and early successional habitats	Could be good for BAP invertebrates; ponds to east may support Great Crested Newts; possibly Skylark, Brown Hare	Invertebrate and reptile surveys needed; possibly Great Crested Newt survey
7183/3	Grasslands south of Wharf Road, Fobbing	Old hillslope grassland and marsh now succumbing to spread of secondary woodland	Drastic clearance of tree cover over much of the site	Formerly old grassland but now essentially woodland with grass/ruderal clearings. Thames Terrace grassland site?	General survey recommended
7184/1	Fobbing Pumping station	Land associated with pumping station, open grassland and small area of woodland over old pit area	Cut meadow area less frequently and not in the summer	Thames Terrace grassland. Possibly Skylark	Invertebrate survey would be of interest



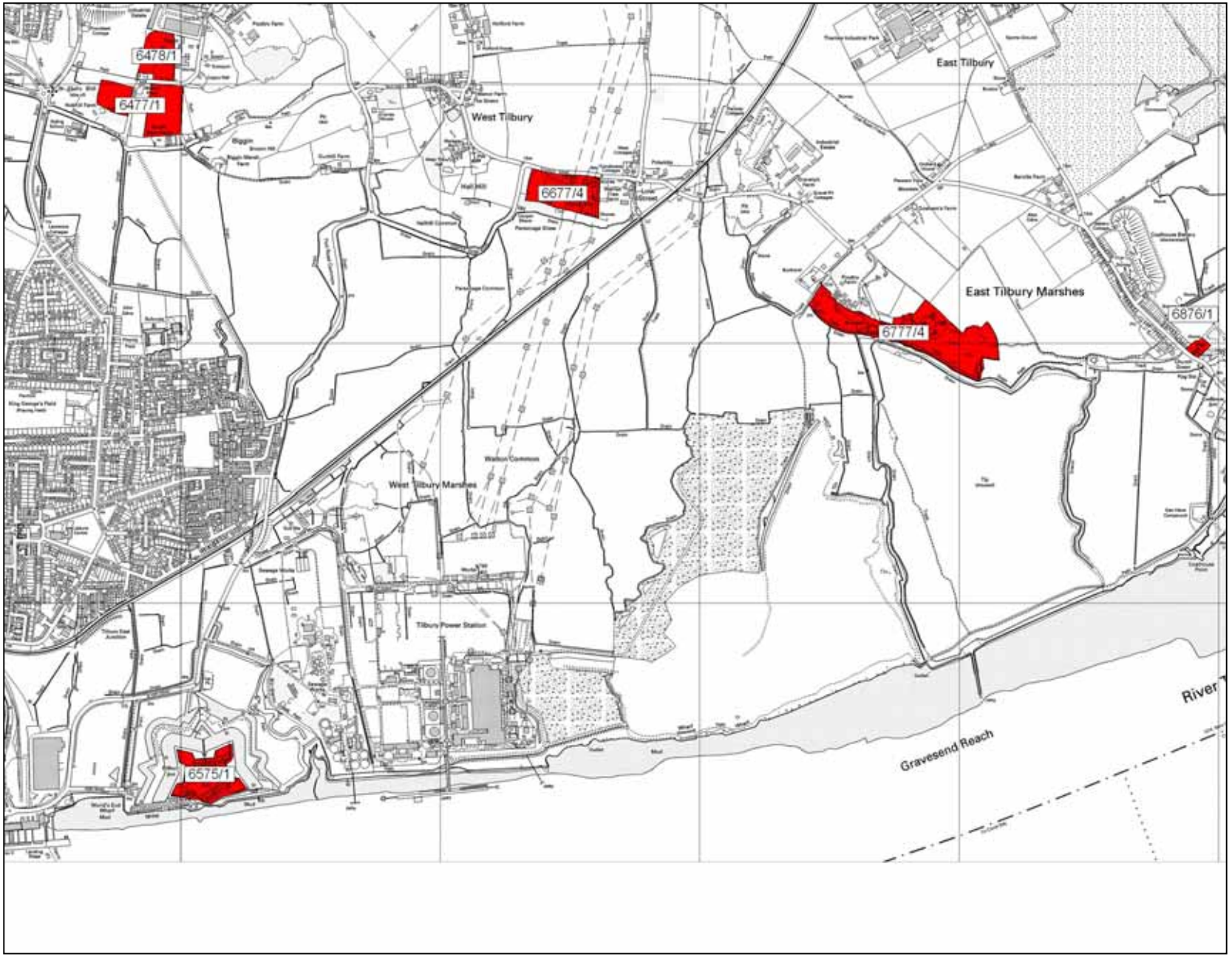
Potential Local Wildlife Sites Map 1 of 8



Potential Local Wildlife Sites Map 2 of 8



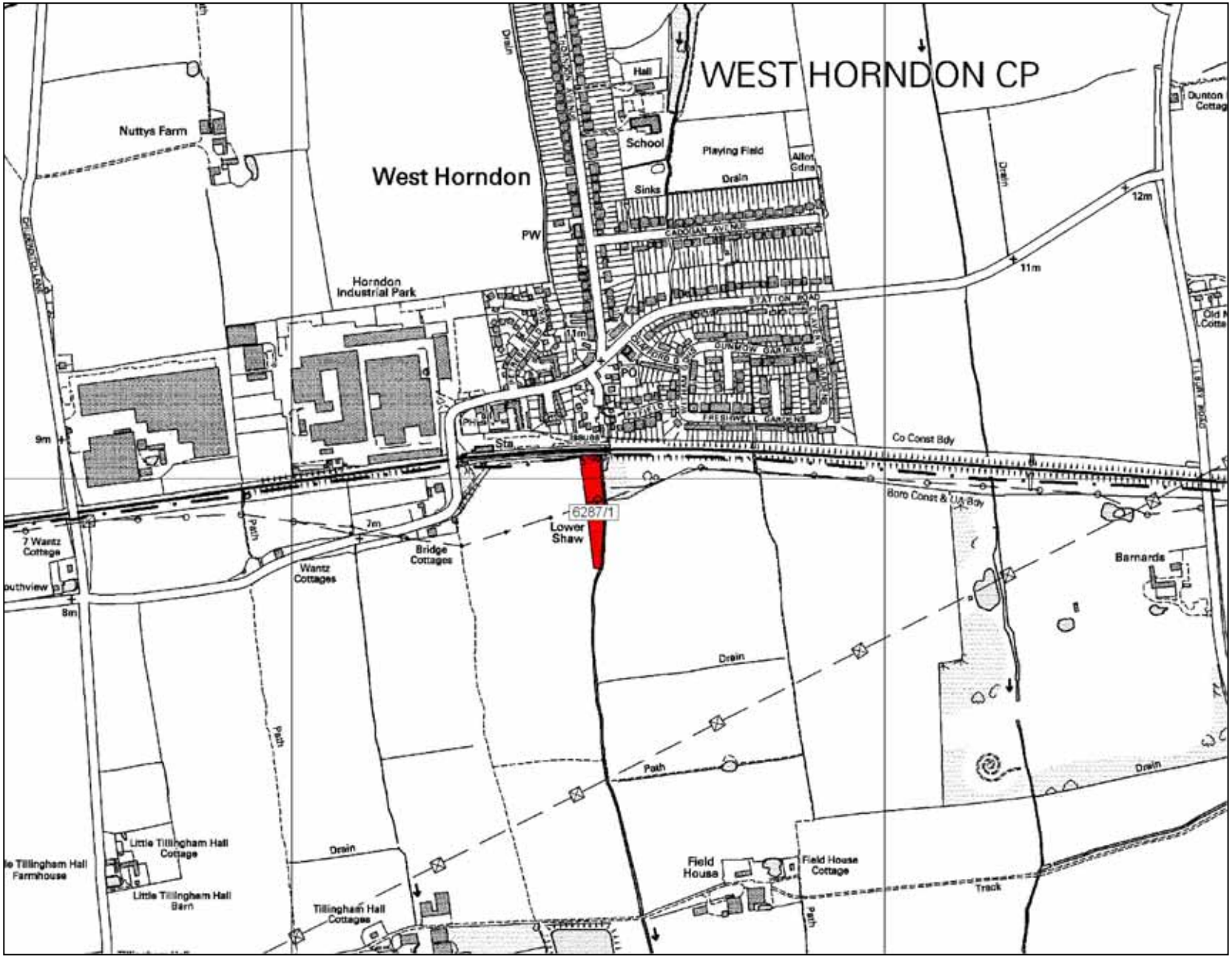
Potential Local Wildlife Sites Map 3 of 8



