KNEPP CASTLE DEER PARK

WEST GRINSTEAD, WEST SUSSEX

Restoration Management Plan

May 2000

COLSON STONE

• PRACTICE •

COLSON STONE PRACTICE
1a QUEENS ROAD
WIMBLEDON
LONDON SW19 8NG

TEL: 020 8944 9401
FAX: 020 8944 9402
cs@colsonstone.co.uk

LANDSCAPE ARCHITECTURE, LAND MANAGEMENT
ENVIRONMENTAL PLANNING, ECOLOGY & CONSERVATION
HISTORIC LANDSCAPE CONSERVATION

OVERALL REPORT CONTENTS

SECTION 1 - CONTENTS

SECTION 1 - LIST OF ILLUSTRATIONS

SECTION 1

DESIGN PROPOSALS AND OUTLINE MANAGEMENT PLAN

Summary

Deer Park

The study area forms a part of the Knepp Castle Estate, near Shipley in West Sussex. It extends to 479 acres in total, comprising woodland, a very large mill pond, and some limited areas of grassland. The remainder of the site, some 204 acres, are in intensive arable cultivation.

The estate originated as a deer park surrounding a Norman Castle. Confiscated by the crown in the early 13th century, it was held and hunted by King John for eight years, but was then returned to private hands until it was disemparked some time in the 16th century. At the beginning of the 19th century a new castellated mansion, designed by John Nash, was built in the center of the estate. It was sited to provide sweeping views of the enormous Mill Pond, and long vistas southwards to the remains of the original castle and to a distant horizon formed by the scarp slope of the South Downs. The new castle stood as the picturesque center-piece of a landscape that utilised and incorporated the existing features of the site into a simple design comprising woodlands, pleasure grounds and parkland.

Sadly, decades of intensive farming during the 20th century, coupled with the natural processes of decay have obscured this design. The lake has shrunk to less than half of its original size as siltation allows more and more of the open water to revert to marsh, reed bed and carr. The long views have become overgrown and virtually all of the parkland area has been ploughed up and given over to arable use.

The current owner, Mr Charles Burrell, is the 10th generation of his family to reside at Knepp. It is his ambition, not only to restore the appropriate setting to Nash's Castle, but also to go some way towards recreating the setting for the original Norman structure, by converting this core area of the estate back to its original function - as a deer park.

Knepp Mill Pond

The Mill Pond was at one time the largest artificial water body in the south of England. Created by the formation of a clay dam across a shallow stream valley, the pond might even predate the Norman Castle. Its existence was central to the local iron industry, providing a head of water to drive a water wheel. When the iron industry went into decline, the pond remained as a local feature, and formed a key feature in determining the siting of Nash's castle.

The sheer size of the Pond means that its restoration will be an enormous project, but there can be little doubt that it is absolutely necessary and needs to be carried out as a matter of urgency. Without it, there is a very real danger that this huge, historic expanse of water will soon be lost.

Ecology

A variety of habitats exist within the study area, supporting a range of flora and fauna, although the abundance of land in arable cultivation means that very little grassland habitat remains. The proposals for the deer park will require the cessation of arable cultivation within the site resulting in a vast increase in the area of permanent pasture. This will be of very significant ecological benefit.

The Mill Pond attracts wildfowl, both to over-winter and to breed, and supports a notably large Heronry. Its margins are valuable habitat to a large number of dragonfly species, as well as to reptiles and amphibians. Its wildlife value is recognised by its designation as a Site of Nature Conservation Importance in the Horsham District Local Plan. The dredging of the lake will ensure that this habitat is greatly enhanced.

Public Access

The current owner recognises how attractive and important the deer park and restored lake would be to the local, as well as to the wider community, and he intends to increase its accessibility. The existing public rights of way will be maintained and appropriate gates will be installed where footpaths enter the park. Additional way-marking will be provided and permissive open access will be allowed over the fields surrounding the Old Castle ruin. In addition, the present program of public open days will be expanded and local schools and special interest groups will be encouraged to visit the new park. New routes for guide walks will be devised, and information packs produced to help people to interpret and appreciate the historical and ecological importance of the site.

Countryside Stewardship

The creation of the deer park and the restoration of the Pond will clearly be a costly exercise, added to which there will be a considerable shortfall in income as a result of taking such a large area of land out of arable production.

This report has been prepared by the Colson Stone Practice, on behalf of the Knepp Castle Estate, in support of an application for the site to be entered into the Countryside Stewardship Scheme. It is hoped that, if successful, the grants available for the management of the new areas of grassland, would go some way towards making up some of this shortfall. Assistance is also being sought, in the form of capital payments, towards the cost of the fencing and other works required to establish the new park, as well as towards the cost of the dredging of the Pond.

Individually, the creation of the deer park and the restoration of the pond would be valuable projects. But taken together, and combined with the proposals for improving public access to the site, they represent a magnificent opportunity to create significant improvements to the aesthetic, historical and ecological value of the landscape at Knepp.

However, it is highly unlikely that the owner could contemplate such a project were it not for the potential management funding available from the Countryside Stewardship Scheme.

Furthermore, the owner could not afford to undertake the restoration of the Mill Pond were it not for the possibility of assistance with capital funding from the Scheme.

Therefore, if these unique proposals are to be realised and the distinct benefits to the landscape achieved, it is crucial that this project is approved and entered into the Scheme.

1.1 THE STUDY

1.1.1 Site

Knepp Castle is located in West Sussex, between Horsham and Worthing (refer Figure 1). The study area, shown on figure 2, forms part of the Knepp Castle Estate and comprises most of the land bounded by the A24, A272, B2139 and the River Adur.

The Castle and its grounds has been in the ownership of the Burrell Family since before it was built in 1809. The site contains the Knepp Mill Pond which at one time was reputed to be the largest man made body of water in the south east of England.

1.1.2 The Original Brief

This study was originally prepared in response to the brief sent on 1st March 1996 and subsequently clarified by the Colson Stone Partnership's (now Colson Stone Practice) Offer of Services dated 29th March 1996 and amended on the 10th May 1996. The cost of the study was grant aided as a Special Project by MAFF.

The principal purposes of the study were to:

(i) Document the historical development of the designed landscape from available archival and field evidence;

(ii) Identify and record the surviving field archaeology and historic landscape features and evaluate their heritage value;

(iii) Identify and map the distribution of wildlife habitats and assess their nature conservation value;

(iv) Review existing public access arrangements and examine ways the existing public enjoyment and appreciation of the site can be enhanced;

(v) Present design proposals for enhancing the aesthetic and amenity value of the landscape taking account of the historic and wildlife value of the land forming the proposed deer park;

(vii) Present proposals for the repair and renewal of the surviving features of the historic landscape, taking into account the potential benefits to wildlife and amenity value;

(viii) Present the programme of work required to realise the proposed deer park in such a way that it may form the basis of a 10 Year Countryside Stewardship Scheme.

Following completion of the report in May 1997, the Estate decided not to proceed with an application to be entered into Countryside Stewardship in that year. However,

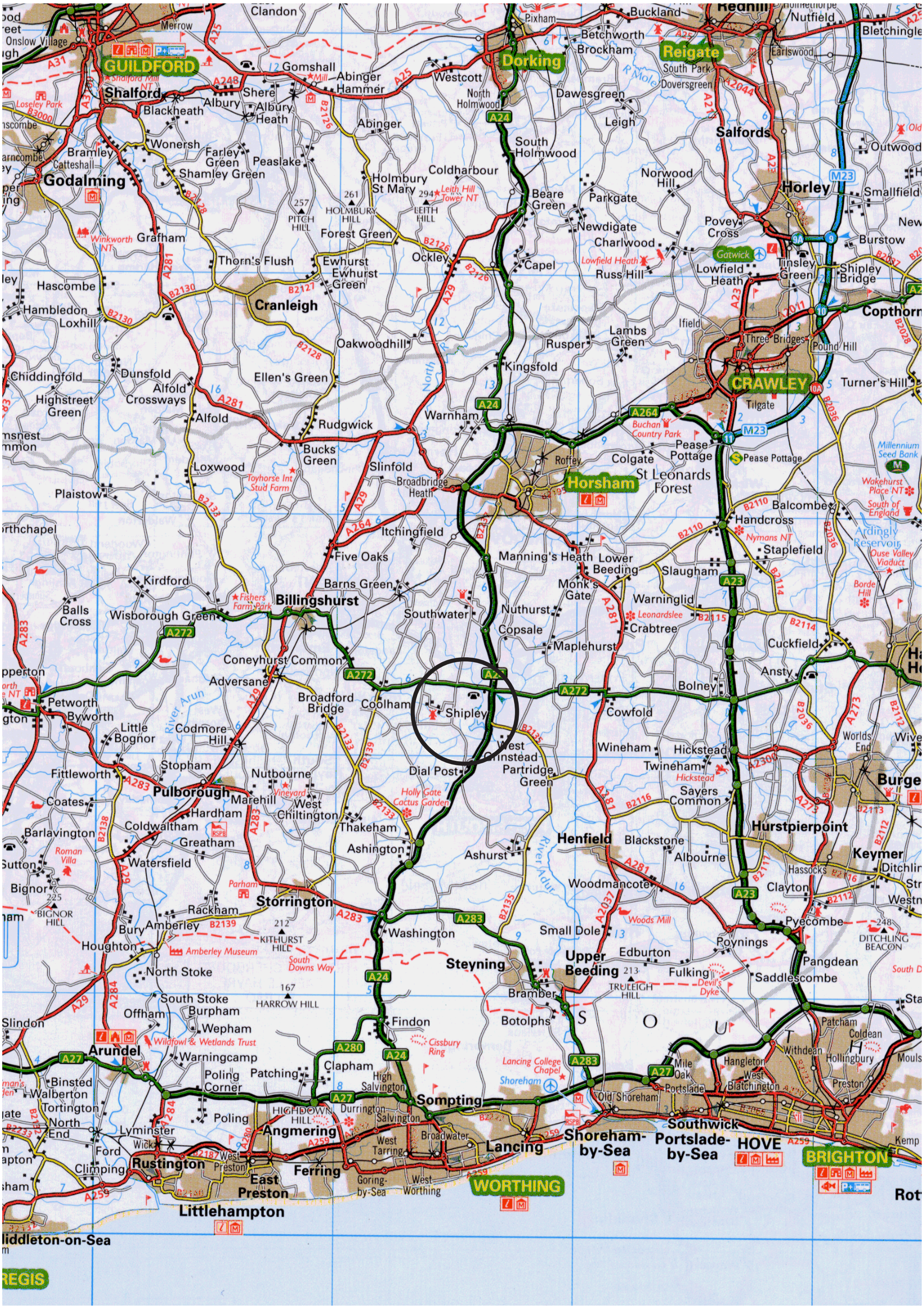


Figure 1
Location

Figure 2
Study Area

at the end of 1999, the proposals were revisited and as a result of changed circumstances in agriculture generally, the decision was taken to submit an application for entry into the scheme in 2000.

The Colson Stone Practice were commissioned in January 2000 to carry out a review of the scheme and all of the supporting information and to update and alter this as necessary.

The current application has been largely based upon the original scheme devised 3 years ago but incorporates some minor revisions.

1.2.3 Methodology

The majority of the research and field work was undertaken in the period August to November 1996. Many of the estate records were lost in a fire in 1904. Historical research has, therefore, involved studying the limited surviving records held at the estate and records held elsewhere, including the British Museum (Burrell Collection), British Library and West Sussex Records Office at Chichester.

The main source of information on the history of the landscape has been historical maps which have been found to exist for the main periods of development.

During the initial study period several meetings were held at the Estate Office with the owner, the land agent and a representative from ADAS (Robbie Craig Esq.). Further meetings have been held with representatives of MAFF and FWAG during the process of updating the scheme.

1.2 PLANNING CONTEXT AND DESIGNATIONS

The Knepp Castle Estate falls within the area covered by the Local Plan for Horsham District, Volume Three Southern Area, which was approved for deposit in March 1994.

The study area is covered by the following policy areas and planning designations which are shown on Figure 3:

(i) The whole of study area falls within the Sussex Downs Area of Outstanding Natural Beauty.

(ii) The park is listed Grade II in the English Heritage Register of Parks and Gardens of Historic Interest in England.

(iii) Knepp Mill Pond has been identified as a Site of Nature Conservation Importance by the Sussex Wildlife Trust. The site identified by the Trust also includes The River Adur and Lancing Brook at Shipley.

(iv) Knepp Castle is a Grade II* listed building.

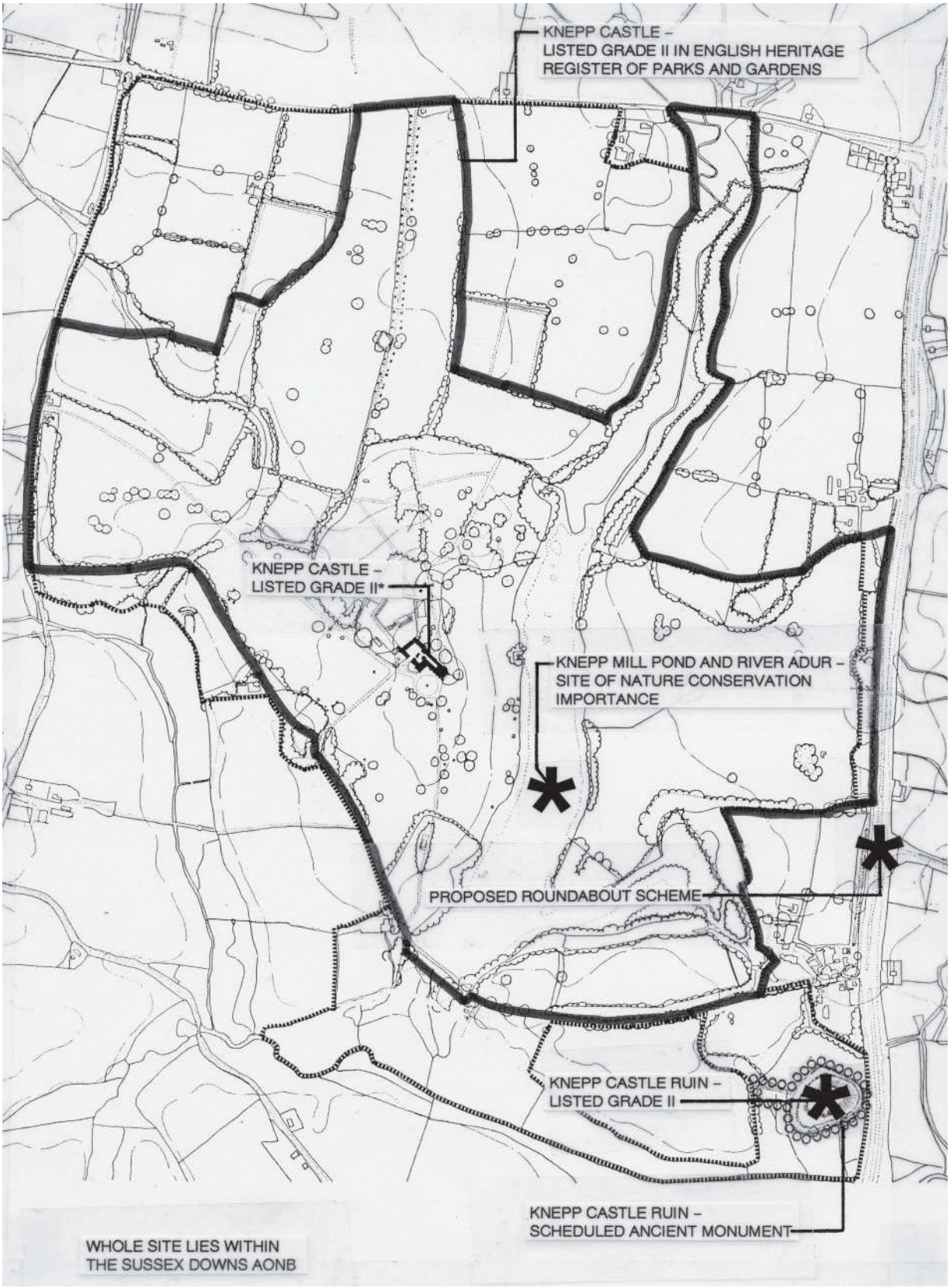


Figure 3
Planning Context

(v) Knepp Castle Ruin is a Grade II listed building and Scheduled Ancient Monument.

The site is not within a Conservation Area and there are no Tree Preservation Orders on any of the trees or woodland within the study area.

There is a highways proposal to improve the junction of the B2135 with the A24 which will involve the construction of a roundabout on the eastern edge of the Park to the north east of Floodgates Farm.

The majority of the current study area is covered by a Section 106 agreement, dated 17th February 1995. This agreement was made in advance of a planning application for the construction of a golf course on the site. It was to come into force when planning permission was granted. However, the application was not submitted.

1.3 LANDSCAPE AND PUBLIC ACCESS

1.3.1 Physical Characteristics

The land forming the study area is gently undulating, ranging in elevation from approx. 10 m above ordnance datum (AOD) in the south to just over 25m AOD in the vicinity of Hill House Farm. The land drains generally from north to south into the River Adur through the Knepp Mill Pond and the small valley running south of Spring Wood (refer to Figure 4).

Three sides of the study area are bounded by roads. The dual carriageway forming the A24 generates a degree of noise intrusion for the Castle, the intensity of which is dependant on the direction of the prevailing wind and weather conditions. The relatively busy A272 also generates noise intrusion within the northern section of the site but its effect on the castle is minimal. The B2224 road along the western boundary of the site is lightly trafficked and causes modest noise intrusion.

1.3.2 Visual Assessment of the Landscape.

Siting of the castle and the designed parkland.

It is clear that Nash carefully sited the castle on an elevated part of the site to give prominence to the building and also take best advantage of the views from the castle over the surrounding countryside. The orientation of the castle was clearly dictated by Nash's desire to obtain the best views of the Knepp Mill Pond and also create the illusion from the castle of a great river flowing through the park. He intended to provide a view to the ruin of Old Knepp Castle and long views to the South Downs.

By the time Nash was commissioned by Sir Charles Burrell to design the Castle in 1809, his partnership with Humphry Repton had already broken. Nevertheless George Repton, one of Humphrey's sons, still worked in Nash's office and is known to have

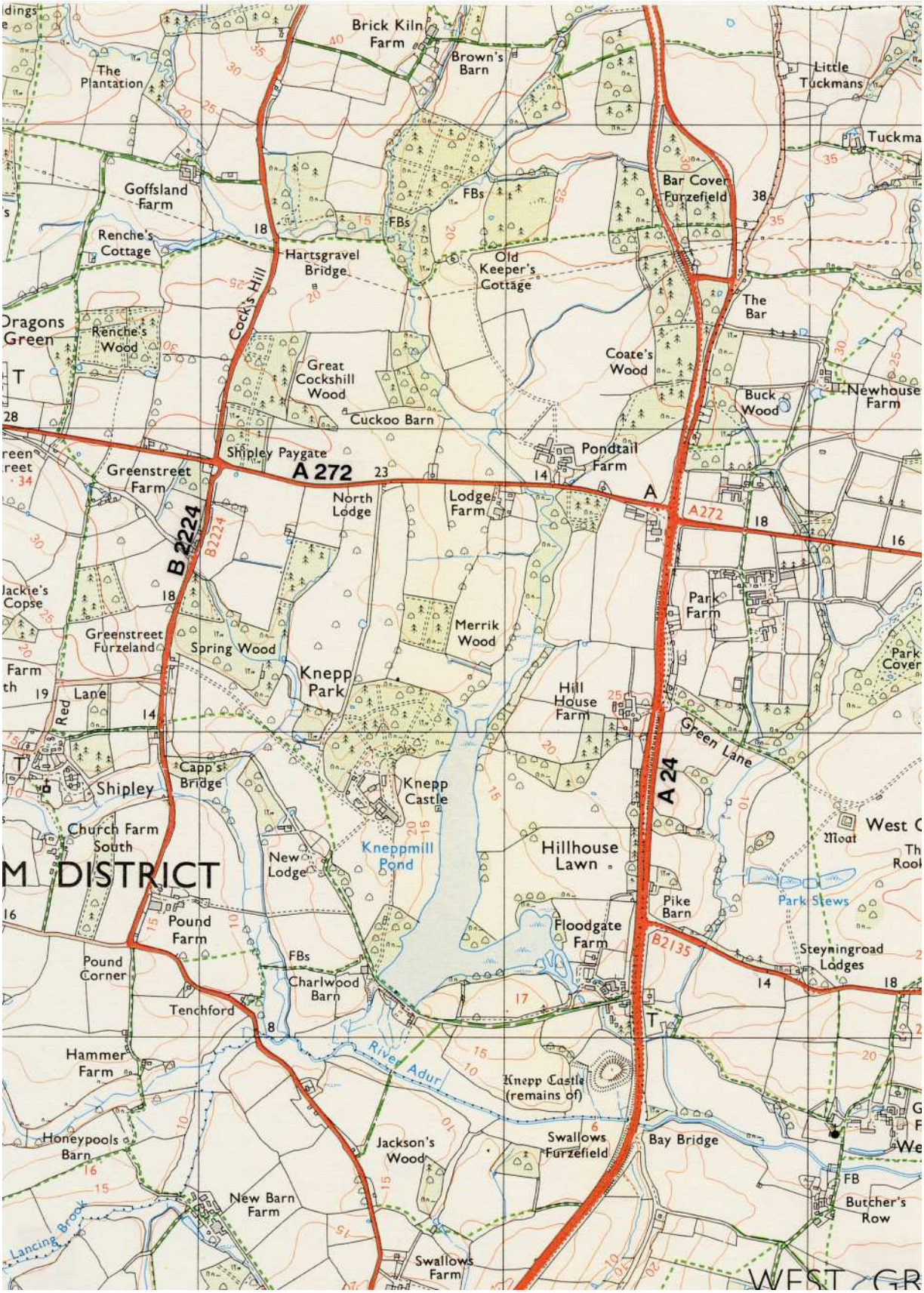


Figure 4
Site Characteristics

prepared designs for the adjoining West Grinstead Park. It is, therefore, inevitable that the siting of the Castle and the layout of the grounds would be influenced by Repton's design principles, particularly as by 1803 he had published his *Observations on the Theory and Practice of Landscape Gardening, including some remarks on Grecian and Gothic Architecture.*

Water-colours of the park painted by Lady Burrell (c.1820) and by H.S. Syms (1848) depict the picturesque qualities Repton advocated. The red books, for which Repton became famous, show that his approach was to modify and adapt existing landscape features to achieve the picturesque effects he was seeking. Certainly, the ground at Knepp already contained many features that Repton would have incorporated and adapted in his designs.