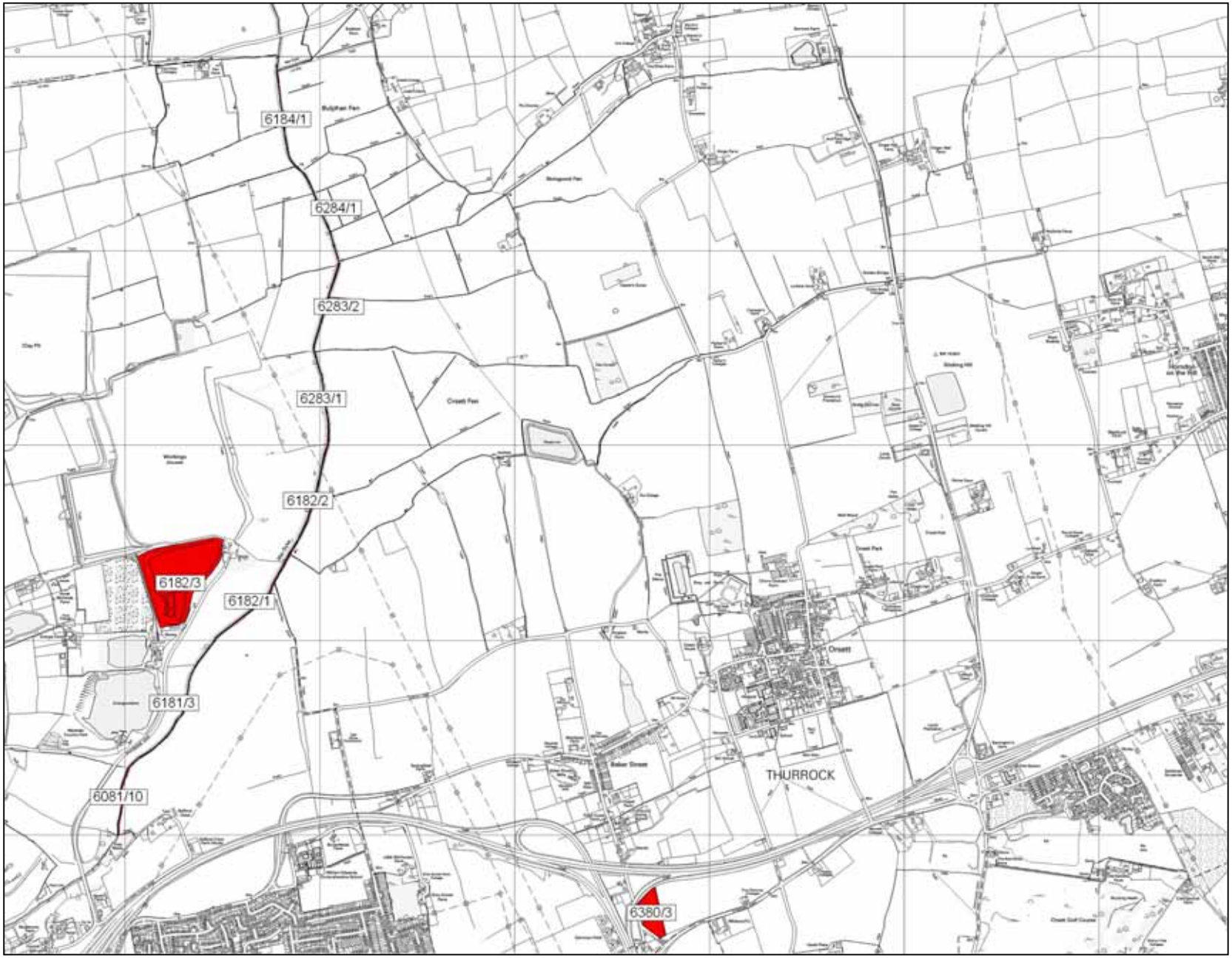
Potential Local Wildlife Sites Map 4 of 8