The contemporary water-colours of the park show the 'borrowed' views of features beyond the park, such as the castle ruin and church spires, that were a characteristic feature of Repton's work. They also show columnar shaped trees scattered amongst the other parkland trees, particularly around the lake, which may have been planted with the intention of creating a more irregular outline to the treescape. Such trees provided vertical emphasis along the pond margins which would be reflected in the water.

Setting of the castle and visibility today.

The visibility to and from the study area is shown diagrammatically on figure 5. The siltation of the pond and the growth of new woodlands and scrub have had a dramatic impact upon the views from the castle, and this has effected its setting. Today, the view to the castle ruins is very narrow, and the feature is very difficult to make out (1 on figure 5). Scrub has totally obscured any visibility of the eastern arm of the pond leading to Floodgates, which had been a characteristic and prominent feature of the 19th century view. Likewise siltation and growth of scrub have severely foreshortened the view eastwards from the castle (2).

Trees in the perimeter belts and woodlands have grown up to obscure views to the spire of West Grinstead Church from ground level, although it is understood that this is still visible from the turret of the castle, as are long views to Shipley Church and Windmill. The South Downs form the horizon in southerly views (3), but storm damage to Changtonbury Ring in 1987 has reduced its prominence as an eye catcher

In much of the parkland area, views are contained within the site, with the horizon being formed by boundary woodland belts and plantations (4). There are only a few narrow glimpsed views out to the landscape beyond. The situation is similar in the northern part of the site where the internal woodlands and tall roadside hedgerows create barriers to screen views to the south, east and west (5). Although the northern boundary is marked by only a low hedge, the flat nature of the topography beyond the site means that the eye is generally not drawn in that direction.

Figure 5
Visual Assessment

Knepp Castle Park within the wider landscape.

The park is generally hidden from view from the surrounding countryside due to a combination of the topography and screening by woodlands, plantations, woodland shaws and hedgerows within the area (6). However, there are some distant views of the castle glimpsed through gateways and gaps in the roadside hedgerows alongside Pound Lane and Swallows Lane to the east and south of the study area (7).

1.3.3 Existing Public Rights of Way and Access Arrangements

A public footpath (No. 1794) crosses the parkland to the west of the Castle continuing eastwards along Castle Lane (refer back to Figure 2). Interestingly, the footpath is shown on the 1847 Tithe Map and part of its route follows one of the early drives across the park which has since fallen out of use. At the western end its route is marked by the line of large old oak trees crossing West Lawn, which are almost certainly the remains of an old hedgerow, which flanked the original track.

A bridle path (No. 1874) leads westwards along Castle Lane from the A24 as far as Knepp Mill Cottages were it turns southwards across fields towards Swallows Lane. Other than this there is no public access to the remainder of the study area

There are occasionally open days, when local schools are given guided tours around the site, and there have also been a number of public open days where demonstrations of woodland and estate management are put on. Furthermore, Polo Tournaments are held every weekend between the end of April and September. The general public are invited to 4 or 5 of these events each year.

1.4 THE HISTORIC AND DESIGNED LANDSCAPE

A detailed description of the historical development of the Knepp Castle Estate, together with an assessment of the surviving features of the historic landscape is given in Section 2 of this report - Historic Landscape Survey. This section provides a summary of that report. A chronology of the development of the historic landscape is provided at Appendix A.

1.4.1 Early Period - Norman Castle and Deer Park

The estate originated in the 11th century as a deer park surrounding a Norman castle. It is not clear whether or not the Mill Pond was is existence at this time. The land was confiscated by the crown in the early 13th Century and was held by King John for eight years, during which time he installed William Bloett as his steward and made several visits to hunt the deer there.

Shortly before he was killed in the civil war, the king wrote to Bloett ordering him to destroy the castle and move all of his possessions to the nearby castle at Bramber. However, it seems that this order was never carried out and the lands were handed back to the de Broase family by Henry III in **1218**. In **1326** the estate passed by marriage to John de Mowbray, whose descendant was created Duke of Norfolk in **1398**.

The land continued as a deer park until at least **1446**, but appears to have been disemparked by **1574**, because unlike other known deer parks in the region it is not shown on Saxton's Plan of Sussex published in that year.

1.4.2 16th Century Iron Industry

In **1568** there was an iron furnace on the site of what is now Floodgates Farm, which was being worked by the Caryll family on behalf of the Duke of Norfolk. If it had not been present beforehand, then Knepp Mill Pond would certainly have been formed during this period of iron working, as it would have been required to provide a head of water to power the hammers and bellows associated with the furnace.

The Carylls bought the estate from the Duke in **1573**, and although the furnace appears to have ceased production in **1604**, they held onto the land until **1752** when Elisabeth Caryll died, leaving no heirs.

1.4.3 18th Century Agricultural Landscape

In **1754**, John Wicker bought Knepp and immediately commissioned James Crow to prepare a detailed survey of the estate. This invaluable map still hangs in the Estate Office today. It confirms that the estate had indeed been disemparked, and that the area of the former deer park had been given over to agricultural use, divided into a number of largely rectilinear fields. It also confirms the existence of Knepp Mill Pond,

and shows the location of a Mill building at its southern end, with a windmill sited close-by.

The original castle is also present, made up of 4 sides forming a square shaped footprint. However, in **1762**, three of the sides were demolished to provide building material for works on the adjacent road (now the A24).

The Crow survey shows that the estate was unusually well served by roads, being located close to both north-south and east-west routes, the latter being quite scarce in the county. The existence of such a route, passing between the castle and the Mill Pond and linking the old furnace and the Mill buildings, may have increased the estate's strategic importance within the region.

1.4.4 Late 18th Century - The Burrell Family

John Wicker died in **1767** and after brief periods of ownership by a number of individuals, Knepp was eventually bought at auction by Sir Charles Raymond in **1787** for the price of £18,900. It comprised *'1600 acres of rich arable, meadow, pasture and woodland'* and the sale particulars stated that the Pond extended to 80 acres, and that close-by there was an *'elevated and beautiful spot, to build a house upon'*.

Sir Charles died in the following year and the estate was inherited by his daughter Sophia, whose husband Sir William Burrell became the 2nd Baronet. He was an enthusiastic amateur archaeologist, and as part of his work preparing the History of Sussex (which was never completed) he commissioned the artists Samuel Grimm and James Lambert to paint an extensive series of views around the county. Some of these were of Knepp and they show the rural character of the agricultural landscape that existed at the end of the 18th Century.

1.4.5 Early 19th Century Development of the Designed Landscape

In **1796** the estate was inherited by Sir Charles Merrick Burrell (3rd Bt) who, in **1808**, commissioned John Nash to design and build a new house overlooking the Mill Pond. In the same year Nash was commissioned by Sir Charles's brother Walter to design a new house for the neighbouring West Grinstead Park.

The Ordnance Surveyors Drawing (OSD) published 2 years before Nash's commission suggests that some form of parkland development had already been carried out at Knepp, on the east side of the Mill Pond, in advance of the construction of the house. It also shows the Mill Pond to be considerably smaller than it had been in the 1754 survey, and a new east-west road had been built across what had been its northern end.

There are no surviving records to indicate who designed the parkland around the new castle but it is probable that Nash did it himself, to a design influenced by the 'picturesque' principles advocated by his one time partner Humphry Repton. A survey by Christopher and John Greenwood in **1825** shows that in addition to the parkland to

the east of the Mill Pond, an area of park had been laid out on the western side of the pond forming the setting to the new castle. The Castle was sited to take best advantage of an elevated position, providing views across Knepp Mill Pond which created the illusion of a great river flowing through the park.

Although it is not shown on the map, possibly because of the small scale, it is probable that the woodland on the north side of the castle forming the pleasure grounds also existed at that time.

1.4.6 Mid 19th Century.

By **1847** when the Tithe Map for the Parish of Shipley was published, the area of the parkland had been extended westwards to include the West Lawn. The Pleasure Grounds were certainly in place, comprising an area of woodlands and substantial grassy glades traversed by an intricate network of sinuous paths. This is the only area of the estate which appears to have been laid out to a completely new design. Comparison with the Crow survey shows that the parkland area had been formed within pre- existing field boundaries, with the open parkland character being created by the removal of the internal hedges, with some of the parkland trees retained as free-standing specimens.

Approach drives to the castle from the south and west crossed the parkland, whilst two drives from the north crossed the area of farmland that lay to the north of the castle.

1.4.7 Late 19th Century

Sir Charles lived at Knepp until his death in **1862** when the estate first passed to Sir Percy (4th Bt) who died in the same year, and then to Sir Walter Wyndham Burrell (5th Bt) who held it until **1886** when it passed to Sir Charles Raymond Burrell (6th Bt).

Unlike the Tithe Map, the 1st edition O.S. map published in **1875** shows accurately the distribution of the trees and woodlands on the site and thus gives a better impression of the irregular arrangement of the parkland trees, some of which were retained from the former hedgerows and some of which would have been planted. It also shows that by this time the northern end of the pond had become silted up and was becoming overgrown with scrub. One of the drives from the north had been slightly realigned and planted with an avenue of trees and a lodge had been built at its northern end where it joined the public road. This might indicate that the North Drive had assumed greater importance than the others, becoming the principal approach to the castle.

1.4.7 20th Century

In **1899** Knepp passed to Sir Merrick Raymond Burrell (7th Bt), and in **1904** a large part of the castle was destroyed by fire. It was rebuilt largely to Nash's original design but incorporating an additional storey. By the time the 3rd edition O.S. map was published in **1911**, the parkland had been extended northwards to include the areas on either side of North Drive, and further areas of woodland had been planted. This map also shows that the northern end of the Mill Pond had continued to silt up, and large areas of reed beds had developed along its margins and in the eastern arm.

In the **1920's** Sir Merrick made over the estate to eldest son Walter (later became the 8th Bt) who held it until his death in **1985**, when running of the estate was taken over by his grandson, Mr Charles Burrell.

Aerial photographs taken in **1932** show that the estate had changed little from that depicted on the early O.S. maps. But since that time the character and condition of the designed landscape has declined. The pond has continued to silt up, to the extent that it is now less than 30% of the size shown on the Crow survey, and large areas have become overgrown by scrub. The Pleasure Grounds have also become overgrown and most of the areas of grassy glade have become closed over or planted up as woodland plantations. Furthermore, almost the entire area of the parkland is now in intensive arable production, although many of the parkland trees have been retained.

1.5 FIELD WORK ASSESSMENT

Following extensive field work carried out during the summer of 1996 we have established that there is considerable surviving evidence of both the Pre-park landscape and the 19th century parkland landscape. This evidence is presented in detail in Section 2 of this report, but is summarised below.

1.5.1 Feature surviving from the Pre-park landscape.

1. *Castle Ruins* - dating from 11th Century, now designated a Scheduled Ancient Monument.
2. *Knepp Mill Pond Bay* - earthwork dam impounding the pond, date of origin unknown but probably in existence by 16th century
3. *Raised Banks* - around the Mill Pond indicating a higher water level in the past
4. *Furnace Farm* - now Floodgates Farm, some slag found in the locality gives evidence of former iron workings
5. *Windmill Site* - Levelled terrace in locality of windmill shown on Crow Survey
6. *Hollow Way* - east -west road shown on Crow Survey
7. *'Road to Church'* - large oak trees beside the track leading northwards through Pleasure Grounds, shown on Crow Survey
8. *Charlwood Earthworks* - unknown origin but used as Rifle Butts at the end of the 19th century
9. *Brickyard Earthworks* - possibly brick working site associated with construction of the house
10. *Spring Coppice Earthworks* - unknown origin possibly early drainage works
11. *Hedgerow Trees* - large free-standing oaks in parkland retained when the hedgerows were stripped out

1.5.2 Surviving features of the 19th Century Parkland Landscape

1. *Knepp Mill Pond* - dominant feature that pre-dates the park but had overriding influence upon sitting of the castle, since then has progressively silted-up
2. *Parkland* - only spatial definition survives, virtually the entire area is under arable now
3. *Woodlands* - all areas shown on 1st edition survive
4. *Pleasure Grounds* - considerable number of specimen exotics, large sections of the path system shown on 1st edition survive as earthworks
5. *Buildings*- the castle was damaged by fire but rebuilt, ha-ha and kitchen garden walls survive
6. *Drives*

1.6 LAND USE AND CURRENT MANAGEMENT

1.6.1 Changes in Land Use since 1847

The Knepp Castle Estate is currently an intensively managed agricultural estate, and the vast majority of the study area is in arable cultivation. The remaining areas are divided between grassland, woodland, pond and garden. The distribution of these land uses is shown on figure 6.

But this has not always been the case, for it also an important surviving example of a 19th century designed parkland landscape. The Tithe Map[1] of 1847 shows a land-use pattern which divided the study area into three main zones: arable fields to the north, and parkland to the south, separated by a narrow zone of woodland crossing the site from east to west. These 3 zones were cut across by the huge linear Mill Pond, which extended over the whole site from north to south. Comparison of the 1847 and 2000 plans demonstrates notable changes in the pattern of land-use across the site:

1. The extent of the arable land has dramatically increased and now covers almost all of the original parkland.

2. The extent of the pond has substantially reduced as the northern, and to a lesser extent the south eastern end, has become silted up.

3. Large areas of new woodland have grown up either as the result of plantation or the development of scrub.

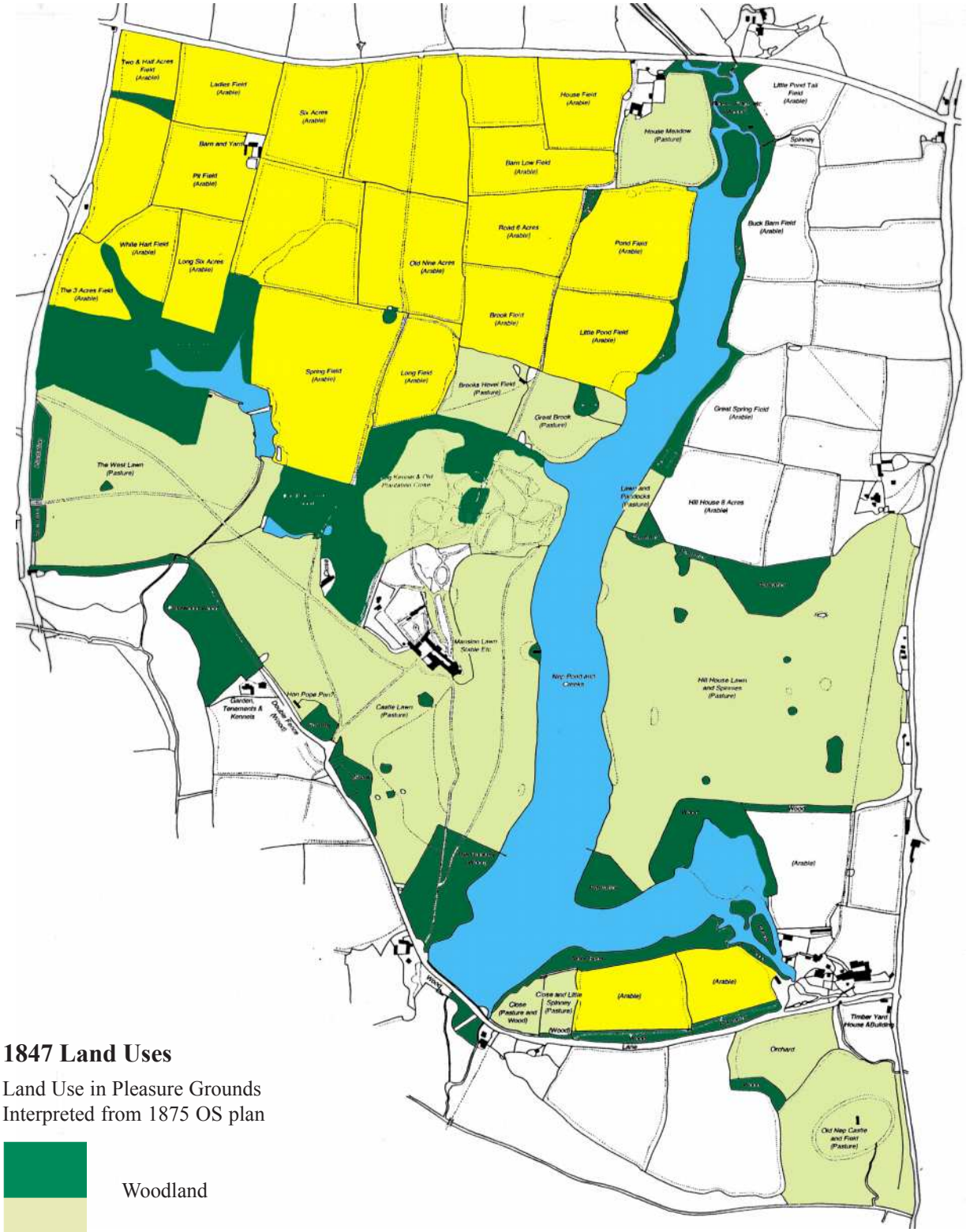
1.6.2 Current Land Uses

Arable

This is the principal land use in the study area which is made up of grade 3 agricultural land given over to arable production and forage. At the time of the original survey (Summer 1996), rye and wheat were the principal crops and large areas of the parkland were given over to silage production with some grazing of the ley pasture by cattle, horses and sheep.

There are two areas of grassland within the parkland which, whilst they are technically in arable rotation, they have been mown-out to form Polo Grounds - a practice ground close the Castle and a Match Ground on Hill House Lawn to the east of the pond. In Spring 2000 a further stick and ball practice ground will be formed adjacent to the Match Ground.

[1] Certain assumptions have had to be made on the Tithe Map where information was lacking. For instance it is assumed that 'pasture' meant permanent pasture rather than ley pasture, which might form part of an arable rotation.



1847 Land Uses

Land Use in Pleasure Grounds
Interpreted from 1875 OS plan

Woodland

Grassland

Arable

Pond

Figure 6a
Comparison of Land Uses in 1847 and 2000

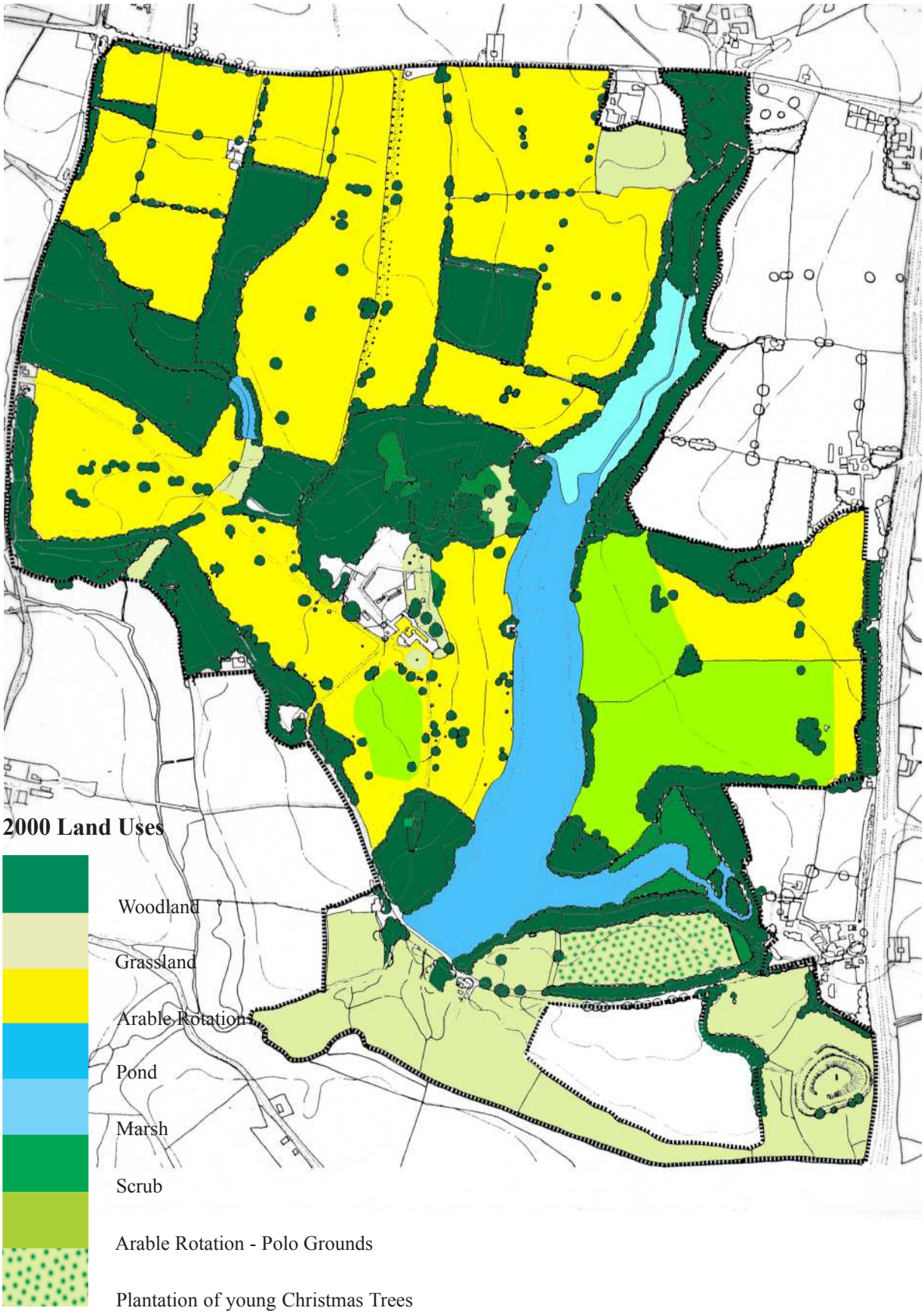


Figure 6b
Comparison of Land Uses in 1847 and 2000

Grassland

There are some areas of permanent pasture to the south of the pond and around the Castle ruin on the floodplain of the River Adur, which are grazed by sheep. Within the main area of the site there are only some fragments of permanent grassland that exist; a small field close to Lodge Farm, cut for hay or silage; a small area on the west side of Brickyard Wood, which is grazed; and a small area to the east of the Pleasure Grounds which is unmanaged.

Woodlands

The woodlands are mostly managed for broadleaf timber production, with selective rather than clear felling being the preferred cropping method. The timber crop is predominantly oak, with some ash and plantations of poplar, particularly at the northern end of the pond. There are also areas of hazel and hornbeam coppice, and the Rookery Wood is predominantly beech and Japanese larch with some ornamental species.

The Pleasure Grounds contain a number of exotic species and part of the area was managed as an ornamental woodland and arboretum until the latter part of this century when plantations of larch and southern beech were planted and areas of scrub and secondary woodland have developed. Large areas of scrub woodland have also developed on the silted up northern and southern ends of the pond. This scrub is principally composed of willow species and is largely unmanaged.

The names, compartment numbers, composition and planting dates of the woodlands are shown on figure 7, together with the locations and species names of the principal free-standing trees in the study area.

Pond

The pond is a man-made feature that was most probably created to drive mill wheels and the bellows of an iron furnace. These machines have long since disappeared, and the pond is now principally an ornamental feature, forming the setting of the Nash Castle. Although when seen from a distance it appears to be a vast volume of water, this belies the fact that due to centuries of siltation with little or no apparent management, most of the lake area is only covered by a thin veneer of water a few inches deep. This problem is made startlingly clear when the pond is drained down, when at first glance it still appears to be full.

Despite the lack of water depth, the pond is managed as a carp pond, and is periodically drained down and the larger fish and eels are netted and sold (rod and line fishing is not allowed).

Large areas of reed mace, several meters deep, shroud almost all of the banks of the pond, and there are large areas of water lilies, especially in the eastern arm of the pond. There is a periodic programme of cutting back the rushes in an attempt to

WOODLAND COMPARTMENTS

No	Name	Area (Ha)	Planting Date	Composition
30	Pondtail Rew	4.0	1960 1972	Hybrid poplars with Oak, Ash and Willow. North end Ash standards with coppiced Hazel
31	Old Nursery	1.6	1984	Young plantation of Larch & Oak
32	Hill House	2.4	1900 1970	Oak, Ash & Hornbeam Scots Pine
36	Merrick Wood	2.4	1890 1965	Oak Poplar
37	Matchetts Wood	3.3	1905	Oak & Ash
38	Matchetts Wood	1.6	1905	Oak & Ash
39	Spring Wood	5.8	1880 1974	Oak
40	Spring Wood	1.6	1940 1965	Oak & Ash
41	Capps Wood	1.6	1910	Oak standards with Ash, Field Maple and Scots Pine
42	Charlwood	1.6	1910 1959	Oak standards with Scots Pine and coppiced Horbeam Plantation of Grand Fir
42a	Charlwood	0.8	-	Ash, Oak, Field Maple and Sweet Chestnut
54	Brickyard Wood	1.2	1851	Oak & Ash
59	Pleasure Grounds	9.4	1860 1983	Oak & Ash Larch & Beech Also includes Cypress plantation and specimen exotics
60	Lakeside	2.8	1850	Oak & Ash
60	(Ladies Walk)	-	1850	Oak with coppiced Hornbeam
60a	Lakeside	1.6	-	Oak & Ash standards with coppiced Alder. Exotic specimens at south end
61	The Bow	0.8	1850	Oak with open windthrown areas. Group of White Willow
62	The Rookery	2.0	1962	Larch and Beech plantation. Oak standards with Ash to south

Figure 7
Woodlands and Parkland Trees

prevent further loss of open water, but the sheer scale of the pond means that this operation has little impact.

Gardens

There is a relatively small area of garden lying immediately to the east and north of the castle, laid out to lawn and including a hard surfaced tennis court. To the north west of the castle, the area around and including the Walled Kitchen Gardens is given over to a plant nursery business, Castle Nurseries, which is let out by the Estate.

1.7 WILDLIFE HABITATS AND NATURE CONSERVATION

A detailed description of the wildlife habitats and nature conservation interest of the study area is given in Section 3 of this report - Ecological Survey. This section provides a summary of that report.

1.7.1 Habitat Survey

The study area contains the following broad wildlife habitats, the distribution of which is shown on figure 8:

- Grasslands
- Woodlands
- Hedges
- Water Bodies
- Miscellaneous Landscape Features

Grasslands

With few exceptions the grassland is extremely species poor, mostly comprising grass leys or agriculturally improved permanent pasture. However there are some more interesting areas, mostly associated with unmanaged grasslands in non-agricultural areas, such as an area of the Pleasure Grounds containing a carpet of Devil's Bit Scabious together with Common Agrimony, Eyebright and Wall Speedwell. The grasslands offer considerable scope for improvement.

Woodlands

The woodlands are the main terrestrial semi-natural habitat on the site, occupying a sizeable proportion of the study area. They are all plantations of predominantly broadleaves, with some areas of conifers and additional semi natural woodland. Whilst none of the woods are 'ancient' some areas are shown on the 1754 survey plan, such as Charlwood and areas of Spring and Matchetts Woods and may thus incorporate fragments of ancient woodland.

They are predominantly plantations of oak and ash standards with areas of hazel coppice, and some areas of hornbeam. Other species include field maple, elder, holly, spindle and bramble. There are some areas of naturalised vegetation including sycamore and *Rhododendron ponticum* though the extent of these species is fairly limited. The Pleasure Grounds Woods contain a large number of exotic species which have survived from the period when this area was laid out and managed as an arboretum. These specimens include various oaks, wellingtonia, pond and swamp cypress and oriental planes. There are some species which one would normally consider as indicators of ancient woodland, such as Alder Buckthorn and Wild Service Tree, but these have clearly been planted.

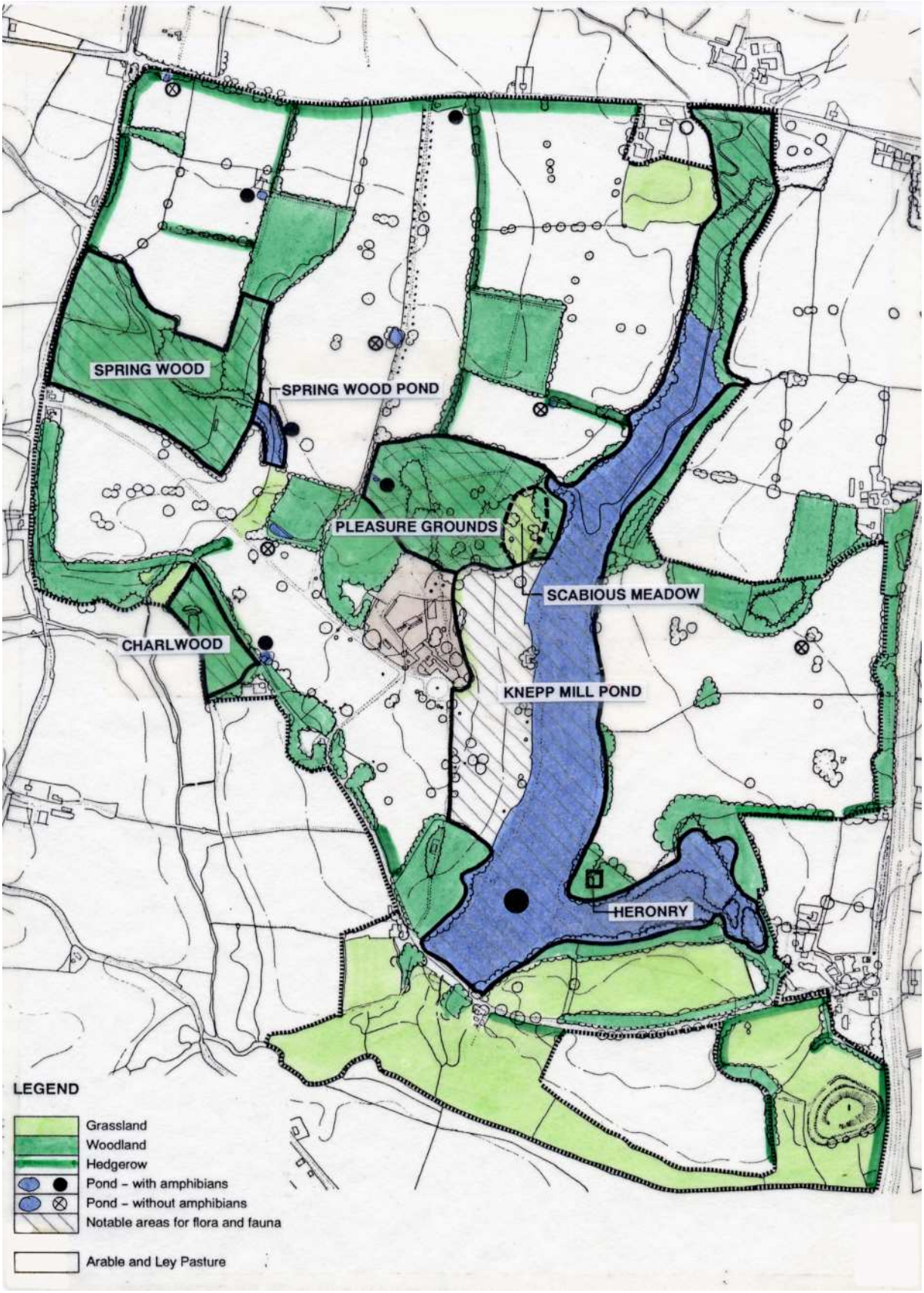


Figure 8
Wildlife Habitats

More recent plantations have included more diverse species including Poplar (Pond Tail Wood and part of Merricks Wood), Beech and Larch (Rookery) and Christmas Trees (north of Ladies Walk).

Most of the broadleaved woods have a well developed ground flora. Although dominated by Dogs Mercury and Ground Ivy at the time of the survey (Autumn 1996), it contains a variety of spring and summer species including Blue Bells, Primroses, Early Purple Orchids (Spring Wood) and Lesser Centuary (Pleasure Grounds). Wood Spurge was also found infrequently. Some of the rides and areas opened up by storm damage have been managed to improve their nature conservation value with the result that these are botanically quite rich.

Coppicing is no longer carried out as a commercial activity. The woods are managed by selective felling to produce a small amount of high quality timber which is milled on the estate. This felling policy minimises the disturbance and has created a good age range of trees in most areas.

Hedgerows

Mostly found in the north of the study area, the hedgerows are fairly species poor, predominantly comprising Blackthorn with Oak standards, with some Hawthorn Field Maple and Spindle found. The hedge along the north western side of Merrick Wood also includes a Wild Service Tree, with areas of bluebells below which suggests that this particular section may be ancient. However, none of the remaining hedges are thought to be particularly old (in hedgerow terms). Despite being of little importance in themselves the hedgerows provide valuable shelter for wildlife and create corridor links between woodlands.

Ponds (not including Knepp Mill Pond)

15 ponds occur widely distributed across the study area. However, with few exceptions they are in poor condition, being dry, senescent, neglected or overshaded. In a survey carried out in 1991 only 6 were found to contain amphibians. They generally offer considerable scope for enhancement. Spring Wood Pond is one of the exceptions, being both relatively large and in open setting. It is managed to produce brood fish for the carp fishery enterprise in the Mill Pond.

Knepp Mill Pond

Knepp Mill Pond forms the focus of the study area, and is one of the largest artificial water bodies in the region. It is clearly the main site of ecological interest on the site and indeed it is designated as a Site of Nature Conservation Importance in the Local Plan on account of its importance to wildlife. The combination of extensive open water, well vegetated margins, good cover and associated woodland, make it a valuable habitat.

The margins of the lake are particularly well developed with a wide swathe of emergent vegetation dominated by Reed Mace, with some areas of Bull Rush. There are also several areas of woodland associated with the lake edge, as well as a range of habitats in the silted areas ranging from reed beds and marsh to alder and willow carr. Water lilies occur at the southern end

It is managed as part of a commercial fisheries enterprise for carp. Every 3-4 years it is drained down and an average of 10,000 lbs. of carp are removed for sale. Apart from carp, the lake also contains roach, rudd, tench and bream. There are no pike but when it was last drained down approximately 1.5 tonnes of eels were caught and sold. Reed mace and water lilies are controlled by annual cutting from a reed boat. This operation takes about 9 days in total.

1.7.2 Wildlife Survey[2]

Birds

To date 122 species of birds have been recorded on the Knepp Castle Estate. The existence of the Mill Pond is a great asset and makes Knepp attractive to a number of breeding waterfowl, including:

- Great Crested Grebe- numbers are increasing, 6 breeding pairs in 1996 (5 in 1998)
- Little Grebe- single pair bred in 1996 and 1999
- Grebe- 5 pairs in 1999
- Grey Heron- heronry in the tall oaks on the south eastern edge of the Pond supported 15 breeding pairs in 1996 (at least 12 in 1999)
- Cormorant- numbers are increasing, up to 50 in 1996

It is also an important site for wintering wildfowl, whose numbers have been increasing, possibly as a reflection of the improved management at nearby RSPB reserve at Pulborough Brooks. Most duck movements seem to take a south-west to north east path linking the two sites. The over-wintering species include:

- Bewicks Swans - the Adur herd occasionally use the lake (7 in 1999)
- Mandarin - an occasional visitor first recorded in 1965
- Widgeon - regularly in excess of 200 (up to 600 in 1997)
- Gadwall - 39 in January 1999
- Teal - regularly treble figure counts, this species likes the reedmace fringes (200 in 1999)
- Shoveler - 12 in early spring 1996
- Tufted Duck - generally a few present
- Pochard - only regular diving species, average 60 present from October to March

[2] This section has been based almost exclusively on information supplied by Mr David Buckingham. The most up to date biological records may be found on the Knepp Castle Estate Internet Site at www.knepp.co.uk.

Of the other species of birds to be found on the site, the most notable are Nightingale, Peregrine Falcon (Single record, 1997) and Hobby (1999). Barn Owls are known to have bred in Cuckoo and Lower Barns, and are nesting in Brooks Platt Barn in Spring 2000.

Mammals

No particularly unusual species are present. In the past Weasels and Badgers have been notable for their scarcity, and only one sett has been confirmed within the study area (in Charlwood). However, sightings of badgers have increased in recent years and there is thought to be sett within the Pleasure Grounds. Mink are commonly sighted around the Mill Pond.

Butterflies

Knepp is notable for its abundance of butterflies, which has much to do with the positive conservation work carried out by the former head forester, the late Chris Wagstaff. The best areas are in Spring Wood, Spring Wood Pond and in the Pleasure grounds (Scabious Meadow). 32 of the 43 commonly recorded species in Sussex have been found at Knepp, the most notable of which are:

- Green Hairstreak - small colony in the Pleasure Grounds
- Brown Hairstreak - abundant on the north side of the Pleasure Grounds, its presence is significant
- White Lesser Hairstreak - Spring Wood , Rookery and Floodgates
- Brown Argus - Scabious meadow and at Green Lane, it is notable to find this species so far from the Downs
- White Admiral - only in Spring Wood
- Silver Washed Fritillary - Spring Wood and Pleasure Grounds

Moths

100 different species of moths were recorded in a survey carried out in 1994, though none of these were particularly notable.

Dragonflies

At least 18 different species of dragonfly have been recorded, most are found around Knepp Mill Pond and Spring Wood Pond, although the other surviving ponds are also important habitats. All of the species recorded are widely distributed in Sussex.

Reptiles

Grass Snakes, Slow Worms, Adders and Common Lizard (2 records between 1989 and 1996) are found within the study area, mainly around the Mill Pond and under refugia set up at the edges of grassy glades in the Pleasure Grounds.

Amphibians

A detailed survey of all of the ponds was carried out in 1991. It found that Toads were quite scarce, Frogs were present and that Palmate Newt was the most abundant species.

1.7.3 Summary of Ecological Value

It is clear that a variety of habitats exist within the study area, supporting a broad range of flora and fauna. The principal interest, from a nature conservation point of view, centres on the woodlands and the Mill Pond.

However, the Pond is under considerable threat as a result of siltation and subsequent progression to reed bed and carr. Whilst these are valuable habitats in their own right, especially the reeds which provide cover for a variety of fauna, their value must be balanced against the overwhelming importance of such a large expanse of open water. The future management of the Pond must take account of these habitats but should be directed towards safeguarding and enhancing these areas of open water

With few exceptions the grassland habitats within the study area are very dull and there is, therefore, considerable scope to improve them through appropriate management. If the ambition of creating a deer park throughout the site is realised, and thus all of the arable land within the study area were to be given over to permanent pasture this would represent a magnificent opportunity to improve the ecological diversity of the study area.

2.1 OBJECTIVES

It is the current owner's ambition to take the study area out of intensive arable cultivation and to lay out a new deer park in its place to provide an appropriate setting for the castle. With this as the guiding principal, and based upon the findings of this study, the following objectives have been identified for the landscape at Knepp Castle. We consider that the adoption of these objectives would not only secure the historic value of the park for the future, but also maintain and improve the aesthetic, wildlife and amenity value of the land.

- To take the study area out of intensive arable production and lay out a new deer park in its place.

- To maintain the economic viability of the land by entering the new deer park into a ten year management agreement with MAFF through the Countryside Stewardship Scheme.

- To maintain and enhance the picturesque qualities of the landscape as an appropriate setting for Nash's castellated mansion, whist at the same time respecting the historic and aesthetic basis for its layout.

- To conserve and restore, in accordance with available archival and field evidence, historic features which contribute to the historic and scenic value of the site and which complement the use of the site as a deer park.

- To restore Knepp Mill Pond in order to re-establish its role as the major feature within the setting of the castle and to safeguard its future as an important site of nature conservation interest.

- To improve the water quality, landscape and ecological value of watercourses, ditches and ponds through appropriate management.

- To conserve surviving archaeological features which provide evidence of the history of the site and its use over the centuries and incorporate these into the layout of the deer park.

- To re-establish permanent grassland within the area of the historic parkland and throughout the other areas of the new deer park, maintain the parkland as grazed pasture and actively manage it to improve its ecological diversity.

- To reveal and enhance views and vistas across and beyond the park whilst at the same time screening out any intrusive views.

- To plant new parkland trees in order to reinforce the historic design, enhance the scenic quality, direct views and extend the parkland character into areas which are presently enclosed agricultural land.

- To manage the existing woodlands for their aesthetic and ecological value, within the limitations imposed by the presence of deer.

- To protect areas of woodland with the highest nature conservation and historic value from damage by grazing deer.

- To reduce the noise and visual intrusion from traffic on the A24 and A272 by the formation of earthwork bunding alongside the eastern and northern boundaries of the parkland respectively.

- To conserve and repair surviving historic built structures.

- To continue to record the habitats and wildlife on the site and monitor the effects that the creation of the deer park and the dredging of the Knepp Mill Pond have on the ecological value of the site.

- To provide permissive, open public access to the area around the old castle ruin and provide interpretative material to enable visitors to gain an understanding of the value and importance of the Knepp Castle Estate.

- To increase accessibility of the site for education and by special interest groups by way of increased numbers of open days.

- To implement necessary tree work on historic trees for safety, aesthetic and arboricultural reasons

- To retain dead wood in trees as valuable habitat for invertebrates where it is considered to pose little potential risk (i.e. away from buildings, drives and footpaths).

- To continue to maintain and update an archive for the park.

2.2 DESIGN PROPOSALS FOR THE NEW DEER PARK

We have identified a number of exciting design opportunities for the laying out of this new deer park, which we have presented on figure 9. The design of the Masterplan for the park has been developed with regard for these opportunities, but has also been greatly influenced by the design principles established by Humphry Repton. Although the design of the original park cannot be attributed to Repton, he was a contemporary of Nash, and worked with him on a number of other schemes around the country. In some of these collaborations, notably at Luscombe Castle, Repton designed the landscape around a new castellated mansion that Nash had designed. It is inevitable that the siting of the Castle and the layout of the grounds would have been influenced by Repton's design principles. It is, therefore, appropriate that the new design layout should also follow the principles that he advocated.

Repton's design principles.

Repton's overall intention was to create scenery which was more varied, rugged and picturesque than the parks laid out by his predecessor Capability Brown. He attempted to combine 'elegance' and practical needs, to temper magnificence with common sense, and to achieve his ends in the most economical way.

He considered that landowners who had tamed and cultivated the whole landscape would find it more attractive to have land around the house left uncultivated and in a natural state, unlike earlier periods when formal gardens were a welcome relief from the 'howling wilderness' around.

He had a preference for an animated landscape to a 'still' life; his preference for cow-dotted pastures rather than melancholy scythed lawns, running water stream and rivers, rather than placid lakes and his concern to preserve signs of 'habitation' and 'industry' in his landscapes.

Repton divided the landscape into three clear cut zones: the agriculture, which he thought should be kept outside the park proper; the park itself, elegantly naturalised with smooth lawns stretching into the middle distance; and the 'dressed ground' around the mansion firmly delineated and not merging with the intervening naturalised parkland.

He considered that the chief beauty of a park consists in uniform grassland, undulating lines contrasting with each other in variety of forms, trees so grouped as to produce light and shade to display the varied surface of the ground, and an undivided range of pasture.

Much of Repton's work consisted of thinning out the planting and restoring the balance between grass, water and trees in existing landscape parks.

When laying out a park Repton adhered to a number of underlying principles as summarised below:

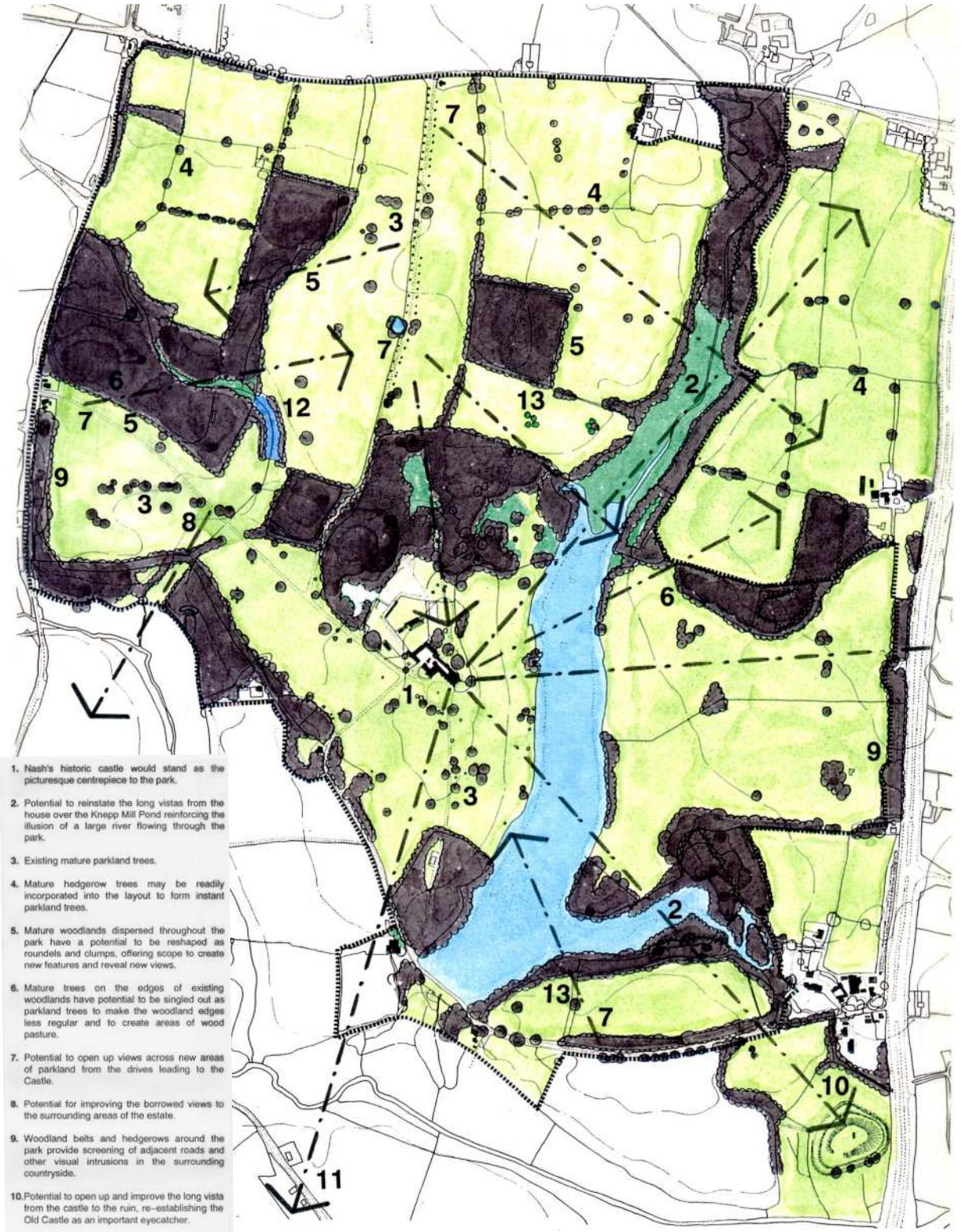


Figure 9
Design Opportunities

1. The scale of the park should be proportionate to the landed property attached.

2. Drives should lead more-or-less directly to the house.

3. There should be 'dressed ground' around the house and not bare 'lawn' sweeping up to the very walls.

4. That landscape and architecture should form one united composition and that the design of a country house should be related to its setting. In planning a park Repton always took into account the architecture of the mansion.