Potential Local Wildlife Sites Map 5 of 8

Potential Local Wildlife Sites Map 6 of 8



Potential Local Wildlife Sites Map 7 of 8



Potential Local Wildlife Sites Map 8 of 8

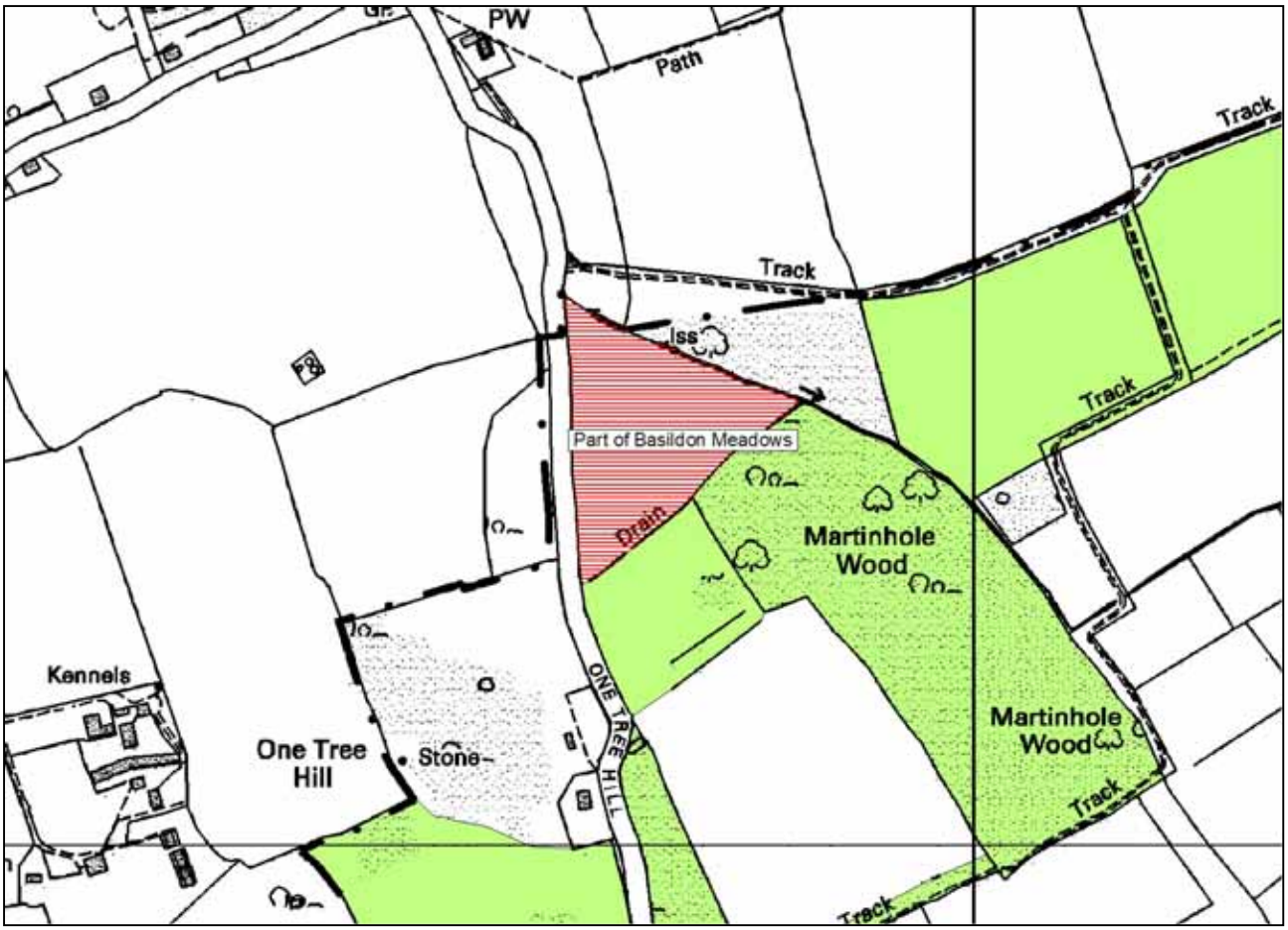
APPENDIX 8

A REVIEW OF THURROCK SSSIs WITHIN THE LOCAL WILDLIFE SITE FRAMEWORK

N.B. The maps included here are illustrative only. They should not be taken to represent the legal boundary of these SSSIs. Natural England should be consulted on all matters regarding SSSIs.

Holehaven Creek is a purely inter-tidal SSSI and is not therefore included here, since Local Wildlife Sites in Essex only cover terrestrial and freshwater aquatic habitats. Similarly, where an SSSI overlaps both terrestrial and inter-tidal habitat, only the land inside the seawall is shown here.

SSSIs are denoted by red hatching. Adjacent Local Wildlife Sites are coloured light green.

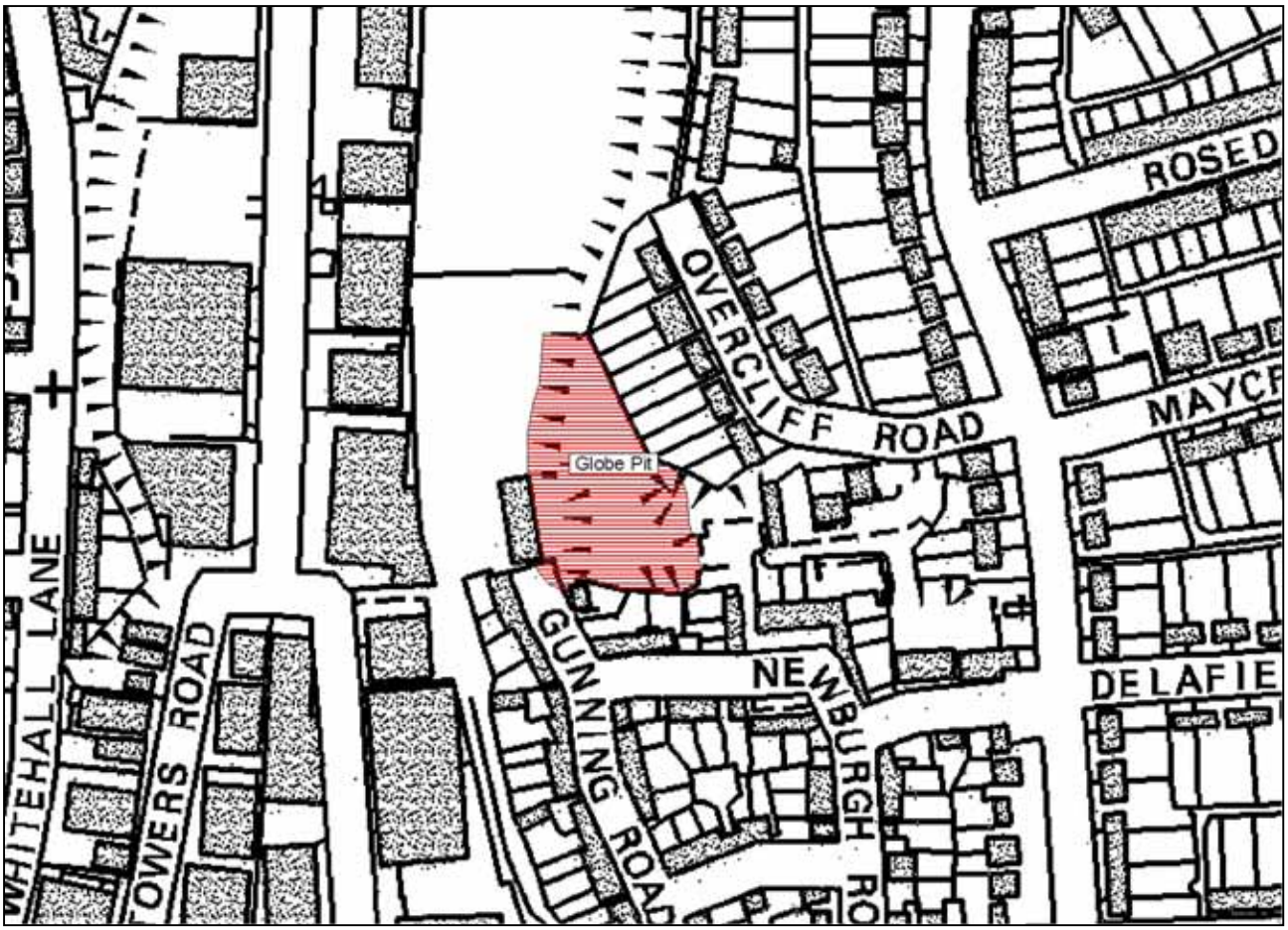


Basildon Meadows SSSI

This SSSI comprises three separate areas, only one of which lies in Thurrock. They are designated on account of their status as old, unimproved grasslands, with a scarce flora, which includes Green-winged Orchid (*Orchis morio*).