5. The boundary should not be delineated by a continuous belt. He proposed various boundary treatments including: the invisible fence using light materials, such as fences made of slender iron and wire painted green; the sunk fence; and a light hurdle instead of a paling to create a temporary inconvenience rather than a permanent confinement.

6. To increase the apparent magnitude of a park by revealing to view features outside the park boundary such as a river, interesting groups of trees, buildings and distant mountains or hills (refer Figure 10).

7. To create groups of trees by planting small plantations, surrounded by a fence, rather by planting individuals which tended to be too regular. He considered that no group of trees can be natural in which the plants are studiously placed at equal distances, however irregular their form.

8. Wood and lawn should be so blended that the eye cannot trace the precise limits of either by varying the formality of its outline.

9. Parkland lawns should be broken and diversified by occasional shadow from trees, taking care not to plant too many trees.

10. The best combination of trees consist of forked trees, or at least of trees placed so near each other that the branches intermix, and by a natural effort of vegetation the stems of the trees themselves are forced from the perpendicular direction, which is always observable in trees planted at regular distances. He considered that no group will appear natural unless two or more trees are planted very near to each other, whilst the perfection of a group consists in the combination of trees of different age, size, and character.

11. Plantations should be both open or closed to create a variety of views (refer Figure 10). This was to be achieved by preventing the cattle or deer from browsing the under storey. This would have the effect or varying the flatness caused by the browse line.

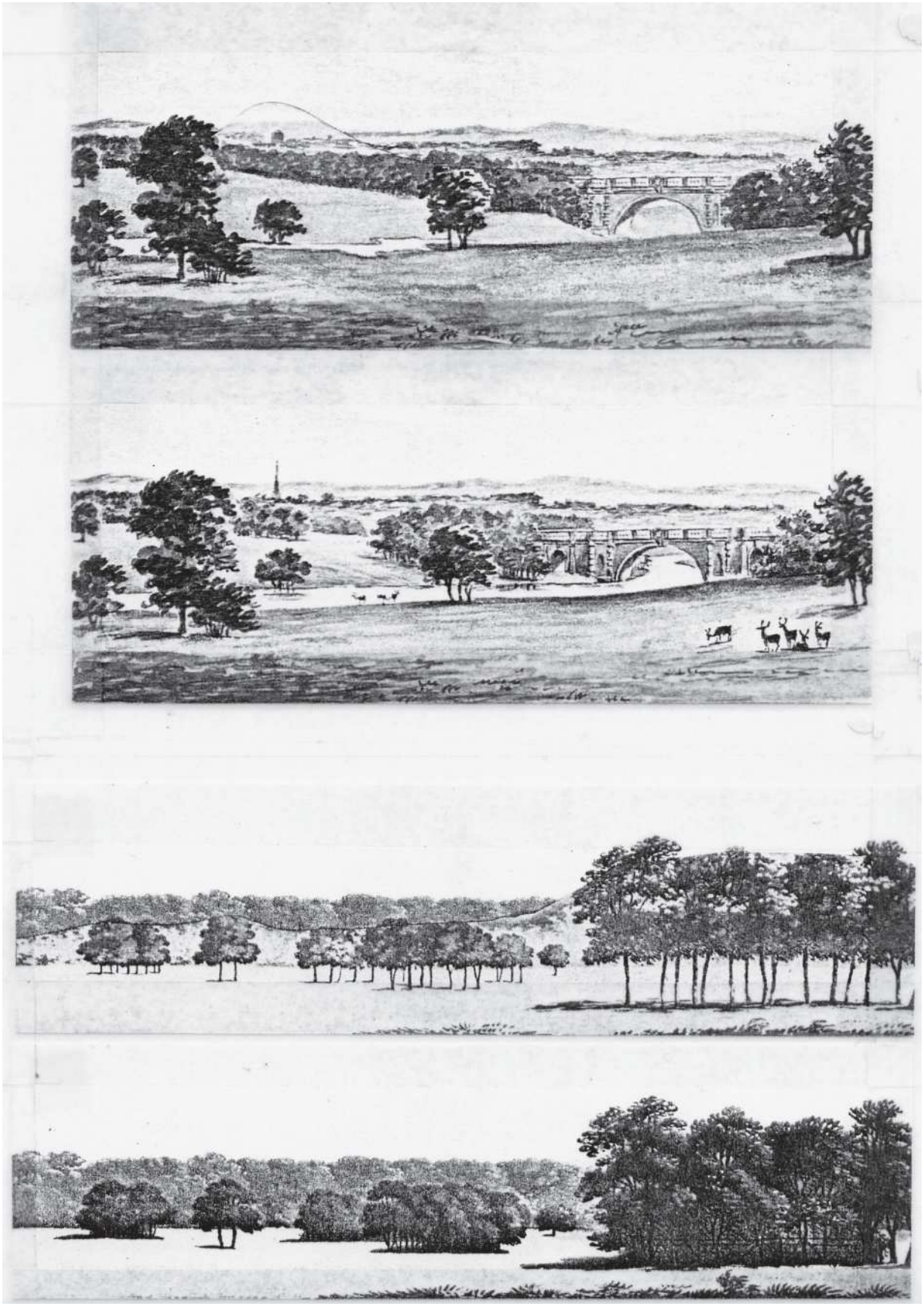


Figure 10
Repoton Design Principles

12. The browse line formed by grazing cattle is important to maintain the impression of scale. He considered that trimming trees at their base would alter apparent scale.

13. To introduce intricacy of outline at woodland edges by the interruption to the flowing lines of grass, with suitable recesses and projections of wood or by cutting down a few trees in front. He also recommended the installation of temporary fence of posts and rails, or hurdles on the outside of woods or plantation, and either advised a hedge of thorns to be planted at eight or ten yards distance from the outline, or rather that the whole plantation be so filled with thorn or spinous plants, that the cattle may not penetrate far when the temporary fence is removed, and thus cause the formation of an irregular outline.

14. When selectively felling trees for aesthetic effect search for groups and combinations, and leave in such places as will display to best advantage their varied or combined forms. He advocated leaving decaying trees for their picturesque effect. He also advised retaining trees where stems have long grown so near each other that their branches are interwoven.

Analysis of the opportunities and these design principles has lead to the development of a Masterplan for the site which is presented as figure 11, together with some accompanying explanatory text. This design plan should be considered as the ultimate goal for the development of the park, and not necessarily a depiction of what is intended within the ten year period of a Countryside Stewardship Scheme. This project will clearly take a good deal longer to complete.

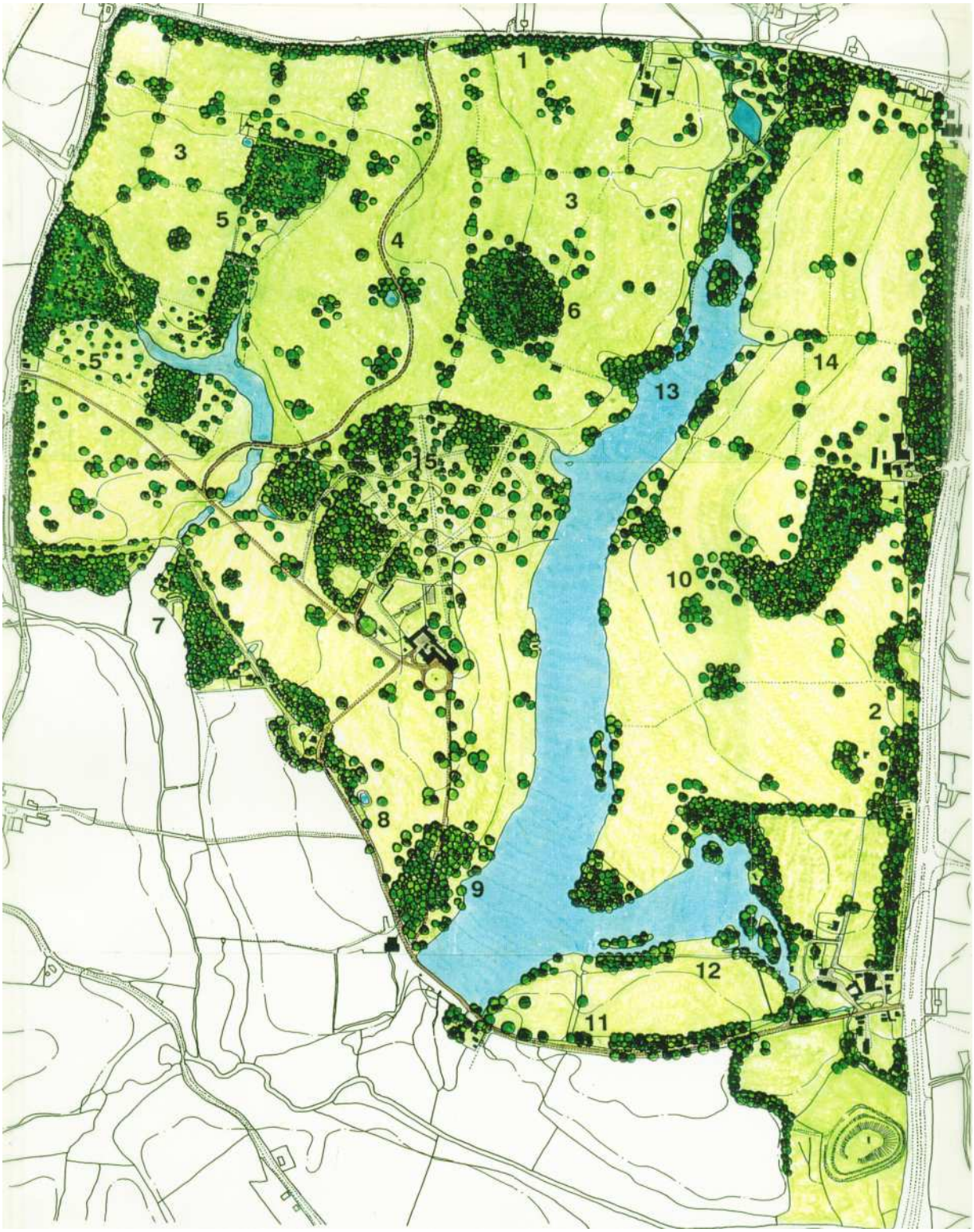


Figure 11a
New Deer Park: Masterplan

1. North Boundary Acoustic Bank and Woodland Belt
A new earthwork bank would be formed along the northern boundary using imported inert material. This would mostly be planted over to form a belt of native woodland to reduce the noise and visual intrusion from the busy road.

2. East Boundary Acoustic Bank and Woodland Belt
An further new earthwork bank would be formed along the eastern boundary. This will comprise parallel bunds formed from imported inert material, with the space between them filled with silt dredged from the Mill Pond. This would mostly be planted over to form a belt of native woodland creating an acoustic barrier beside the A24 trunk road. Carefully sited gaps would be left in the planting to allow views over the top of the road to the countryside beyond.

3. New Areas of Parkland
Areas currently in arable rotation within the park would be seeded with grass and managed by grazing with deer and other stock to encourage the development of a species rich sward. Selected sections of hedgerows would be removed but surviving trees would be retained as specimens within the new areas of parkland. New trees would be planted to reinforce the massing of existing trees and to frame and direct views from the drives.

4. North Drive
North Drive would be diverted to follow a sinuous route in order to bring the Knepp Mill Pond into view and to open up other vistas. The drive would be re—routed across the valley to the north of Brickyard Wood to allow views across to the restored and extended Spring Pond.

5. Spring and Matchetts Wood
Selected areas of the woodlands would be fenced to protect the understorey and ground flora from grazing. The unfenced areas of the woods would be selectively thinned, eventually resulting in the formation of areas of wood pasture, revealing new views and contrasting with dense woodland cover of the fenced areas. The existing timber barn to the north of Matchetts Wood would be refurbished and converted for residential use to be let out. A discrete new access would be formed leading to the barn from the B2224.

6. Merrick Wood
The central part of the wood would be fenced to form a large roundel on this existing local spur. The mature oaks and pines outside the fencing would be retained to form an irregular edge to the roundel.

7. Capps Wood and Charlwood
A vista from the West Drive down the valley between Capps Wood and Charlwood Wood would be revealed by selective tree clearance. The ancient track bounding the park would also be revealed by selective tree clearance.

8. Views to The Sussex Downs
The woodland belt and hedgerow trees on the park boundary to the south of the Castle would be selectively thinned in order to open up distant views of Chanctonbury Ring and the Sussex Downs.

9. The Rookery
Selective thinning of trees along the western edge of the Rookery would be undertaken to reveal the mature Douglas Firs and other ornamental trees and to enable the Knepp Mill Pond to be glimpsed through trees from the drive.

10. Hill House Wood
Selective thinning of trees at the western end of Hill House Wood would reveal views across the area of Hill House Farm. New random tree planting would be carried out to make the woodland edges appear less regular and to screen the farm buildings.

11. Vista to the Castle from Castle Lane
Selective thinning of trees along Castle Lane and on the banks of the Knepp Mill Pond would open up a narrow vista across the lake towards the castle.

12. Vista from the Castle to Knepp Castle Ruin
Selective thinning of trees along Castle Lane and in the woodlands to the west of Floodgate Farm would reveal the important vista of Old Knepp Castle Ruin from the Nash castle.

13. Knepp Mill Pond
Knepp Mill Pond would be dredged in order to reestablish open water along the two main vista lines from the castle. An island formed at the northern end of lake would create the illusion of the “river” continuing out of view in the vista from the castle. The creation of a silt trap at the northern end of the lake could potentially minimise the inflow of silt in the future. Occasional eyots would be formed along the length of the pond would provide refuges for wildlife and add visual interest.

14. Hill House Farm
Selected sections of hedgerows would be removed and replaced with invisible fences and additional trees would be planted in clumps to visually unite this area with the remainder of the park and screen the farm buildings.

15. Pleasure Ground
Most of the area would be fenced to prevent access by deer, to allow the woodlands to remain dense, and to maintain a screen around the service areas of the Castle. Selective thinning of trees and scrub would be undertaken to reveal ornamental specimens and vistas to and from the Castle. Clearance would re-establish the historic gardenesque character of the Pleasure Grounds and new trees would be planted to reinforce this. Cleared areas within the compartment would be reseeded (as necessary) and grazed by sheep. The Ha-ha around the eastern side of the castle gardens would be restored, but the original iron fencing along it would not be reinstated.

Figure 11b
New Deer Park: Masterplan Legend

2.3 PROPOSALS COVERING THE WHOLE SITE

2.3.1 Deer Fencing

The principle objective at Knepp is the creation of a new deer park. Before a herd can be introduced the site must be made secure with an appropriate deer-proof fence. Furthermore, any areas within the park from which deer are to be excluded must also be fenced. The proposed alignment of the deer fence is shown on figure 12, together with the positions of cattle grids and gates. The majority of the fence will be constructed with timber stakes and galvanised line wires. However, in certain prominent or visually sensitive areas, a traditional iron railing is proposed in order to preserve and enhance the historic character of the park.

2.3.2 Grazing proposals

It is proposed that all of the grassland in the study area will be permanent pasture, the larger part of which will be grazed by fallow deer. However, because it is intended that the size of the herd will start small, then other stock will have to be grazed throughout the park at peak grass growing periods. It is envisaged that this would include various types of sheep and cattle as appropriate.

The grassland on the floodplain of the River Adur will continue to be grazed by sheep, as will the grassland around the old castle ruins. Furthermore, sheep will graze new areas of grassland created after scrub clearance in the Pleasure Grounds. Some areas of the site will also be grazed by ponies, in particular Filleys Plat and Floodgates Orchard.

2.3.3 New Earthworks

New earthwork bunding will be formed along the northern and eastern boundaries of the site. It is proposed that the bund along the northern boundary will be asymmetrical in profile, rising gradually from the generally level ground within the park (say 1:10-15) to a height of 3-5m maximum, although the dimensions of this feature will be varied. The north face will be steeper, up to a gradient of say 1:2-3.

The bund will be formed from imported inert material which would be spread and consolidated in layers and covered over by topsoil. A large area of the completed landform will be planted-up with native trees and shrubs (under Woodland Grant Scheme). This feature will considerably reduced the noise and visual intrusion from the busy A272, and will create a considerable shelterbelt marking the northern boundary of the parkland. It also offers the potential for generation of considerable revenue for the estate, which will be put towards the cost of dredging the Mill Pond.

Further earthworks will be formed along the eastern boundary. Here it is proposed that a pair of parallel bunds would be formed, with the space between them being filled with silt dredged out from the Mill Pond. This would eventually be profiled in the same way as the north bund, topsoiled over, and largely planted with native trees and

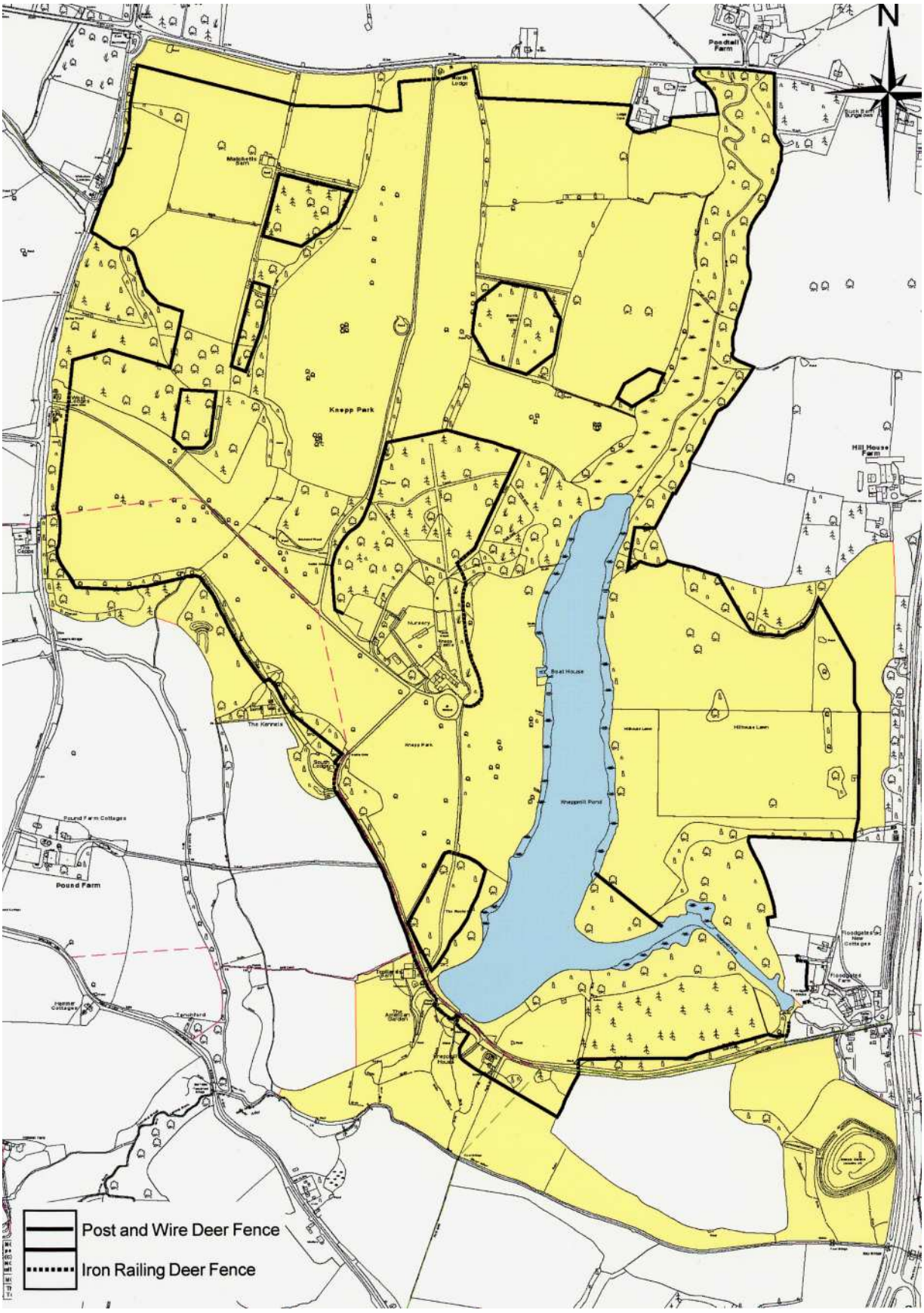


Figure 12
Deer Park Fencing

shrubs, creating a feature which will substantially reduce the noise intrusion from the A24 dual carriageway.

Both of these projects will be designed in detail, and will be submitted for planning approval in due course. In the mean time, the new deer fence along the north and eastern sides of the park will be established along a temporary alignment in anticipation of these works proceeding. Provided the planning application was successful and following completion of the work, the fence would be realigned to incorporate sections of the bunding within the deer park.

2.3.4 Public Access

The existing public rights of way will be maintained and appropriate gates will be installed where the footpaths enter the area of the deer park. Additional way marking will be installed to direct the public along the designated routes. In addition to this it is proposed to allow permissive open access over the fields surrounding the old castle ruin to enable the public to gain access to this important Scheduled Ancient Monument. Any necessary styles or gates to facilitate this access will also be installed.

The Estate is keen to expand the current programme of open days and to encourage local schools and special interest groups to visit the new park. It is proposed that there will be 5 public open days and a further 2 school open days per annum, all of which will be well advertised in the local press in advance. A number of routes for guided walks would be devised and information packs and pamphlets would be produced to help people to appreciate the historical and ecological importance of the site.

2.4 PROPOSALS FOR THE CHARACTER AREAS

On the basis of the present landscape structure, the study area has been subdivided into a number of character areas, the extent and distribution of which is shown on figure 13. For easy reference the study area has been further sub-divided into a series of discrete management compartments on the basis of geography and land use. These are shown on figure 22 inserted at the end of this section of the report.

This section outlines the management work required to achieve the overall objectives for each character area and, where relevant, a discussion of the proposals is included. The proposals for Knepp Mill Pond are dealt with separately in Section 3.

2.4.1 Parkland

The parkland subdivides into the following compartments:
North Drive West, North Drive East, West Lawn, Spring Wood Field, Brickyard Cover, Park, Riding School, Boat House, The Bow and Hill House Lawn.

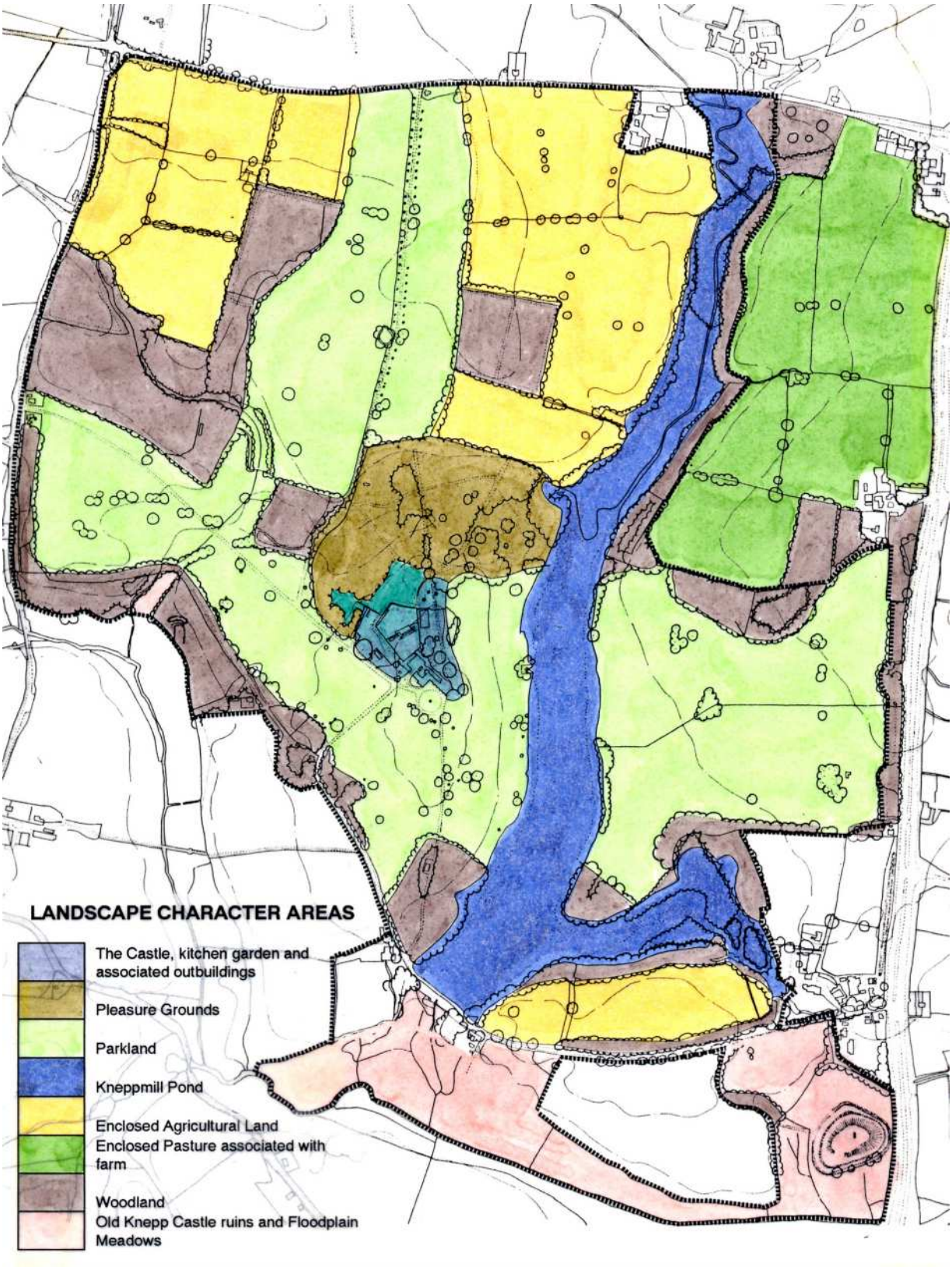


Figure 13
Landscape Character Areas

Outline proposals

- Re-establish permanent grazed pasture in all areas that are currently in arable rotation
- Manage the fragments of existing grassland to improve the species diversity of the sward.
- Carry out tree surgery on parkland trees where necessary, particularly close to buildings and overhanging drives and footpaths.
- Plant trees to reinforce existing groupings of parkland trees.
- Plant new belt of native trees and shrubs on the bund along the northern and eastern boundaries.

Discussion

Where arable land is to be converted to permanent grassland, it will clearly be necessary to re-seed with grass. This should be of species suitable to the locality with low competitive vigour. It should also be sown much thinner than for agricultural purposes to allow space for broadleaved herbs from the soil seed bank to establish. At least initially, the sward will have to be managed to remove pernicious broadleaved weeds, such as dock.

One of the effects of introducing deer is that in the early years there will almost certainly be too much grass for the size of the starter herd. Much of this will have to be cut as silage, at least for the first two years. But it could be beneficial in that it would allow some of the grass to be cut and removed as hay. A variety of other stock will also have to be grazed to keep the grass down at peak growing periods.

Where fragments of unmanaged grassland exist it would be desirable to enhance the species diversity of the swards as naturally as possible, rather than by artificial means such as seeding with wild flower mixes. Suitable methods might include the following:

1. Traditional hay meadow management involving a midsummer cut for hay followed by winter grazing. The grazing should be heavy enough to cause some poaching so that gaps are left for a wider variety of broadleaved herbs to invade.
2. Avoidance of herbicide and fertiliser use which leads to the swards being dominated by a few competitive grasses (e.g. rye grass). (Such operations would be prohibited by a Countryside Stewardship Agreement anyway. However, they will continue on the Polo Ground areas which are excluded from the Stewardship Area)
3. Occasional light scarification of the sward to allow species that might be present in the soil seed bank to re-colonise the site. This may recover species that were present already in the seed bank prior to the agricultural improvement of the sward. This is greatly preferable to introducing species even from sites nearby.

Though none of these methods will lead to the rapid creation of species rich grassland, they may have small effects almost immediately, and a marked improvement in species diversity should begin to manifest itself gradually, after about 20 years. However, the main problem in creating species-rich grassland on agriculturally improved land is that the high nutrient status of the soil cannot be quickly reversed, except on certain sandy soil types. Introducing a lot of species is pointless if soil conditions continue to favour the competitive dominance of a few species.

If artificial methods of grassland enhancement were to be introduced, this should be confined to areas where the presence of artificial flower meadows would not detract from an otherwise old complex of habitats. It should also be confined to areas where it stands a chance of working, in particular in areas which have not recently been in arable cultivation and have high fertility. In addition, the extent of such areas should be kept experimental in size, so that the results can be evaluated before the method is applied to a wider area.

Such methods may take the form of spreading hay bashings from species rich grassland in the locality after the area has been scarified to open up the sward. The main problem with this method is likely to be finding a suitable seed source in sufficient quantity. The existing sward may also be too dense and too vigorous to allow the new seed to survive the competition. The fragments of more species rich grassland found in the study area (such as the Scabious meadow in the Pleasure Ground) could be used as a seed source.

Alternatively, hay could be cut in the unimproved and currently unmanaged fields on the estate to the south of the study area. Other adjoining land owners with unimproved or relatively unimproved meadows in the locality may also be willing to supply hay bashings[3].

An alternative method of inoculating the sward would be to introduce young plants as plugs grown from locally collected seed, particularly since establishment from plugs has been demonstrated to have a higher success rate. However, collection and raising of plugs from seed found on the estate would be laborious. It could, however, be something that the on-site nursery might consider. Common species that are known to be frequent in unimproved grassland nearby should be used.

If after a number of years (say 5) it is apparent that management alone has failed to enhance the grassland, it may be necessary to reconsider the policy on introduction, as outlined above.

2.4.2 Enclosed Agricultural Land

The enclosed agricultural land subdivides into the following compartments:

[3] Furthermore, the High Weald Meadows Project aims to collect seed from existing flower rich grassland. This seed is professionally harvested, dried, cleaned and tested by a local firm, to provide a reliable seed source which can be guaranteed to be from a grassland in Sussex with similar conditions.

Workhouse Lodge, Spring Wood Corner, Matchetts, North Matchetts Wood, Lodge Fields, Lake Fields, Brookes Platt, Filleys Platt and Bridge Fields.

Outline Proposals

- Establish permanent grazed pasture within areas that are currently in arable cultivation by the methods discussed above.
- Manage the fragments of existing grassland to improve the species diversity of the sward.
- Retain sections of hedgerow that have been identified as being ancient but remove remnants of more recent hedgerows from the internal areas of the new park.
- Retain all hedgerow trees and incorporate them within the layout as parkland trees.
- Plant new parkland trees
- Plant new belt of native trees and shrubs on the bund along the northern boundary.
- Convert Matchetts Barn for residential use to be let.

Discussion

The proposal to remove sections of hedgerows is likely to be a contentious one. Furthermore, the treatment of hedgerows now comes under the control of the Hedgerow Regulations 1997 (SI 1160). An application will be made to the local planning authority in early summer 2000 setting out which sections are to be retained and which are proposed to be removed. This will include a detailed assessment and justification for the works. However, in outline we offer a number of points to support this proposal:

1. The removal of certain sections of hedgerow is vital to the creation of the parkland character in the northern half of the site.
2. The existing hedgerows which are intended to be removed are species-poor, and are not likely to be very old (in hedgerow terms).
3. Although it is obviously a different habitat, we consider that the vast improvements to the scale and quality of the grasslands which are proposed as a part of the overall scheme would more than compensate for the loss of some relatively short lengths of hedgerow.
4. The remaining hedgerows will be maintained and enhanced. In particular, sections including significant proportions of blackthorn and elm will be managed to provide favourable conditions for Brown Hairstreak and White Lesser Hairstreak respectively, which are notable butterfly species found in the park.
5. Large areas of new perimeter planting are proposed along the northern and eastern boundaries, once again we consider that this will add to the compensation for the loss.

Figure 14a
Photographic Images of the Landscape Character Areas

Figure 14b
Photographic Images of the Landscape Character Areas

Matchetts Barn, located in the northern section of the site, is a traditional timber framed agricultural building. It is proposed to renovate this structure and convert it for residential use, to be let out. A new drive will be created to provide access from the B2224 to the west.

2.4.3 Enclosed Pasture associated with Hill House Farm

Hill House Farm includes the following compartments:
Pond Fields, Pigpens, Buck field, Lower Meadow, Middle Meadow, Tea Caddy, Backfield.

Outline Proposals

- Plant parkland trees to create visual integration with the deer park.
- Plant parkland trees to screen farm buildings and group of buildings on the junction of the A24 with the A272.
- Plant new belt of native trees and shrubs on the bund along the eastern boundary.
- Continue maintaining as permanent pasture.

2.4.4 Old Knepp Castle Ruin and Floodplain Meadows

This area includes the following compartments:
Floodgates Orchard, Old Castle Nab and Knepp Mill Laggs.

Outline Proposals

- Continue to maintain as permanent pasture, managing the grassland to improve its species diversity as discussed above.
- Maintain and where necessary restore the boundary and internal hedgerows.
- Install appropriate gates, way markers and information boards to facilitate public access to the fields and the old castle ruin.
- Monitor the condition of the ruin and earthworks.

2.4.5 Woodland

The study area contains the following woodland compartments:
Spring Wood, Matchetts Wood, Merrick Wood, Pondtail Rew, Hill House Plantation, Lakeside, The Bow, Hog Wood, The Rookery, Charlwood, Capps Wood, Capps Belt, and Brickyard Wood.

Outline proposals

- Install deer fencing around selected areas of the oldest and most ecologically valuable woodlands to protect from grazing.

Figure 15a
Photographic Images of the Landscape Character Areas

Figure 15b

Photographic Images of the Landscape Character Areas

- Remove the existing stock fencing from selected sections of woodland and carry out selective thinning in order to promote the development of widely spaced specimen trees in wood pasture and open up view across the parkland.
- Maintain density of woodland belts on the boundary of park to provide screening.
- Where appropriate thin or clear selected areas of woodland at locations on the boundary where interesting views to the surrounding landscape can be revealed.
- Manage the protected areas of woodland with a view to improving their nature conservation value.

Discussion

The proposed introduction of deer to the park will inevitably have a substantial effect on the woodlands, particularly as it is proposed that the deer should be free to roam throughout the site, except in specific areas protected by fencing.

Within woodlands where deer will be allowed to roam, it is proposed that selected trees up to 30 years old will be protected by wrapping chestnut pale fencing around the trunks. However, for this to be effective long-term, it will require regular inspection and maintenance.

Elsewhere, the effect of the deer on the existing woodland is dependent on the careful control of stocking density[4]. However, even with careful control it must be anticipated that deer will browse the ground flora and the shrub layer and may de-bark some trees. It is difficult to anticipate the rate at which the ground flora, shrub layer and unprotected trees will be reduced, but over time depletion and loss will occur, leading to wood pasture in place of the present woodland structure.

In nature conservation terms, the introduction of deer is bound to have an adverse affect on the woodlands. Therefore, the areas of highest ecological interest are to be protected from deer by appropriate fencing. It is probably no coincidence that some of these areas are also the most historically significant woods on the site. For example, the two areas of Spring Wood and Matchetts Wood which are to be protected, are both identifiable areas of woodland shown on the 1754 survey by Crow.

The effect of the deer in the remaining areas should be carefully monitored and numbers carefully controlled so that any damage can be limited. The speed of change should be controlled so that new habitats have time to develop before established ones are lost. At the same time the protected areas of woodland should be enhanced.

The management direction should be geared towards nature conservation (within the constraints provided by grazing deer). Measures that could be applied include:

[4] An adult Fallow Deer constitutes 0.2 Livestock Units (LU) as compared to 1.0 LU for a Cow.

1. *Control of sycamore and Rhododendron ponticum*
   Neither of these species are native and both spread rapidly, shading out native species. At present their occurrence is quite localised and control would be both feasible and beneficial.

2. *Improving the dead wood habitat*
   At present, there is little standing or fallen dead timber in the woods. Dead wood is an important part of semi-natural woodland and increasing this component would be beneficial. Almost certainly, the quantity of standing deadwood will increase as deer de-bark the trees. Such trees should be made safe but left standing where possible. Where trees have to be felled for safety reasons (and are of no commercial value) the large timber should be left on the ground.

3. *Improving the semi-natural character*
   A policy to phase out plantations of exotic species (e.g. conifers and poplars) and replace these with native species of broadleaves would benefit the semi-natural character of the woods. Individual protection of young saplings with guards 1.2m high may be necessary to prevent the saplings being damaged by deer.

4. *Creation of glades*
   Although glades are likely to form naturally in unfenced woods over a period of time as trees are lost and deer grazing reduces natural regeneration, it would also be beneficial to create glades in areas of fenced woods, in order to improve the diversity of habitats. Glades would be particularly beneficial in areas of damp ground. In fenced woods it will be necessary to cut the vegetation in the glades from time to time to prevent succession to scrub and secondary woodland.

5. *Opening up old ponds*
   Many of the old ponds in the woodlands are overshaded and silted. Reduction of the overshading on the south side, together with removal of silt would enhance the ecological interest of these habitats.

6. *Re-introduction of coppicing in some deer-fenced woods*
   Once again this would be beneficial as it further increases the diversity of habitats in the park.

2.4.6 Pleasure Grounds

Outline Proposals

- Fence off most of the area of this compartment to prevent access by deer.
- Selectively clear scrub to reveal ornamental trees and re-establish the character of the historic layout of the Pleasure Grounds, comprising a mosaic of woodland and grassy glades with specimen trees.

- Re-seed cleared areas as necessary and maintain as permanent pasture grazed by sheep. Manage to improve species diversity as detailed above.
- Manage the areas of woodland as detailed above.
- Plant specimen trees appropriate to the gardenesque character.
- Consider reinstating original path system.
- Monitor the effects of deer grazing on the condition of the Scabious meadow and protect with appropriate electric fencing if necessary
- Remove existing stockfencing and sections of iron railing from the perimeter of the compartment, setting aside for reuse elsewhere in the park as appropriate.

2.4.7 The Castle, kitchen garden and associated outbuildings

Outline proposals

- Continue routine maintenance of building fabric.
- Clear debris and repair/reconstruct the Ha Ha around the eastern side of the castle gardens, including digging out the base of the ditch to ensure that the full height of the brickwork is exposed and the feature is, therefore, effective as a barrier for deer.

3.1 Historical Context

Knepp Mill Pond is a man-made feature, created by the formation of a clay dam, or bay, across a shallow stream valley. It was created in connection with the iron industry as a means of developing a head of water to drive a waterwheel, either powering a set of bellows to fire a furnace, or a hammer to crush iron ore. Other mills may later have taken advantage of this power supply to drive corn-milling machinery.

The date of its formation is not clear. In 1780 Sir William Burrell (2nd Bt) put forward the theory that the name of the original Castle may have been derived from the French expression '*Nape d'eau'* meaning *'sheet of water with the form of a table cloth'*. This theory relies on the pond being in existence prior to the construction of the castle late in the 11th century. It could, therefore, be a remnant of very ancient iron workings.

A record in 1326 makes reference to a water mill at Knepp, which might indicate the existence of the pond. Records from the 16th century stating that the Caryll family were working iron at Knepp on behalf of the Duke of Norfolk in 1568, provide the first definite indication of its' existence.

Knepp had an important strategic location with good communications for that period. Proximity to north-south *and* east-west routes through the county were rare. Furthermore, 300 yards to the south of the former furnace site, (now known as Floodgates Farm), are the uppermost reaches of the canalised section of the River Adur. This represents another important transport link allowing timber and iron to be transported between Knepp and the coastal port at Shoreham.

The furnace at Knepp ceased operation in 1604; which is some time before the general decline of the Iron Industry of the Weald which occurred in the mid 17th century. One reason for this may have been that despite its enormous size, because of the small catchment area of the pond and its generally flat nature, there was insufficient water flow to drive the furnace bellows effectively.

The pond is shown on the Crow survey plan prepared in 1754, covering an area of nearly 80 acres. Figure 16 shows that the size of the lake has been steadily diminishing from that time, until the present day when only 28.87 acres of open water remain. The longest dimension of open water is now only 1000m, compared to 1400m in 1875, 1600m in 1847 and 1950m in 1754. The reasons for this may be twofold. Firstly, documentary and field evidence indicates that, historically, the level of the water in the pond was considerably higher than its present level[5]. Any lowering of the water level will, therefore, have resulted in a corresponding reduction in surface area. Secondly, it is clear that there has been an enormous amount of silt deposition across the whole area of the lake, but especially at the northern end where the feeder stream enters, resulting in a shrinking back of the open water and reversion to dry land.
Nevertheless, in 1809 when John Nash was commissioned by Sir Charles Burrell to design and build the house at Knepp, the pond would have been the most prominent feature of the park. Nash's design took advantage of the topography and the long

[5] The lowering of the level may have a connection with the construction of the Coolham to Cowfold road in 1800,

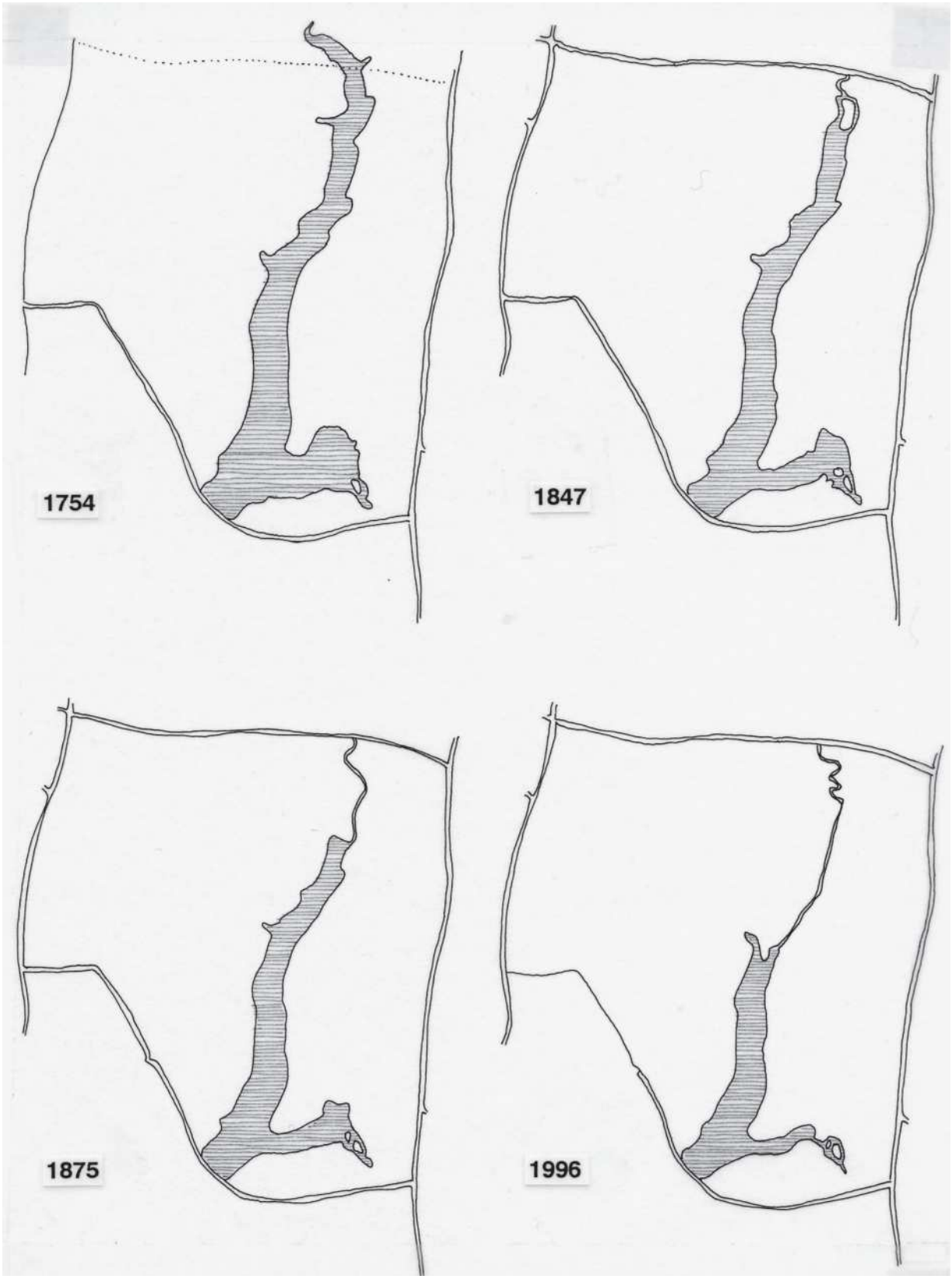


Figure 16
Kneppmill Pond from 1754 to 1996

views down this spectacular expanse of water. The new castellated mansion was sited so that in the views from it, the water would appear to be a part of the grand sweep of a river. An important part of the illusion was that the ends of the pond were not visible from the castle, in order to trick the viewer into thinking that the river continued on, as it curved away out of sight.