Relevant Local Wildlife Site Selection Criteria: HCr10; SCr13

At present, this site would qualify as a Local Wildlife site for the same reason as its SSSI designation. Should the site deteriorate in quality so that it no longer qualifies as an SSSI, the level of deterioration would have to be assessed to see if still qualified as a Local Wildlife Site.



Globe Pit

N.B. The illustrated boundary here is provisional, with the southern boundary having been subjected to building work not shown on available SSSI boundary maps.

This is a geological SSSI. It is a largely wooded site, although there is some open ground to the south. Its southern perimeter may have undergone some recent disturbance as a result of adjacent building work.

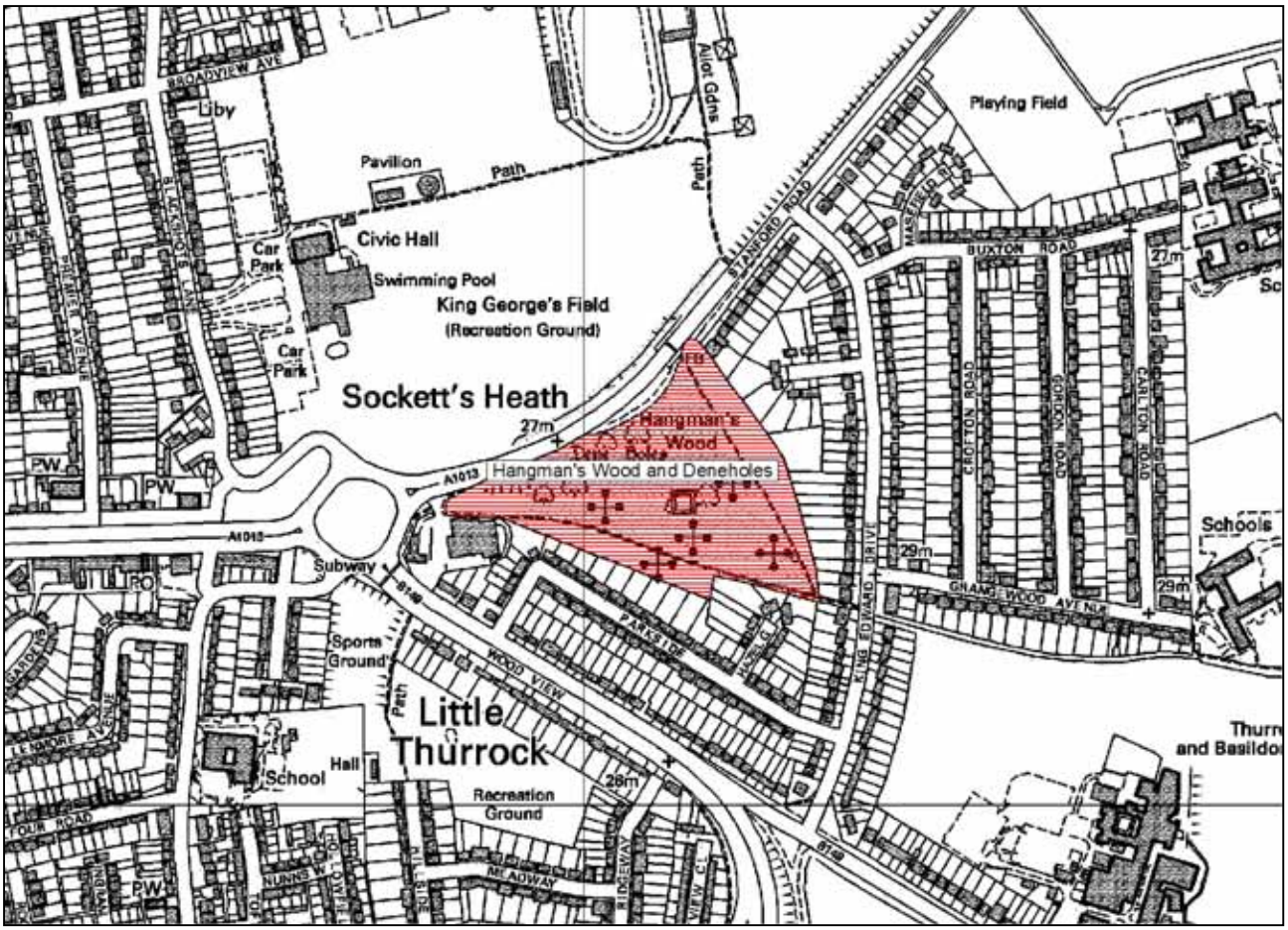
Relevant Local Wildlife Site Selection Criteria: Current data suggests that this site is only of local interest at present and it would not qualify as a Local Wildlife Site. However, its invertebrate populations may be worthy of closer inspection.

Grays Thurrock Chalk Pit

This old chalk quarry is designated as an SSSI on account of its flora and invertebrates associated with base-rich habitats.

Relevant Local Wildlife Site Selection Criteria: HCr15; SCr11; SCr12; SCr13

This important nature reserve would currently qualify for inclusion within the Local Wildlife Site network on account of its chalk flora and invertebrate populations. It may also qualify under amphibian and/or reptile populations, but this would require further survey work.