In the 187 years since the castle was built as the size of the lake has shrunk so this illusion has become less and less convincing. The headwaters, which have become silted up and overgrown with trees, are now clearly visible from the castle, and effectively block the long view that once extended northwards across the open water. Furthermore, the view south eastwards, towards the old ruin, is now almost totally blocked by trees and scrub that has grown up on the silted-up eastern arm of the pond near to Floodgates Farm. If one contrasts the views today with those depicted by Lady Burrell and H.S. Symms in the early 19th century (figure 17), it becomes very clear that that the loss of the lake has had a very detrimental effect on the setting that Nash originally intended for the castle.

3.2 Existing Condition of the Pond

Only 28.87 acres of open water remain in the pond as the incessant deposition leads to the succession towards dry land. The deposited material becomes progressively older and drier towards the northern end of the former pond. The older deposits are sufficiently stable to withstand the weight of machinery and have been planted over with trees. The younger deposits are more boggy and marsh like in character. These have become overgrown with alder and more especially willow. Great swathes of reed mace at the mouth of the feeder stream slow down the waters entering the pond and promote further accumulation and deposition of silt resulting in further loss of open water and reduction in the overall length.

The fringe of reed mace extends almost the whole way along the banks, in some places reaching up to several meters wide. The close-packed stems create the still conditions to allow deposition, with the result that the pond is becoming steadily narrower as its banks are extending inwards towards the centre - as further deposition occurs, so the depth of the water decreases and the swathes of reeds grows wider. There is a periodic programme of cutting back the rushes in order to control the loss of open water, but the sheer scale of the pond means that this operation has little impact.

There is a similar picture in the south-eastern arm of the pond, where large areas of alder and willow carr have developed on pond deposits. Leaf mould and further deposits continue to build up and so the area of the pond continues its progression towards dry land. In this area the problem is compounded by the vast areas of water-lilies that exist, which further slow the water allowing deposition and whose leaves annually contribute to the build up of sediment.

As silt has been deposited over the centuries, so the depth of the water has also been diminishing. Much of the remaining area of open water is covered by only a thin veneer of water, no more than a few inches deep. This becomes startlingly apparent

Figure 17a

Water-colours of the Pond by Lady Burrell c1820 and views by H.S.Syms dated 1848

Figure 17b

Water-colours of the Pond by Lady Burrell c1820 and views by H.S.Syms dated 1848

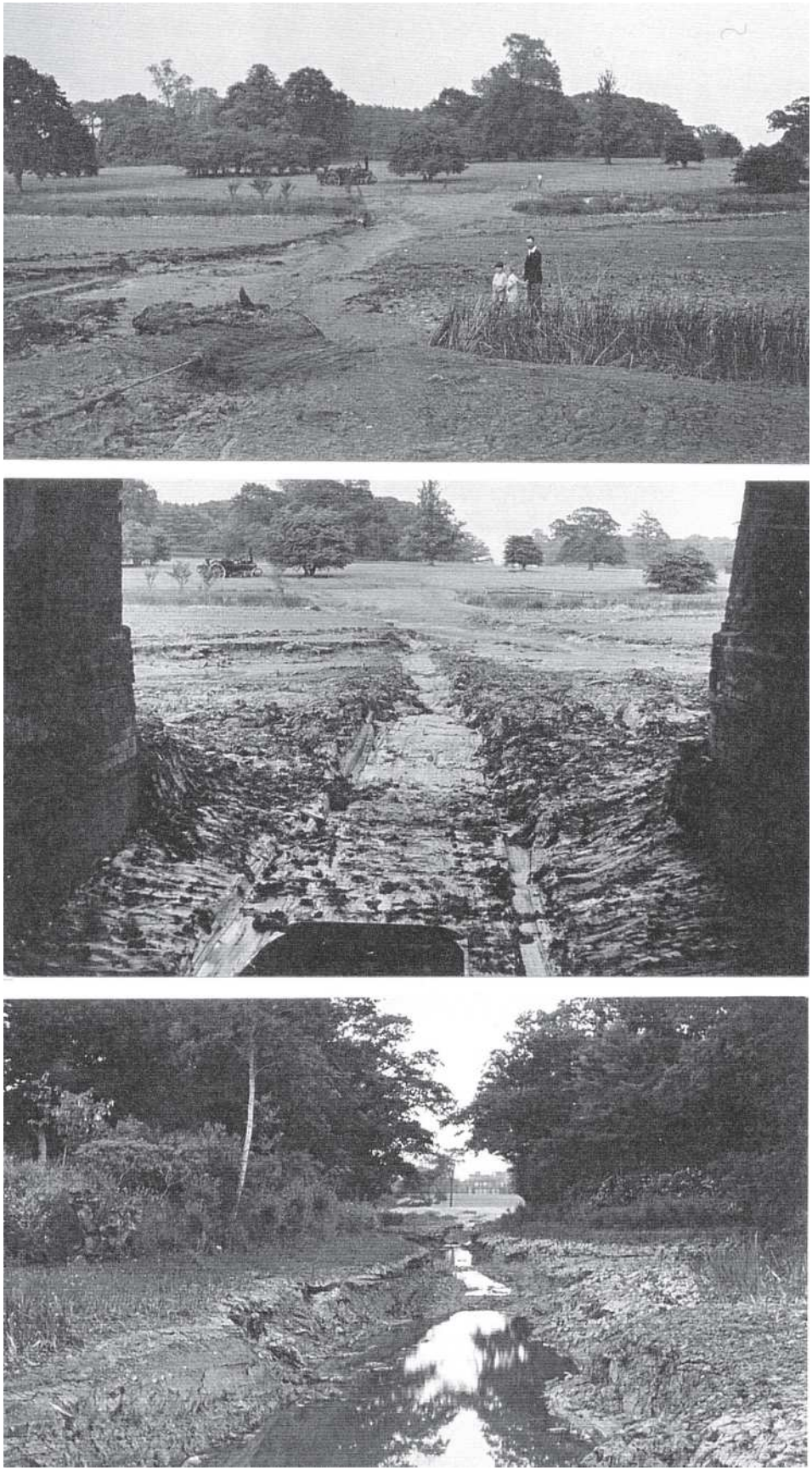


Figure 18
Photographs of dredging works in 1939

when the water is drained down as the photographs in figure 19 demonstrate. The pond is so congested with silt that from some viewpoints it is not instantly obvious that the water has been removed.

In addition to the effect upon the appearance of the lake, the siltation has other impacts. For instance, in mid-summer there is a massive algal bloom across most of the open water, which creates a dense covering across the surface. This is likely to be caused by a combination of high nitrate levels and insufficient water depth. The shallow water warms up quickly creating ideal conditions for the development of filamentous algae on the pond bed, which floats to the surface to form a dense blanket preventing light from penetrating to the lower levels. Over the long term this has a considerable impact upon water quality and is damaging to the overall ecology of the lake.

The siltation of the pond is a major concern. Some dredging work was carried out in the summer of 1939, as shown on the photographs in figure 18. But there are no records to indicate the amount of silt that was removed. Some recent attempts have been made, including a sudden drain-down in the hope that some of the silt would be dislodged in the rush of escaping water. This experiment resulted in a substantial build up of silt around the outflow but little silt actually left the pond. A seemingly more drastic measure carried out by the current owner's father employed the use of explosives in an attempt to dislodge the more solidified areas of silt at the northern end. This, however, also resulted in failure, as the silt was blown vertically into the air - landing in the same hole that had been created by the explosion!

A trial excavation carried out in 1996 revealed that the silt was up to 2.2m deep at the southern end of the lake, close to the dam (figure 20). The excavated material, which was found to be quite firm, was spread in an area of the adjoining Filleys Platt. In the intervening 4 years, the deposits have dried out and shrunk back a certain amount (20%) and become grown over by grass with considerable areas of willow and birch scrub also becoming established.

3.3 Ecological Value

The lake is the premier habitat in the locality. Its importance derives from the extensive body of open water and the progression of habitats found around its margins. It attracts a wide variety of wildfowl, both to over-winter and to breed, though few of these are diving species, and supports a notably large Heronry comprising some 15 breeding pairs. Its margins are also host to a large number of dragonfly species, reptiles and amphibians. Its wildlife value is recognised by its being designated as a Site of Nature Conservation Importance in the Local Plan.

Figure 19a
Photographic Images of Kneppmill Pond

Figure 19b
Photographic Images of Kneppmill Pond

3.4 The Threat to the Pond

The unique value of the pond must surely be the sheer scale of the expanse of open water, which was at one time reputed to be the largest artificial water-body in southern England. But, as the silt deposits continue to accumulate, so more and more of the open water is being lost. Furthermore, because so much of the surviving area of the pond is now only covered by a limited depth of water, little further build up is needed before large areas of the deposits break the surface of the water and form a pattern of small islands in the pond. This effect can already be seen in certain areas, especially close to the edges.

If action is not taken soon then there is a very real danger that the pond will rapidly decline, becoming ever shorter and narrower, until eventually it will disappear. There is indisputable evidence that this process is already taking place and may even be accelerating and the attempts of the current owners to check the spread of the reeds are of limited impact given the scale of the problem.

The restoration of the pond is, therefore, a primary objective which would not only restore the historical setting of the Grade II* listed Castle, but which would greatly improve its overall appearance, and enhance its nature conservation value.

3.6 Restoration Proposals

We propose that the surviving area of the pond be dredged, and that the area of open water be enlarged to approximately the extent shown on the 1875 Ordnance Survey map, thus partly re-instating the original vistas from the Nash castle. This would be achieved by removing areas that have reverted to marsh, reed bed and carr. The area of open water would be enlarged from 28.87 acres to approximately 56 acres.

A detailed survey of the silt within the pond has not yet been carried out, but based upon the knowledge that depths of material at the south end are up to 2.2m it has been assumed that the average depth of silt across the area of pond to be dredged is 1.5m. Thus the total volume of material to be excavated would amount to 330,000 cubic metres. We anticipate that the works would be carried out in a number of stages over a period of up to 20 years. Phasing the operation in this way would reduce the impact upon habitats and help to spread costs.

It is proposed that the arisings from the dredging would be used to positive advantage in the creation of new landforms in the park. For instance, it would be highly beneficial to create a new earthwork bund along the eastern boundary to reduce the noise pollution from the busy A24 trunk road. It is proposed that this bund would be built up in stages with imported inert material being used to form the outer banks, creating settlement lagoons between them for depositing silt.

Some material might also be used in the formation of interesting landform features in connection with the design of the new deer park. These ideas are described in concept form on figure 21.

Figure 20
Photographs of dredging works in November 1996

The trial excavations near to the dam revealed that the silt becomes relatively firm if allowed to dry out for a period. Furthermore, the bed of the pond was found to be quite solid. Following consultations with dredging contractors the following method of dredging is being considered:

1. A silt trap would be constructed at the northern end of the pond to help prevent future siltation. In addition, proposals to create a by-pass to the lake during storm conditions (when much of the silt is brought in) would be investigated.

2. The topsoil would be stripped from the area alongside the A24 where the new earthwork is to be formed. This soil would be stockpiled in low mounds formed close-by (maximum 1m high) to minimise the risk of souring.

3. Parallel bund walls would be formed with suitable imported inert material, which would be spread and consolidated in layers to achieve stable sides to the settlement lagoons up to 3-5m high. The western (park) side of the bund would be profiled to a shallow gradient feathering in to the surrounding levels.

4. Water would be let out of the pond.

5. Temporary hardcore tracks would be built in and out of the pond to allow access for heavy machinery.

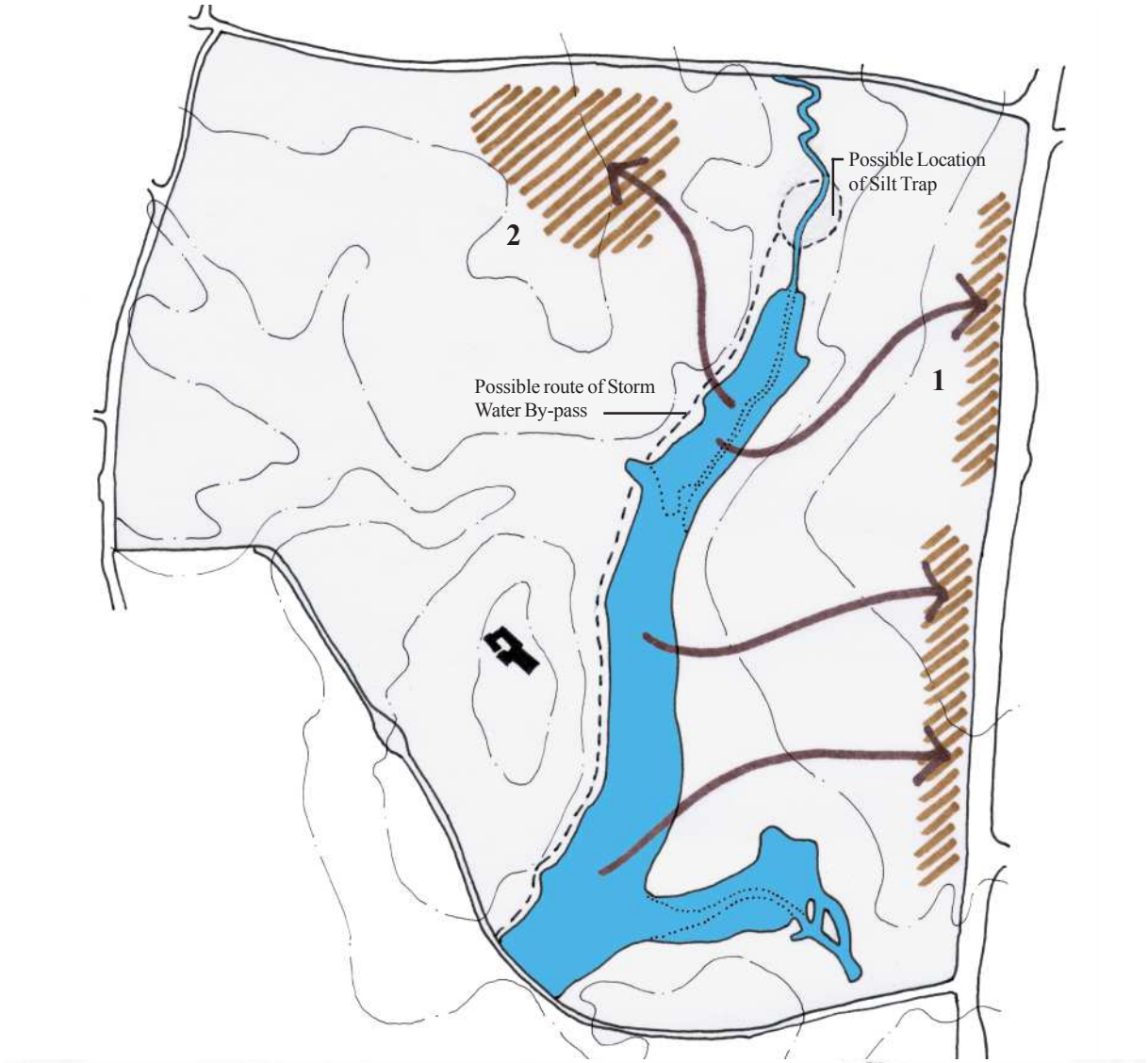
6. A number of dredging teams, each comprising a small bulldozer, an excavator and 3-4 ‘Moxie’ type dumper trucks, would remove silt, transporting it to the settlement lagoons, where the material would be spread out evenly and allowed to dry out (by drainage and evaporation).Where material shrinks down over time within the lagoons, this would be 'topped-up' with new material dredged in the next phase

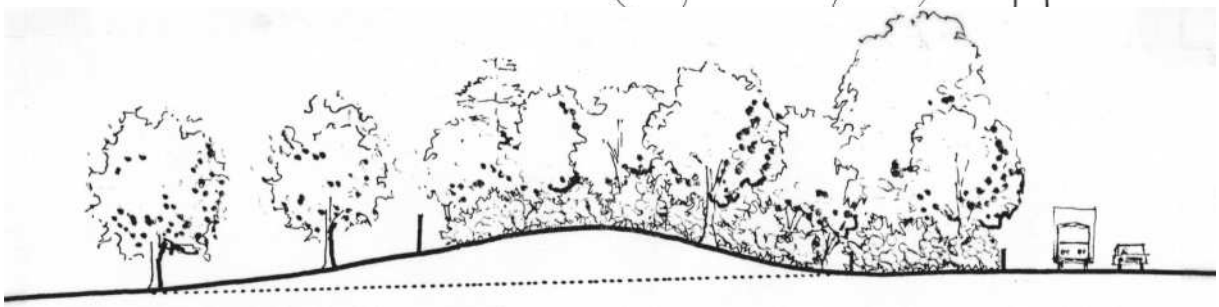
7. Following the complete filling of each of the sections of the lagoon (which would be divided by cross walls) the original topsoil would be spread and graded to achieve an even and gradually ascending profile, which would then be seeded and planted with native trees and shrubs (under Woodland Grant Scheme) as appropriate.

8. The works will be phased over approximately 20 years and dredging would be programmed to clear about an eighth of the pond every 2-3 years, thus allowing the cost to be spread and habitats to recover between phases..

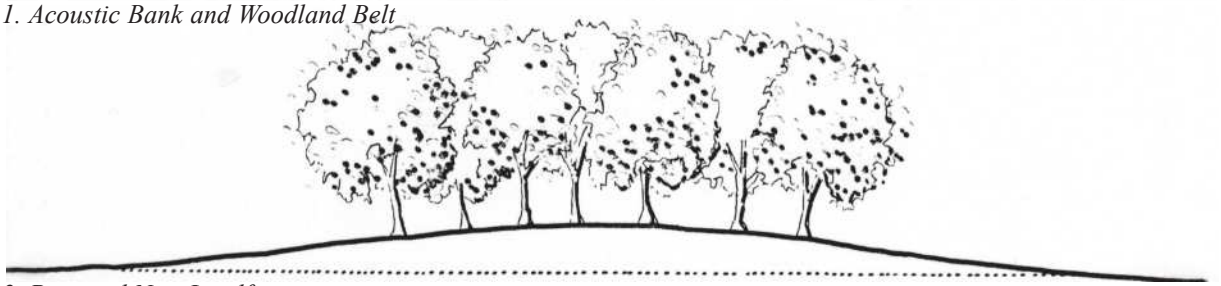
Discussion

The dredging work will be considered in detail in conjunction with a detailed planning application for the formation of the bunding. The Estate has already carried out initial consultation with the local planning authority, the county ecologist, the Environment





1. Acoustic Bank and Woodland Belt



2. Potential New Landform

Figure 21
Mill Pond Restoration Proposals

Agency and the Farming and Wildlife Advisory Group. The response to this consultation has been very favourable (see letters included in the appendix). Close liaison will be maintained with all interested parties as the scheme is developed.

The present ecological interest of the pond relies on the extensive body of open water and the progression of habitats found around its edges. These range from reed swamp, marsh, willow and alder car, oak/ash woodland and scrub to permanent grassland. These various habitats are important for maintaining the ecological diversity of the lake and it is, therefore, crucial that the dredging and extension of the lake retains good and substantial examples of the associated wetland habitats which have developed within the original bank lines of the pond. Prior to the start of dredging that these areas will be surveyed in more detail to determine which should remain, particularly of the marshland and carr areas.

Whilst dredging will provide an opportunity to reduce the extent of reed mace, particularly in those areas of the pond which are to be reclaimed back to open water, a fringe around the margins of the pond would be retained together with some selected areas of shallow water. This vegetated margin is an important transitional area between the grassland and open water, which provides cover whilst the adjacent shallows form a valuable feeding ground. Control of the future spread of reedmace will be achieved by dredging silt beyond it, so creating water too deep for the reed mace to colonise. The shallow areas would be maintained by periodic cutting of any encroaching reed mace.

Removal of the silt will inevitably cause changes to the ecology of the lake. However, by phasing the removal, new conditions will be created in the dredged areas, while the old conditions still remain. This will allow opportunities for colonisation and adaptation, so reducing the impact that occurs when a lake is dredged in a single stage.

It is envisaged that the existing mosaic of habitats that exists towards the northern end of the lake, would be retained but would migrate northwards over time. For instance, the plantation of poplar in Pondtail Rew would be felled, and this area would be managed to encourage the establishment of willow/alder carr as replacement for the area to be cleared further to the south. Likewise once the existing carr were cleared, the head of the lake would be managed/dredged to encourage development of wetland, reedbed and shallows to replace the area that exists slightly further to the south, which is to be cleared to create deeper open water.

Ideally, the section of pond being dredged should be separated from the rest by dams, not only to retain water in the lake for rapid refilling, but also to conserve the biological interest of the unaffected parts of the lake. This however, may be impractical in this case given the scale of the pond.