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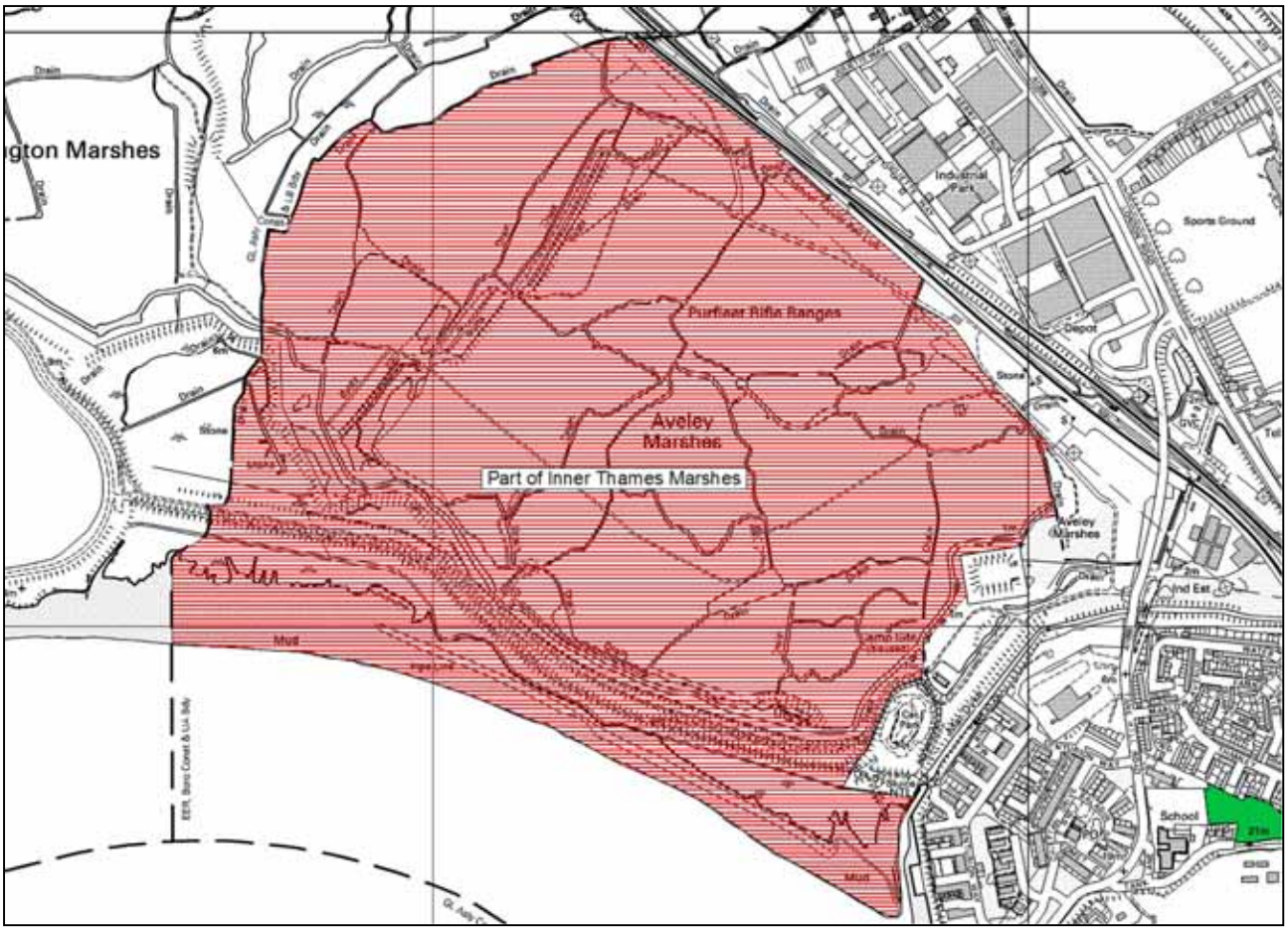
Hangman's Wood and Deneholes

This site is an SSSI on account of its wintering bat population within the Deneholes. This is one of only a very few such over-wintering bat sites known in the county.

Relevant Local Wildlife Site Selection Criteria: HCr1(a); SCr6

Even if the bat populations were to decline, to the point where SSSI status is withdrawn, the wood is likely to become a Local Wildlife Site on account of its ancient woodland status. In this respect, the wood is rather degraded, with little old woodland ground flora and little understorey, but positive management and appropriate under-planting with shrubs should improve the quality.