From a nature conservation point of view dredging of the lake would ideally be undertaken in the Autumn to reduce the impact on the ecology of the lake. This period avoids the breeding season and allows the lake to refill over winter when the rate of water flow is higher. However, because of the nature of the soils and geology on this

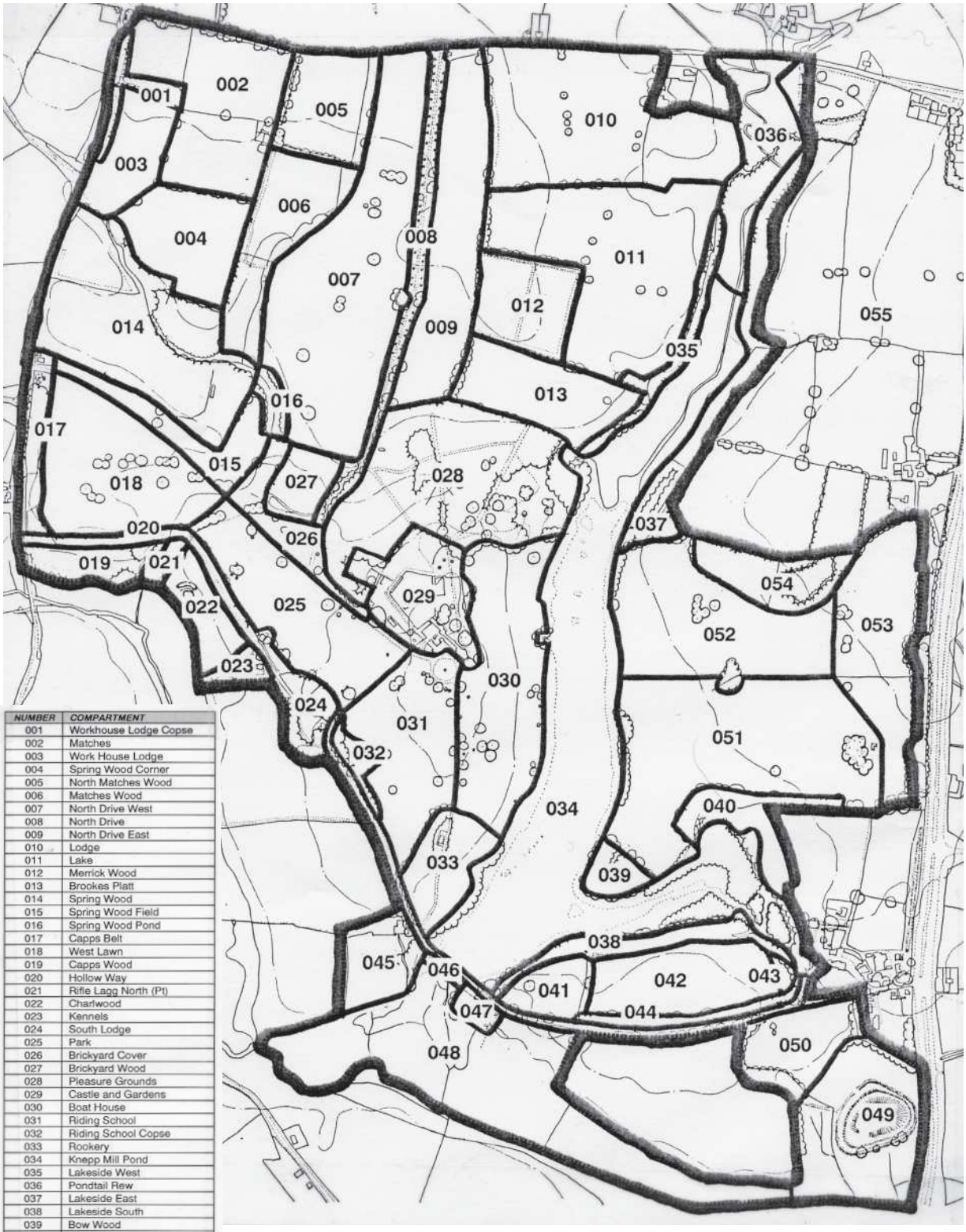
site, it would be completely impractical to consider moving heavy machinery when conditions are likely to be wet. Therefore, work would be carried out in mid to late summer.

4.1 Conclusion

There are two primary objectives for this project, the creation of the deer park and the dredging of the Mill Pond. Individually, these would be valuable projects. But taken together, and combined with the proposals for improving public access to the site, they represent a magnificent opportunity to create significant improvements to the aesthetic, historical and ecological value of the landscape at Knepp.

However, there would be a significant shortfall in the economic viability of the farm resulting from such a large area of arable land being taken out of production. It is, therefore, highly unlikely that the owner could contemplate such a project were it not for the potential management funding available from the Countryside Stewardship Scheme. Furthermore, the owner could not afford to undertake the restoration of the Mill Pond were it not for the possibility of assistance with capital funding from the Scheme.

Therefore, if these unique proposals are to be realised and the distinct benefits to the landscape achieved, it is crucial that this project is approved and entered into the Scheme.



NUMBER	COMPARTMENT
001	Workhouse Lodge Copse
002	Matches
003	Work House Lodge
004	Spring Wood Corner
005	North Matches Wood
006	Matches Wood
007	North Drive West
008	North Drive
009	North Drive East
010	Lodge
011	Lake
012	Merrick Wood
013	Brookes Platt
014	Spring Wood
015	Spring Wood Field
016	Spring Wood Pond
017	Capps Belt
018	West Lawn
019	Capps Wood
020	Hollow Way
021	Rifle Lagg North (Pt)
022	Charlwood
023	Kennels
024	South Lodge
025	Park
026	Brickyard Cover
027	Brickyard Wood
028	Pleasure Grounds
029	Castle and Gardens
030	Boat House
031	Riding School
032	Riding School Copse
033	Rookery
034	Knepp Mill Pond
035	Lakeside West
036	Pondtail Rew
037	Lakeside East
038	Lakeside South
039	Bow Wood
040	Hog Wood
041	Filley's Platt
042	Bridge Fields
043	Tennis Court
044	Ladies Walk
045	Charlwood Barn (pt)
046	Dam
047	Mill Cottage
048	Knepp Mill Laggs
049	Old Castle Nab
050	Floodgates Orchard
051	The Bow
052	Hill House Lawn
053	Hill House
054	Hill House Plantation
055	Hill House Dairy

Figure 22
Management Compartments

SECTION 2

HISTORIC LANDSCAPE SURVEY

SECTION 2 - CONTENTS

SECTION 2 - LIST OF ILLUSTRATIONS

Introduction

The estate has its origins as a deer park surrounding a Norman Castle, which was disparked in the late medieval period and given over to agriculture for several centuries. In the early 19th century a new castellated mansion was built in the centre of the estate for Sir Charles Burrell, designed by the eminent architect John Nash, and much of the surrounding land was laid out as its parkland setting. The size of the parkland was extended during the succeeding years, reaching its zenith at the beginning of the 20th century. Since then the area of the parkland has slowly been denuded, and now almost the whole area is back in arable cultivation.

The present owner, Mr Charles Burrell is the 10th generation of the family to own Knepp Castle Estate since 1788.

This section of the report is divided into 3 parts. Part 1 describes the development of the landscape based upon analysis of the records and historic plans. Part 2 presents the findings of our field work which has established what evidence of the historic landscape has survived. In Part 3 we have proposed that the area of the site included in the English Heritage Register should be reconsidered in the light of this study.

1.1 Early Period - The Norman Castle and Deer Park

The original castle at Knepp was built by William de Broase, on land given to him by William the Conqueror following the Battle of Hastings in 1066. It was built as a defensive castle, and became a hunting box sited on a small hillock, or *motte*, within a deer park.

A number of different interpretations of the origins of the name of the estate have been put forward. One theory is that the name was originally '*Cnapp'*, meaning '*the crest of a hill'*, in reference to the castle's elevated position. Alternatively, Sir William Burrell, writing in the late 18th century[6], suggested that the name derived from the French expression '*Nape d'eau'* meaning '*a sheet of water with the form of a table cloth',* which presumably makes reference to the castle's proximity to the hammer pond[7].

In 1208 King John confiscated the lands and castle at Knepp from de Broase, installed William Bloet as his steward, and kept 220 greyhounds for hunting deer there. In the eight years that he owned the land, there is considerable amount of correspondence from the King that makes reference to the deer park. In 1209, he wrote '*We send you Michael de Puning, commanding you to permit him to take all the fat deer he can without the park at Cnappe as well as by bow as by his dogs'*. And again in 1214 he wrote to the Barons of the Exchequer ordering them to pay Bloett's accounts for repairs to Knepp, for enclosing the park and for putting the Stewpond in order[8]. Later in the same year, following a rebellion by the Barons, the King wrote to Bloet ordering him to *'transfer everything we possess to Bramber . . to fortify the castle . . and to destroy all the houses which surround the castle'*. In 1216, shortly before he died, King John wrote again to Bloett saying '*we order you to see the castle is burnt and totally destroyed'*. It is not known to what extent these final orders were carried out.

In 1218 the castle and lands were returned to the de Broase family, and it remained in their ownership until 1326, when, following the death of William de Broase, the estate passed by marriage to John de Mowbray whose descendent was created the Duke of Norfolk in 1398. The surviving records from an inquisition which followed de Broase's death clearly indicate that the Deer Park was still in existence at that time. The inquisition found that *'in the manor of Knepp there was a messuage worth nothing but repairs, a park of a thousand acres worth 10s. a year beyond the support of the deer and the keeping up of fences. A water mill in the park worth 6s. 6d. per annum, 20 acres of land worth 1d., 6 acres of pasture worth 2d. 7 acres of meadow worth 6d. per annum'*. It is interesting to note the mention of the '*water mill'* in the park which may provide a hint at the possible existence of the Knepp Mill Pond.

The estate continued in use as a deer park under successive Dukes of Norfolk, and was still in existence in 1446, when King Henry VI confirmed the grant which John Duke

6 In his manuscripts that form a part of the Burrell Collection in the British Museum

7 The exact origins of the hammer pond are unclear. However, if Sir William's theory is correct, it would suggest that it existed before the castle was built, towards the end of the 11th century.

8 Stewpond: a fishpond, particularly associated with medieval monastic gardens, they produced fish for consumption.

of Norfolk had made to John Pennycoke of the custody of the '*park'* for life. However, it appears to have been disemparked by the time Saxton's Plan of Sussex was published in 1574. Neither is it shown as a park on John Speed's Map of Sussex published in 1676, unlike its close neighbour West Grinstead Park (refer to figure 1)[9].

1.2 16th Century Iron Industry

Following the abandonment or disemparkment of the deer park, the estate assumed importance in the iron industry. Records indicate that a furnace on the site of what is now Floodgates Farm, was being worked by the Caryll Family for the Duke of Norfolk in 1568. The Carylls are a well known family who built their fortune as ironworkers throughout the Weald. Their wealth was such that in 1573, Sir Edward Caryll bought the estate from the Duke and his family remained there until 1752, although records indicate that the furnace ceased operation in 1604. This is some years earlier than the general decline of the industry in the region, which occurred after the Civil War, when a reduction in the demand for armaments, and the discovery of coal made it cheaper to work the iron ore in the Midlands.

If it had not existed before, Knepp Mill Pond would certainly have been formed during this period of late 16th century iron working, providing a head of water to drive both the 'hammer' which crushed the ore, and the bellows to fire the furnace. Such hammer ponds are a common feature of the Weald, being formed when a clay dam, or bay, was built across a shallow river valley. Writing in 1931, Ernest Stracker, who was one of the foremost authorities on the iron industry, stated that *'the great pond is the largest piece of water in Sussex, with a long and high bay, but owing to the flat nature of the country, small catchment area and low rainfall, the waterflow cannot be great'*. Thus it seems that, despite its enormous size, the pond may not have provided sufficient power to ensure that Knepp became a major centre for the industry, and perhaps contributed to its early demise.

1.3 18th Century Agricultural Landscape

Following the death of Elisabeth Caryll in 1752, the estate was sold to a London banker, Mr Belchier, who in turn sold it on to John Wicker in 1754. Immediately upon buying Knepp, Wicker commissioned James Crow to prepare an accurate survey of the whole estate and this plan hangs in the Estate Office today. An interpretation of part of this plan is shown in figure 2.

The Crow Plan provides a detailed illustration of the layout of the estate some 600 years after it was originally developed as a park. In the area of the current study, it shows an agricultural landscape extending northwards from the original Norman castle, which is bisected by the linear hammer pond. Within the study area, the field layout has a very rectilinear appearance, with field boundaries being generally straight. By contrast, the field system that lies some way to the north of the study area, has a more random appearance, made up of irregular-shaped field boundaries. An

[9] Interestingly, the Knepp Mill Pond is also absent from both of these Maps

Figure 1

The Theatre of the Empire of Great Britain by John Speed, dated 1676

Figure 2
Crow Map of the Estate, dated 1754

interpretation of these differences might be that it indicates the extent of the original medieval deer park. The irregular fields lying outside the park represent the remnants of an ancient field system, whilst the regular pattern of boundaries lying within the original park and were only established after the park was disemparked, some time in the 15th or 16th century.

A road forming the eastern boundary of the estate divided it from its neighbour at West Grinstead, which the plan indicates was owned by Merrik Burrell. This road, which passed close-by the castle was one of the many north-south roads which crossed through Sussex providing access from London to the ports on the south coast. Less common, however, were roads which crossed from east to west. Thus the existence of such a road towards the southern end of the estate, passing between the castle and the Knepp Mill Pond may have meant that the Knepp Estate was more accessible than most, and as such held greater strategic importance.

Other features of note shown on the Crow plan include the Mill and associated windmill adjacent to the bay in the south western corner of the pond and the collection of buildings in the south eastern corner of the pond which were collectively known as *'Furnace Farm'*, in reference to the Caryll's iron workings in the late 16th century. The Castle itself is shown comprising four sides forming a square. However, in 1762 three of the sides were destroyed to provide road building material for works on the adjacent Horsham to Steyning road (now the A24).

John Wicker died in 1767 and the estate passed to his daughter Mary, who was married to Sir Thomas Broughton. He sold it to Rev Joseph Jackson and Henry Fletcher in 1776, who then sold it on again in the same year to Jacob Rider, who owned Knepp until his death in 1787.

1.4 Late 18th Century - The Burrell Family

After Rider's death the estate was put up for auction, and was bought by Sir Charles Raymond for the price of £18,900. The sale particulars provide a brief description of the estate, and go on to suggest that the site offered great potential for future development. They state:

'[These are] The particulars of a valuable and Extensive Freehold Estate consisting of the Manor of Knepp and 9 Contiguous Farms with Knepp Mills and Pond. Containing altogether 1600 acres of rich arable, meadow, pasture and woodland. . .which will be sold by Auction by Mr Willock at the Rainbow Coffee House in Cornhill, London on Friday the 23rd of November 1787 at 12 o'clock.

This estate is perfectly compact, lying all within a Ring-Fence, and there is a FISH-POND of EIGHTY ACRES, in the centre of it; near the upper end of which, at a proper Distance from the Turnpike Road, is an ELEVATED AND BEAUTIFUL SPOT, to build a house upon, and which would command uninterrupted Views over the whole Estate, and the adjacent country of the SOUTH DOWNS'

But Sir Charles died in the following year and the estate was left to his two daughters Dame Sophie, wife of Sir William Burrell and Juliana, wife of Henry Boulton. In 1789 Juliana sold her share to Sir William, and thus the whole estate came into the control of the Burrell family, in whose ownership it has remained to the present day.

Sir William Burrell (2nd Bt)[10] was a very keen archaeologist and historian. Between 1771 and his death in 1796, he carried out extensive research into the county's history and compiled a detailed set of manuscripts containing his hand-written notes, with a view to writing *The History of Sussex*. As a part of this work Sir William commissioned the artists Samuel Grimm and James Lambert to paint an extensive series of views around the county. Although the majority of these water-colours concentrate on ecclesiastical and archaeological subjects, there are a number of views around the Knepp Castle Estate, showing the character of the Pond and the Ruin. A view of Knepp Castle and West Grinstead church by Grimm is reproduced as figure 5a and depicts the character of the agricultural landscape surveyed by Crow.

Sir William died before completing this work, and in his will he bequeathed the manuscripts and paintings to the British Museum, where they survive as the *Burrell Collection*

1.5 Early 19th Century Development of the Designed Landscape

When Sir William died in 1796 the estate was inherited by his son Sir Charles Merrick Burrell (3rd Bt), whose younger brother Walter was later to inherit West Grinstead. In 1806 the OSD series map was published at a scale of 2'' to 1 mile, a copy of which is shown at figure 3. Despite its small scale, this map series was surveyed in remarkable detail and it indicates two notable changes within the estate.

Firstly, an area lying between the Knepp Mill Pond and the Horsham Road had been cleared of its hedgerows, and the particular graphic used on the map suggests the existence of an area of parkland. The northern, eastern and southern boundaries of the parkland had been planted with woodland belts, in the style fashionable during the late 18th century English Landscape Movement. But this park appears unrelated to any form of building. One explanation might be that it had been developed as an extension of the neighbouring West Grinstead Park; after all, the two estates were owned by brothers. But the existence of a broad belt of agricultural land dividing the two areas casts doubt on this theory.

Alternatively, Sir Charles may have laid out this parkland in advance of the imminent construction of a new house. If this were the case it might indicate that he had originally intended his house to be constructed to the east of the Knepp Mill Pond. Or, it could be that at the time that this area was surveyed, work to create the whole park was only partly completed, and that he stripped out the hedgerows on the western side of the pond soon after this survey was recorded.

[10] Sir Charles Raymond was created the 1st Baronet in 1774. Title went with Sofia Raymond to Sir William Burrell.

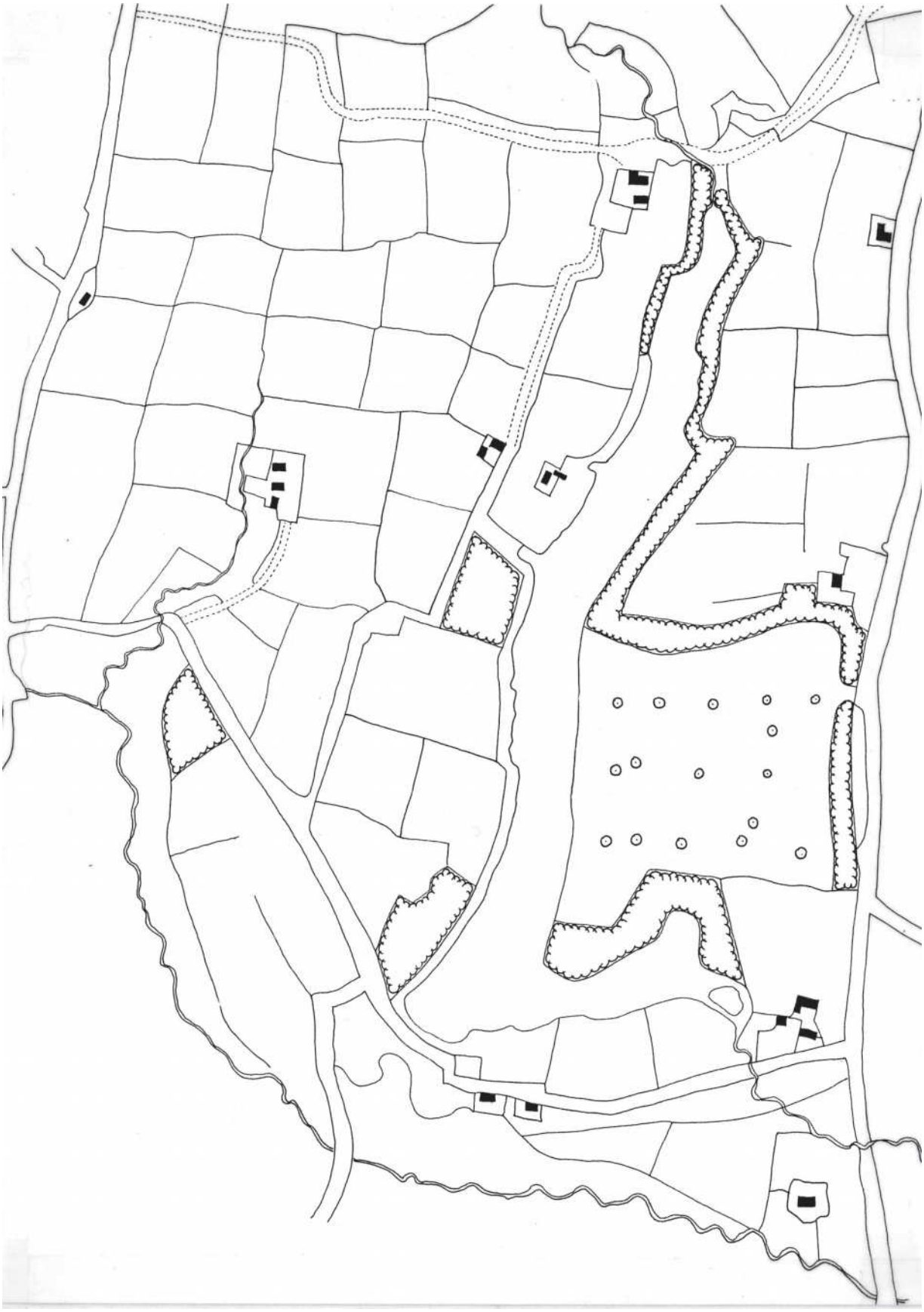


Figure 3
Ordnance Surveyors Draft, 2 inches to 1 mile, dated 1806

Secondly, in 1800, records indicate that Sir Charles financed the construction of a new road between Coolham and Cowfold. The 1806 map shows that this new road (or rather a track) had been formed, passing east to west in the northern part of the current study area (although it does not appear to extend further east or west after leaving the estate). The route that the road took crossed what had been the northern end of the Hammer pond (as shown by Crow). In order to achieve this it appears that the water level in the pond may have been lowered, and thus reducing the overall size of the pond[11].

In about 1808 Walter Burrell commissioned John Nash to design and build a new house at West Grinstead. In the same year, Nash was also commissioned by Sir Charles Burrell to design and build a house at Knepp. The construction of both houses began the following year and Knepp was completed by 1812 at a cost of £28,500. Unlike West Grinstead where Nash used real stone, the Castle at Knepp was constructed entirely from brickwork, rendered in stucco and lined out to simulate stonework. The bricks were fired on site and the timber was cut from the estate woods. The local Horsham stone was only used for construction of the main porch.

No records survive relating to the laying out of the grounds, but it is likely that an area of parkland was laid out at the same time as the castle was being built. A survey by Christopher and John Greenwood was published in 1825, a copy of which is reproduced at figure 4. This plan shows the building in place with the area immediately to the south east and west laid out to parkland, and forming its setting. Two drives lead northwards across the parkland from Castle Lane. They meet and sweep around the eastern side of the house, and continue northwards as a single drive running parallel with the pond, joining the Cowfold to Coolham road (A272) at Lodge Farm.

The graphics used on this map would suggest that West Grinstead Park and Knepp Castle formed a continuous area of parkland, divided only by Horsham to Steyning Road (A24). The remainder of the study area is shown in plain graphic, suggesting that it remained in agriculture.