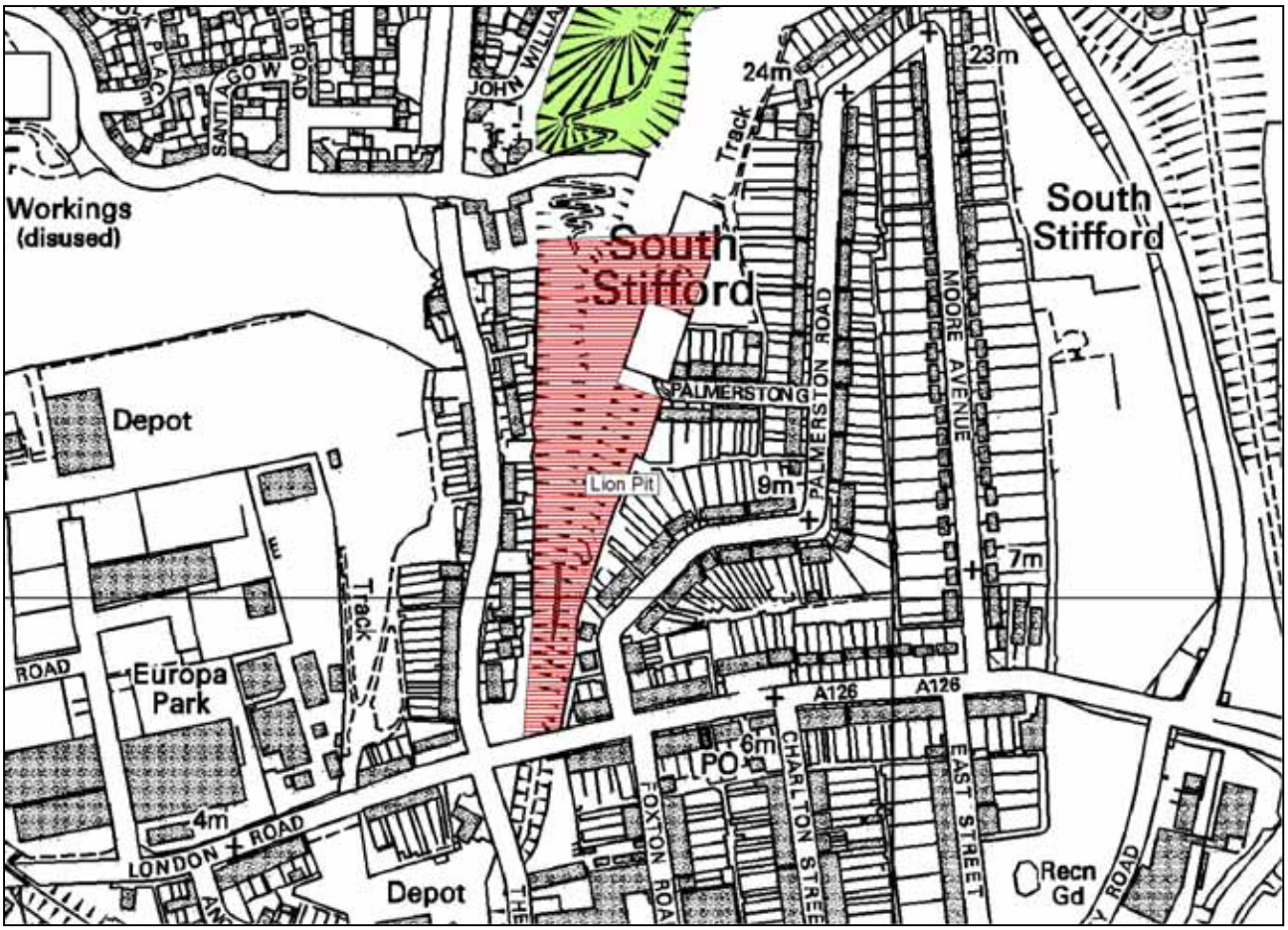


Inner Thames Marshes

The Aveley Marshes section of this site lies in Thurrock. The SSSI has been notified because of its importance for breeding birds, over-wintering wildfowl and waders, nationally rare and scarce flora and invertebrates.

Relevant Local Wildlife Site Selection Criteria: HCr16; SCr10; SCr12; SCr13

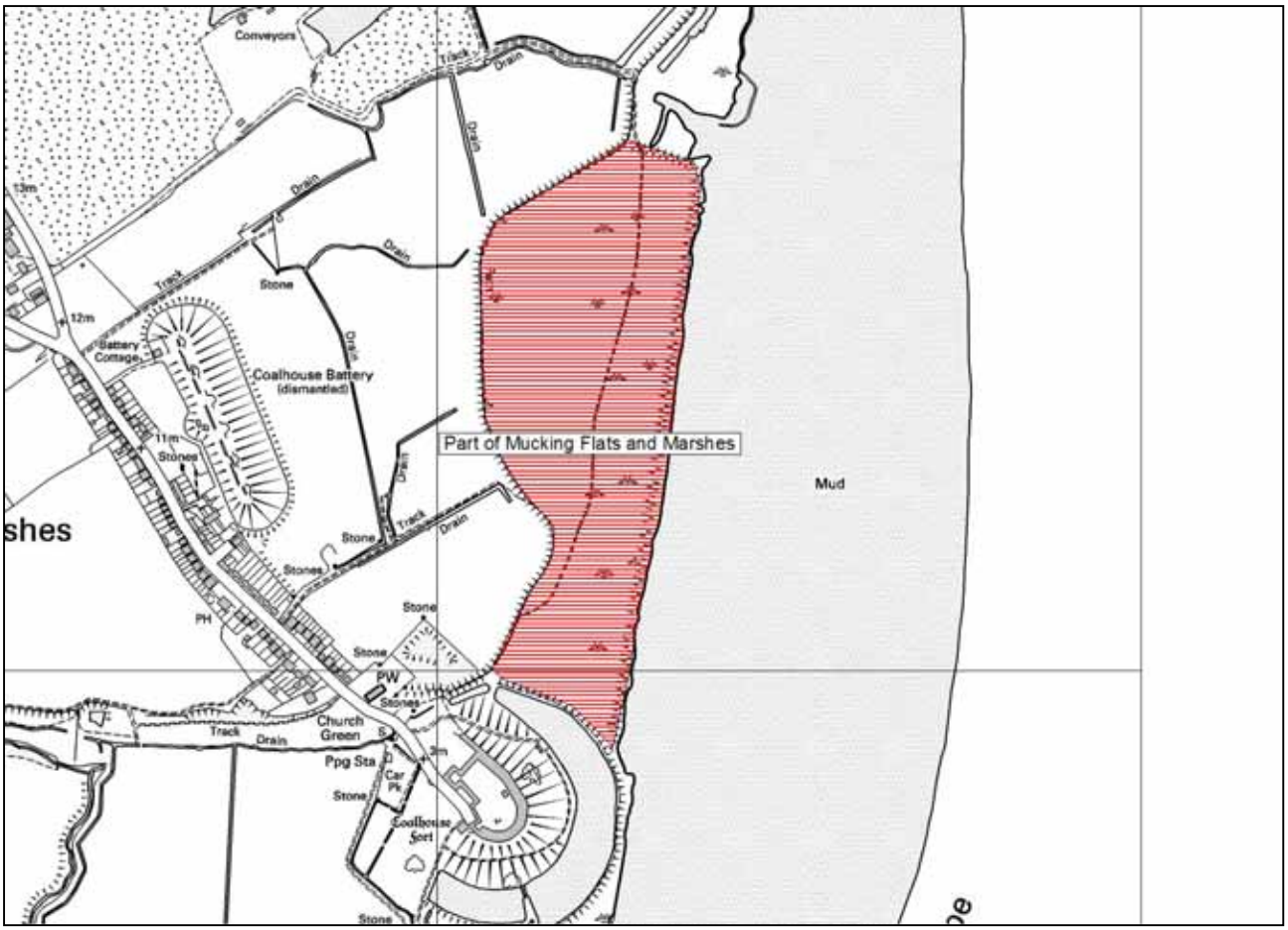
The Local Wildlife Site network seeks to conserve all remaining fragments of coastal grazing marsh, so this site would have to deteriorate quite spectacularly in order for it to not qualify for Local Wildlife Site status. It is of importance for its Water Vole populations, as well as the features listed above.



Lion Pit

This is a geological SSSI.

Relevant Local Wildlife Site Selection Criteria: Current data suggests that this rather wooded area does not qualify as a Local Wildlife Site, although its invertebrate populations would be worth investigating further. It suffers greatly from the dumping of domestic waste over boundary fences and general recreational disturbance.



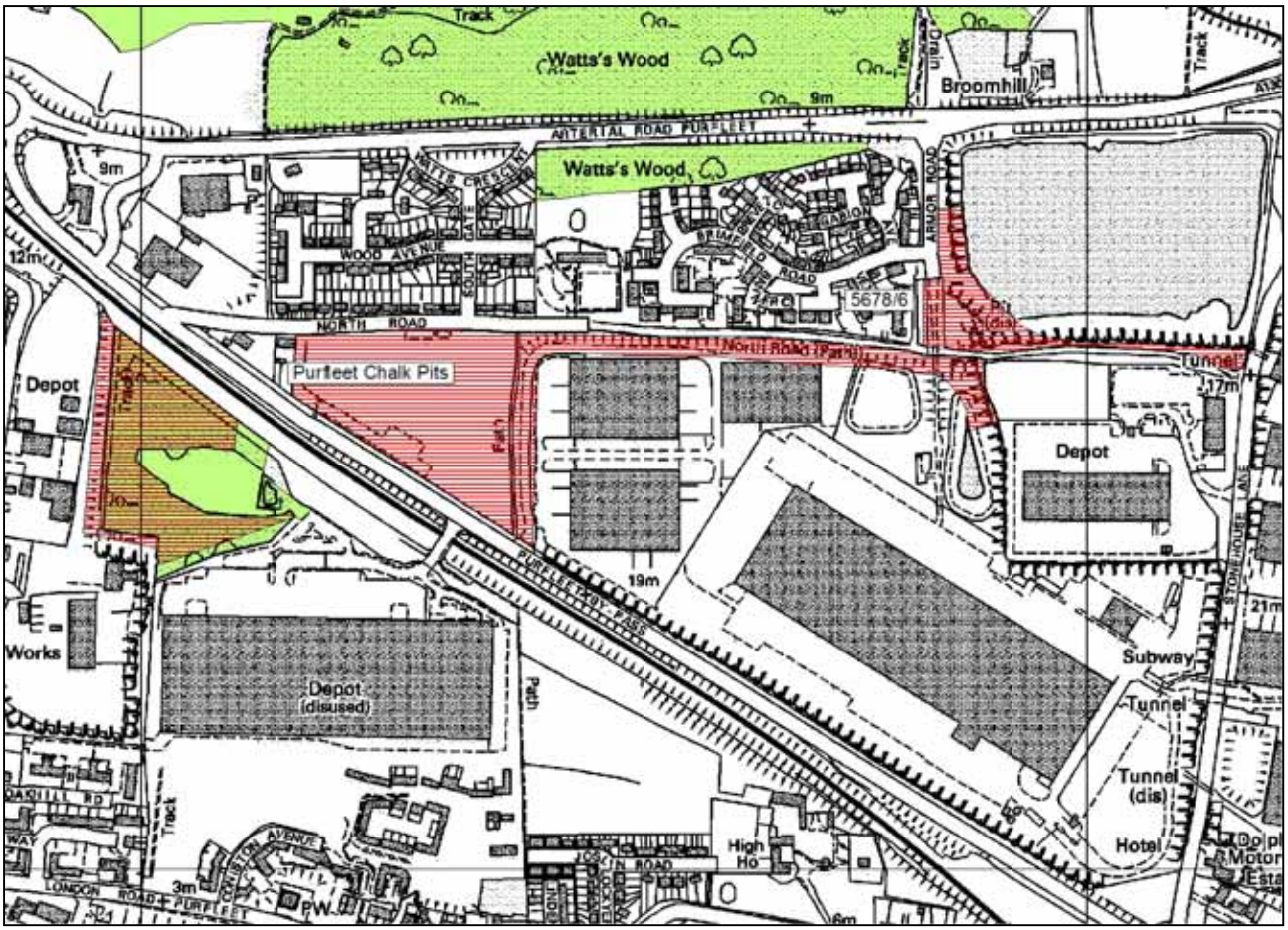
Mucking Flats and Marshes

This old silt lagoon, created as a settling area for dredged marine material, was included within the SSSI on account of its value to coastal wildfowl and waders. The lagoon is now disused, drying up and becoming vegetated, to the point where Natural England now consider it to be in an unfavourable condition.

However, recent survey work has shown the site to now support an exceptional invertebrate assemblage that is in itself worthy of conservation, in conflict with its original SSSI qualification.

Relevant Local Wildlife Site Selection Criteria: SCr11; SCr12

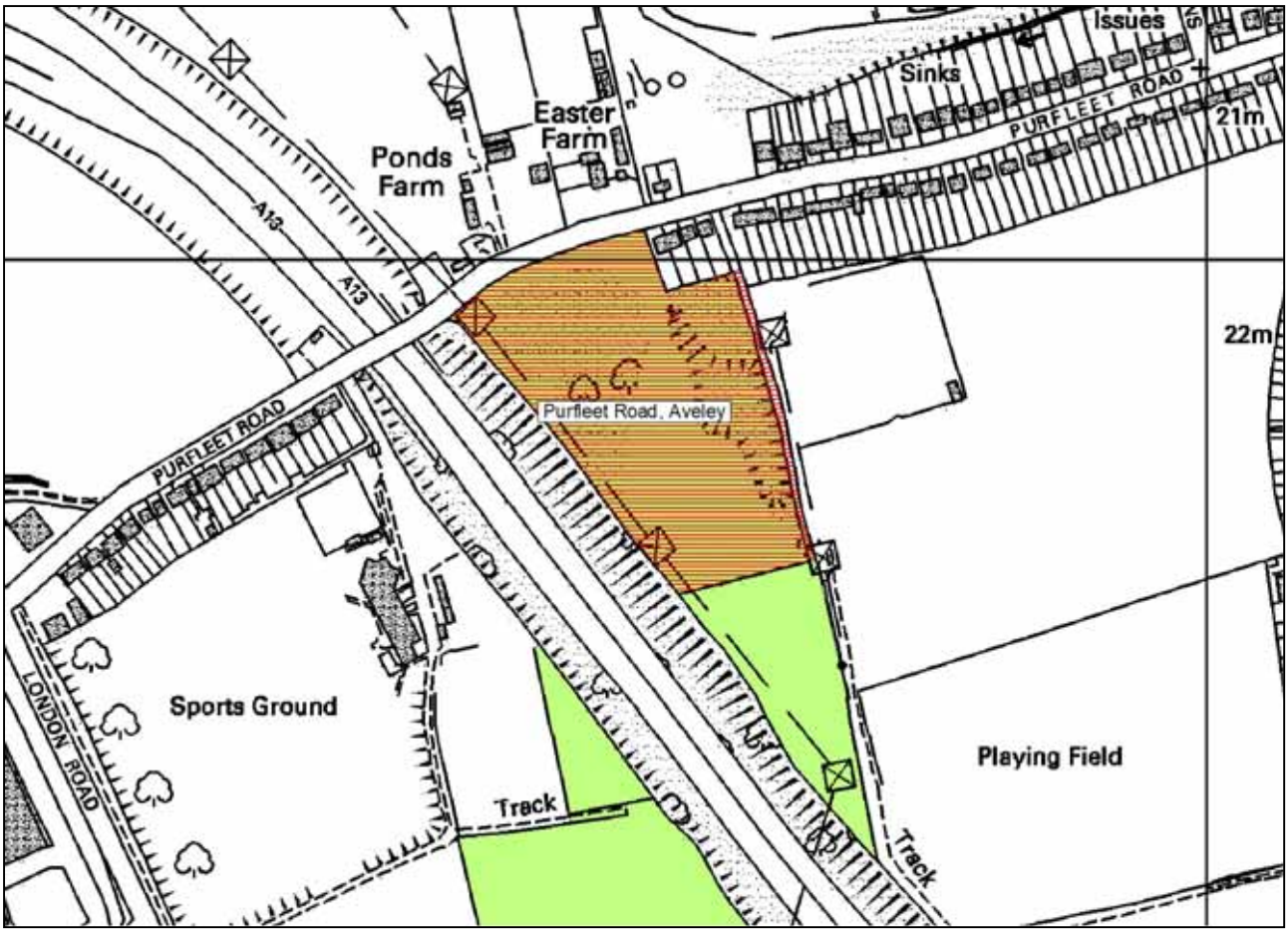
If de-notified as an SSSI on the grounds that it no longer has any importance for coastal wildfowl and waders, this lagoon would certainly qualify as a Local Wildlife Site for its invertebrate populations. If remedial work is undertaken to improve the site for coastal wildfowl and waders, much of this invertebrate interest would be lost, perhaps until the site dries out once more.



Purfleet Chalk Pits

This is a geological SSSI, but part of the site overlaps with the Purfleet Pit Local Wildlife Site (Th5), identified on the grounds of its invertebrate populations.

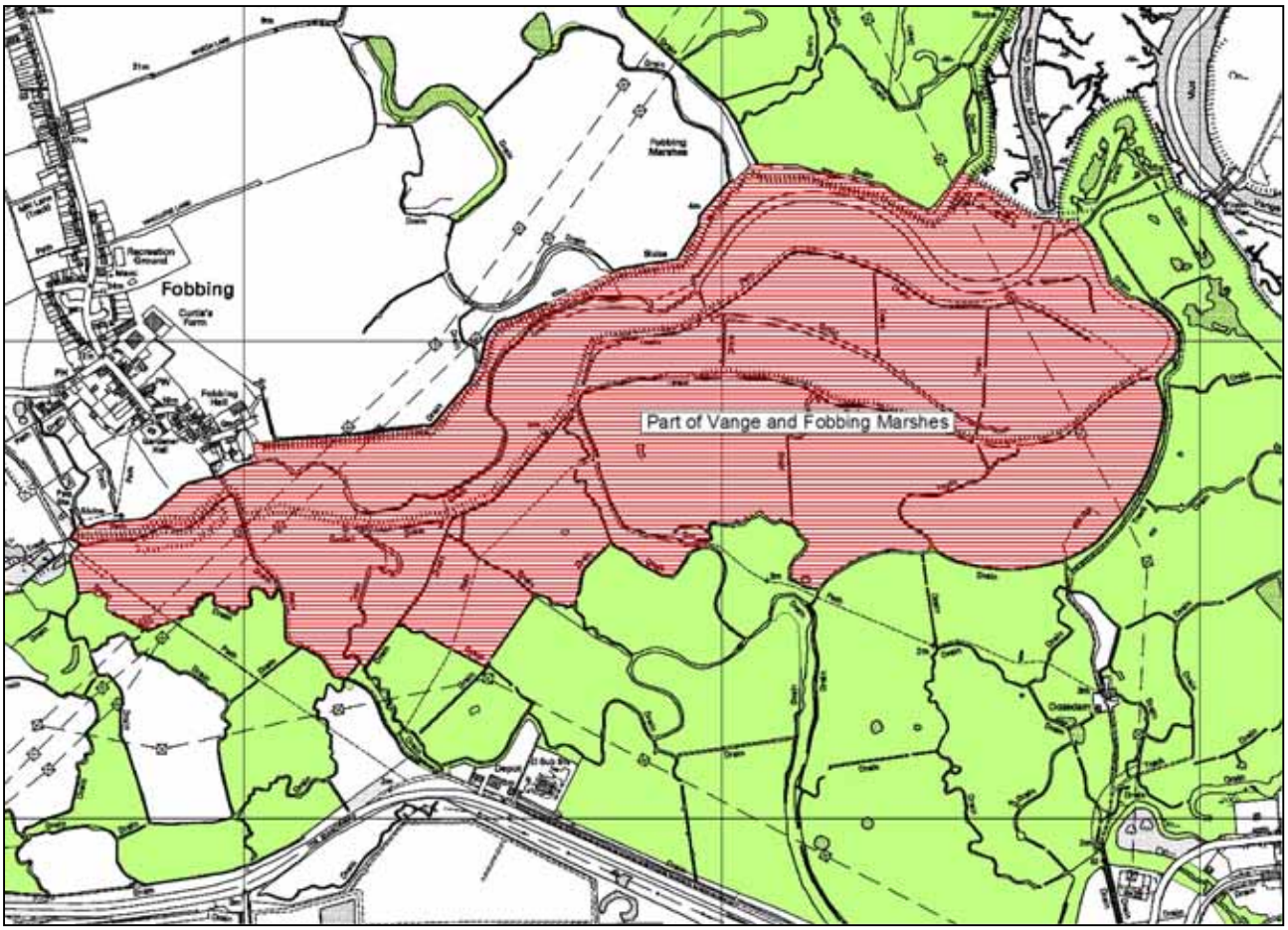
Relevant Local Wildlife Site Selection Criteria: Other than the land already identified within a Local Wildlife Site, insufficient data is held to make judgements on the remaining land. There is likely to be some interest within the flora and invertebrate populations that would be worthy of closer investigation.



Purfleet Road, Aveley

This is a geological SSSI, but is virtually all included within the Jill's Field Local Wildlife Site Th3, (other than a very small strip of land along the eastern boundary).

Relevant Local Wildlife Site Selection Criteria: Already covered by Local Wildlife Site Th3.



Vange and Fobbing Marshes

Only part of this SSSI lies within Thurrock. It is designated on account of its coastal grazing-marsh flora, with additional invertebrate interest.

Relevant Local Wildlife Site Selection Criteria: HCr16; SCr12; SCr13

The Local Wildlife Site network seeks to conserve all remaining fragments of coastal grazing marsh, so this site would have to deteriorate quite spectacularly in order for it to not qualify for Local Wildlife Site status. The identification would be on grounds of the grazing-marsh habitat, plus scarce and rare invertebrates and flora.

West Thurrock Lagoon and Marshes

This old lagoon, created as a dump for pulverised fuel ash from the adjacent power station, was included within the SSSI on account of its value to coastal wildfowl and waders. The lagoon is now disused, drying up and becoming vegetated, to the point where Natural England now consider it to be in an unfavourable condition.

However, recent survey work has shown the site to now support an exceptional invertebrate assemblage that is in itself worthy of conservation, in conflict with its original SSSI qualification. The flora is also of interest.

Relevant Local Wildlife Site Selection Criteria: HCr22; SCr11; SCr12; SCr13?

If de-notified as an SSSI on the grounds that it no longer has any importance for coastal wildfowl and waders, this lagoon would certainly qualify as a Local Wildlife Site for its invertebrate populations. It is also of interest for the several stands of reed within the mosaic of habitats and the flora, which includes chalk grassland species and saltmarsh specialists. If remedial work is undertaken to improve the site for coastal wildfowl and waders, much of this invertebrate interest would be lost, perhaps until the site dries out once more.