An illustration by Charles Smith published in Cartwright's *'Parochial Topography of the Rape of Bramber'* in 1830 (refer to figure 5b), shows the castle situated in a parkland setting with an area of woodland extending behind the building down the banks and to the edge of the Pond. The Park is shown grazed by sheep. Whilst the castle itself appears to be drawn accurately, the close proximity of the building to the water and the exaggerated nature of the topography behind suggests considerable artistic licence has been employed. The woodland that forms the backdrop to the castle in this view is not shown on the Greenwood survey, which could indicate that the Pleasure Grounds were laid out in the intervening period, and that the artist has shown what the view would be like once the trees had grown up. However, it is more likely that the Pleasure Grounds were in existence, or at least an area of woodland

11 It is not known whether the pond was drained to build the road, or whether the road was constructed on this alignment because the water had already been drained down some time beforehand.

Figure 4

Survey of the County of Sussex by Christopher and John Greenwood, dated 1825

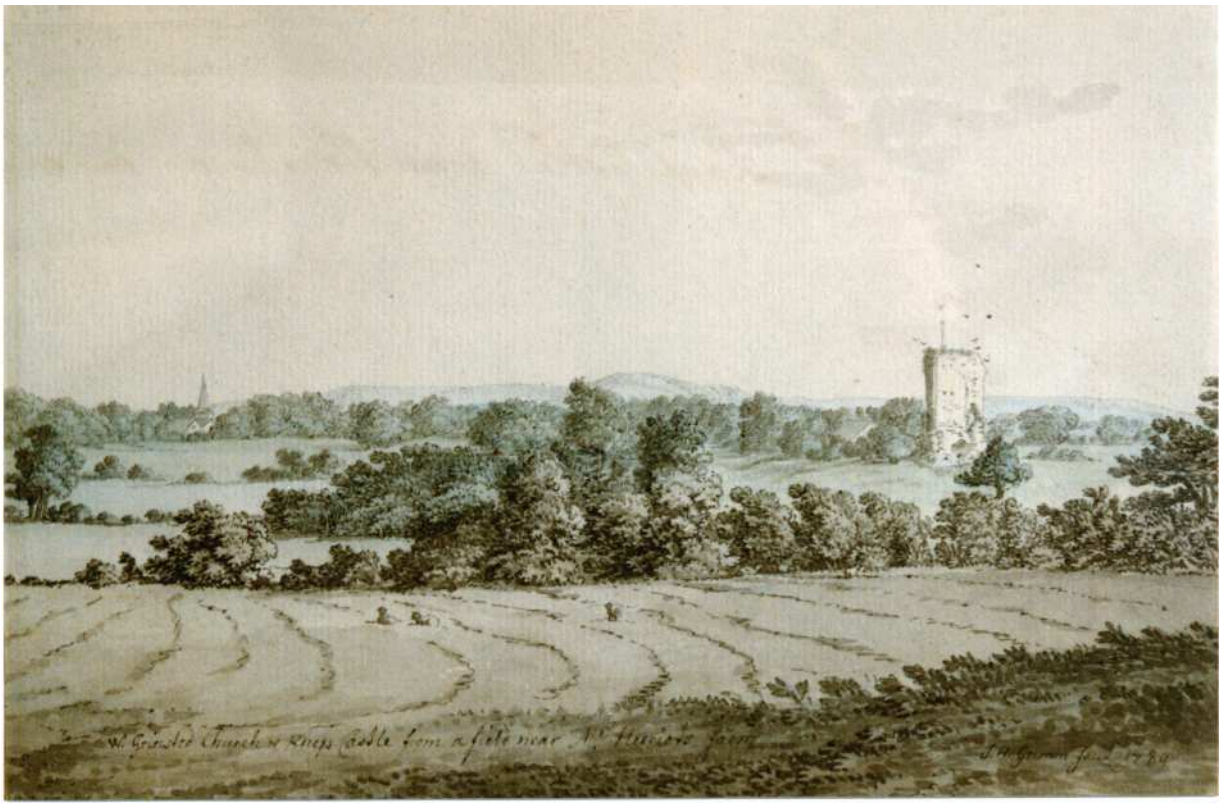


Figure 5a

W. Grinstead Church and Knepp Castle by S.H.Grimm, dated 1789

Figure 5b

Knepp Castle, etched by Charles Smith from a drawing by Lady Burrell, dated 1830

Figure 6
Watercolours of the park by Lady Burrell c.1820

existed in 1825, but that the very small scale of the survey plan (1'' to 1 mile) prevented it from being shown.

The engraving might, therefore, be a fairly accurate reflection of the overall character of the view. When the same illustration was reprinted in Horsfield's *'History, Antiquities and Topography of the County of Sussex'* in 1835, and it was accompanied by the following description:

'[Knepp] is situated on a gentle elevation, commanding some interesting scenery, and overlooking the most extensive piece of water south of the River Thames and which derives additional beauty from its serpentine form, adorned as its banks are, by fine timber and plantations'

1.6 Mid 19th Century

In 1847, the Tithe Map for the Parish of Shipley was published (refer to figure 7). By this time the parkland had been extended westwards to include West Lawn, and the Pleasure Grounds to the north of the castle were certainly in place. Comparison of the Tithe Map with the Crow Survey of 1754 shows that to a large degree the grounds had been laid out to take the best advantage of the existing landscape structure, rather than creating a major new design overlay.

Figures 8 and 9 show a series of watercoloured views by H.S. Symms that are contemporary with the Tithe Map. They provide a remarkable indication of the character of the landscape that this plan describes.

The new castle had been sited to take advantage of an elevated position and the views that were available from there, both of the surrounding countryside and of the hammer pond. It was orientated so that each aspect of the house provided a different view, and the effect of the serpentine form of the pond was maximised to give the illusion of a broad sweeping river rather than an artificial lake. The grand window half way up the round staircase tower was aligned so that the view from it extended down a great length of the pond, which thus maximised the visibility of open water. As this view, which was also shared with the dining room, extended north eastwards, the headwaters of the pond were hidden out of sight as the pond swept around a slight bend.

Views from the drawing room and library extended south eastwards across the water, focusing on the dramatic ruins of the original castle. In this view, the woodlands and plantations along the banks of the pond would not only have framed the ruins, but also they would have served to hide the ends of the pond, creating the illusion that the pond continued-on out of sight. At least some of these woods pre-date Nash's design, appearing on the Crow Survey and in the Grimm water-colours.

Figure 7
Tythe Map of the Parish of Shipley, dated 1847

Figure 8
Sketches in the parishes of West Grinstead and Shipley by H.S.Syms, dated 1848

Figure 9

Sketches in the parishes of West Grinstead and Shipley by H.S.Syms, dated 1848

To the south, views from the principal frontage of the Castle extended across an area of parkland to a distant horizon formed by the scarp slope of the South Downs, at the top of which the wooded Chanctonbury Ring[12] formed a notable eye catcher.

The parkland setting of the castle, which comprised the West Lawn, the Castle Lawn and Hill House Lawn[13], had been formed by the removal of the hedgerows from the previously agricultural landscape. Many of the hedgerow trees would have been retained and it is probable that new trees were planted (although the tithe map does not record individual trees). Some new areas of woodland plantation were planted around the edges of the parkland, especially at the western end. It is not at all clear which drive formed the principal approach to the castle. The original drives, shown on Greenwood's map were still in place, but these had been supplemented by an additional drive from the north, and a new approach from the West. Thus there were 5 possible routes to the castle, but curiously none of them appeared to include an entrance lodge.

The Pleasure Grounds lying to the north of the castle are the only area of the estate that seems to have been developed to a completely new design. Here the Tithe Map shows a significant area of woodland called *Hog Kennel and Old Plantation Close* - a name which makes reference to the small woodlands shown on the Crow and OSD plans. The plantation was laid out with an intricate network of sinuous and circuitous paths throughout, and was in all probability a form of woodland garden which surrounded and enclosed the walled kitchen gardens located immediately to the north of the castle.

Elsewhere, the layout of the estate remained largely unchanged from that shown on the Crow Survey of nearly 100 years beforehand. It is, however, worth noting that the extent of the pond at its northern end had once again been reduced.

1.7 Late 19th Century

In 1831, when his brother Walter died, Sir Charles inherited West Grinstead Park. When he died in 1862, both estates passed to his son Sir Percy (4th Bt), but he died in the same year and the estates passed to Sir Walter Wyndhan Burrell (5th Bt), who held them until his death in 1886.

In 1875 the 1st edition Ordnance Survey Map was published (25'' to 1 mile), a copy of which is shown at figure 10. In contrast to the Tithe Map, OS maps accurately show the distribution of trees and woodlands. This gives a better impression of the character of the Parkland around the castle, showing the irregular arrangement of specimen trees. It also gives more information on the layout of the Pleasure Grounds, indicating that it comprised substantial areas of open glade with free-standing trees as well as

[12] Changtonbury ring is a Pre-historic enclosure dating from the Bronze Age (c.1000 BC). It was planted with Beech trees in 1760 by Charles Goring to form an eye catcher for the nearby Wiston Estate.

13 Philip Miller in his Gardeners Dictionary defined a lawn as a great plain in a park or a spacious plain adjoining a noble seat, never less than 30-40 acres. The Idea of the landscape lawn was to give a sense of openness, although it was recommended that trees be planted, if possible irregularly.

areas of woodland and denser shrubbery around which the paths were routed (there was some modification of the path system from that shown of the Tithe Map).

Despite these differences in the quality of the surveying, the 1st Edition OS shows that the basic layout and structure of the estate had changed very little since 1847. Nevertheless, some of the changes are noteworthy. Firstly, the approach drive from the north had been slightly straightened, an avenue of trees had been planted alongside it and a lodge had been added at its junction with the *New Road*. This might indicate that the north drive had assumed greater importance than either of the others, suggesting that it had become the principal route to the Castle.

The western end of Castle Lane, the ancient east-west route passing along the south side of the parkland, had fallen out of use and become wooded over. The plan also shows that a considerable amount of siltation had occurred at the northern end of the pond, further reducing the extent of the open water.

In 1886 Sir Charles Raymond Burrell inherited the estate from his father, and became the 6th Baronet. He had married Etheldreda Loder in 1872, and it was her brother, Sir Edmund Loder, who bought the nearby estate of Leonardslee in 1889, and developed an extensive woodland garden there[14]. It is possible, bearing in mind the family connection, that the Loders might have had a hand in the continued development of the Pleasure Grounds at Knepp, advising on changes to the layout or supplying newly introduced plants from around the world etc. However, it appears that no records exist, either at Knepp or Leonardslee which would confirm this.

1.8 20th Century

In 1899 Sir Charles died and the estate was inherited by Sir Merrick Raymond Burrell (7th Bt), whose love of horses encouraged him to set up a stud farm at Knepp, breeding hunters. But in 1904 disaster struck and much of the south eastern part of the castle was gutted by fire. This fire destroyed the contents of a number of rooms including the majority of the estate records that had been held in the Library. Sir Merrik rebuilt the house, almost to the original design, but included an extra floor.

By the time the 3rd edition OS Map was published in 1911 (refer to figure 11), the hedgerows in the fields either side of the North Drive had been stripped out and the area had been developed as an extension of the parkland. The hedgerow trees were retained as parkland specimens and some new roundel plantations were added. The surviving estate records indicate that a new plantation called Merrick Wood, lying to the north of the woodland gardens, had been planted with oak in 1890, and it is possible that this northern extension of parkland took place contemporaneously.

The 1911 Map also shows that the pond had continued to silt up, to such an extent that the northern end had become woodland. The map graphic also indicates that extensive swathes of reed beds had developed, especially along the eastern bank and in the eastern extension of the pond leading to Floodgates Farm. Other changes since the 1st

14 The Gardens at Leonardslee are included on the English Heritage Register, listed Grade I

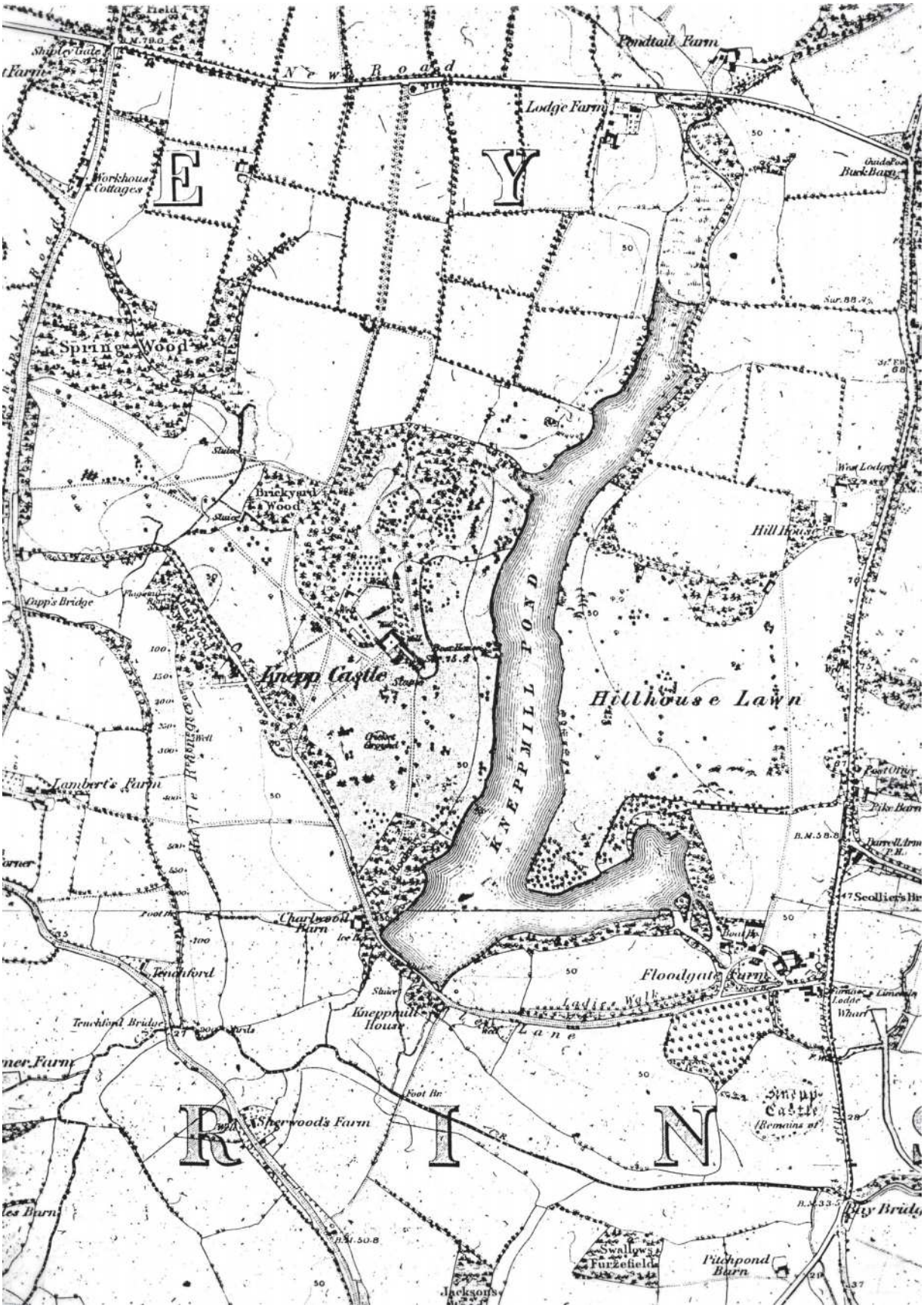


Figure 10
First Edition 6 Inch OS Map, dated 1875

Figure 11
Third Edition 25 Inch OS Map, dated 1911

edition include the construction of lodges at each of the remaining entrances to the Park.

In 1912, Sir Merrick sold West Grinstead Park to his friend Mr J.P. Hornung who subsequently established a racing stud, which later became part of the National Stud under the directorship of Sir Merrick's second son, Peter Burrell. In the 1920's Sir Merrick made over the Knepp estate to his eldest son Walter, whilst retaining the Home Farm, which was the centre of his own stud enterprise.

Figure 12 shows a pair of aerial photographs of the estate taken in 1932. The first shows a close up of the castle and the kitchen garden. The character of the Pleasure Grounds shows up very clearly in this view, comprising dense clumps of trees and shrubbery and open glades. Because the photo was taken in winter, one can see that there are a large number of specimen conifers, both in the open and throughout the woods. It is also interesting to note that to the west of the castle, the kitchen gardens and service area was screened off from view by a dense belt of evergreen shrubbery. In the distance, the avenue over North Drive forms an impressive feature, together with two young roundel plantations in the northern park.

The second view shows the impressive scale of Knepp Mill Pond in the foreground of the view towards the castle. Some large areas of reeds can be seen along the margins, especially in the eastern arm of the pond leading towards Floodgates. However, there is little evidence of any dense areas of scrub that has subsequently developed, and at the time of this photo there would have been a clear and uninterrupted view from the castle to the ruins.

In the summer of 1939 some dredging work was carried out in the pond using traction engines, but there are no records to indicate the volume of material that was removed or where it was dumped. However, photographs in the family album indicate the very considerable depth of deposits that existed. Whether this was intended to be the first of many phases of the operation is not known, but the outbreak of war prevented any further work. The lake was drained down for the duration of the war, by order of the War Office. It was thought that its enormous size and distinctive shape would assist enemy bombers navigating their way towards London.

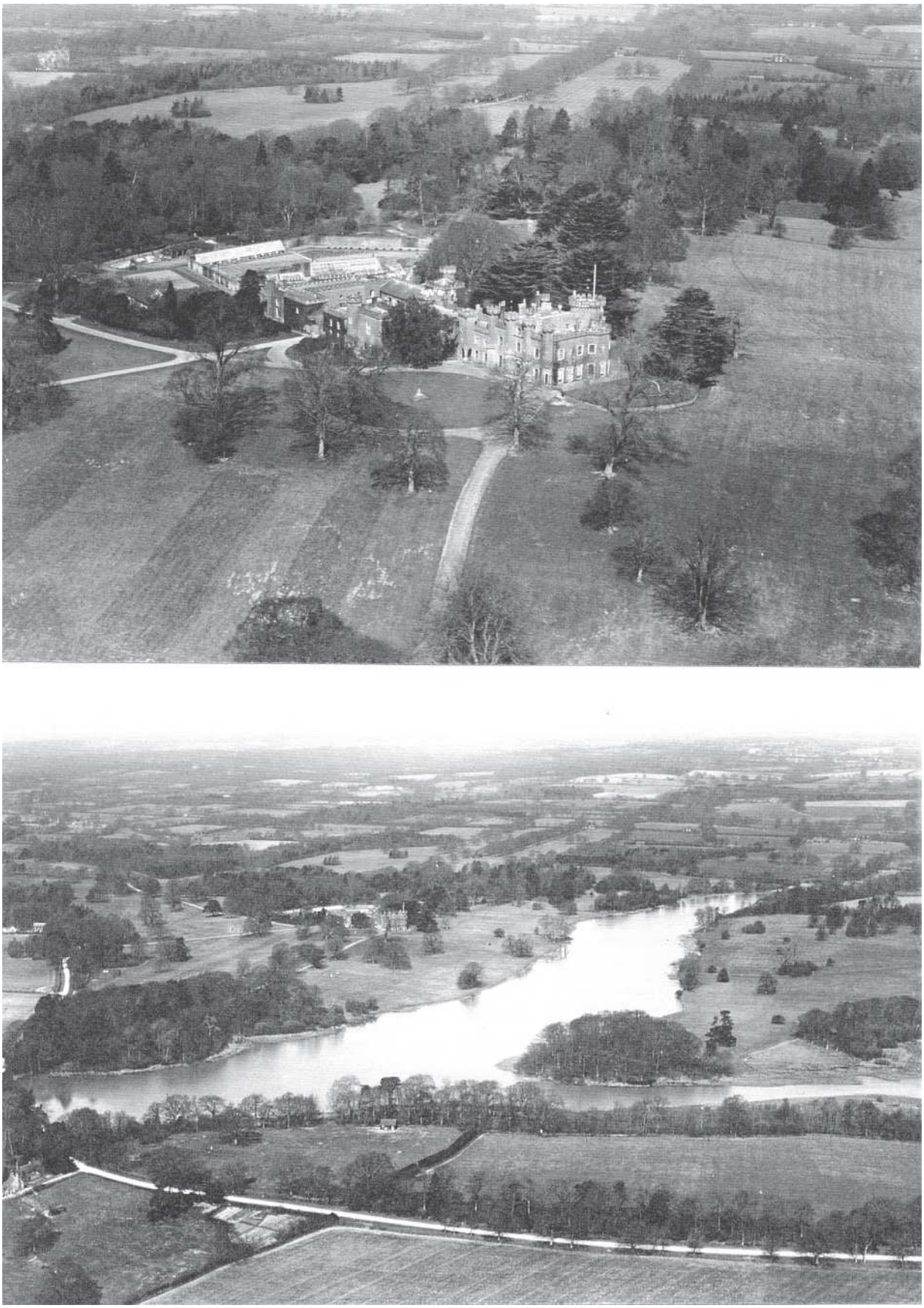


Figure 12
Aerial Photographs, dated 1932

1.9 Recent Period

Sir Walter (8th Bt) owned the estate until his death in 1985, when the running of the estate was taken over by his grandson Mr Charles Burrell. Under Sir Walter few changes occurred to alter the layout of the park. However, the pond has continued to silt up, to the extent that it is now some 30% of the size of the pond shown on the Crow Survey of 1754. Much of the silted up area has either been planted over or has developed as dense scrub, and the areas of reed beds have expanded.

Likewise the Pleasure Grounds have become overgrown by scrub, and many of the former glades have become closed over. Little of the original path network is still passable. The area also suffered a fair degree of storm damage. Furthermore, many of the original parkland trees have been lost, and the avenue of trees alongside the north drive, which were originally elms, have been felled.

Figure 13 shows the layout of the park in 1996.

Figure 13
Survey of the Castle Grounds, dated 1996

2.1 General

We have carried out extensive field work to corroborate the map and documentary evidence and establish the extent to which the layout of the historic landscape has survived.

2.2 Features surviving from the Pre-park landscape.

This section deals with the major archaeological and ancient countryside features which have survived from the period before the laying out of the designed parkland landscape and which are shown on figure 14[15].

1. Castle Ruins

The main archaeological interest on the site is clearly the remains of the original 11th century Knepp Castle which is designated a Scheduled Ancient Monument. It comprises a major set of earthworks including a substantial motte[16], and an upstanding section of masonry, which are described in some detail in West Sussex County Council's Sites and Monuments Record reproduced at Appendix C. A dig carried out by an amateur archaeologist from Southampton University in 1962 failed to uncover any further subterranean remains of the castle walls, which strengthens the theory that the larger part of the castle was knocked down in 1762 to provide material for nearby road works.[17] Some works have been carried out on the ruin to stabilise the stonework, and a lightening conductor has been fitted, although this now needs to be repaired.

2. Hammer Pond Bay

The bay is a considerable earthwork forming a dam at the southern end of Knepp Mill Pond. The sluice on the dam is used to control the water level of the pond. It includes a fish trap in the outfall stream with two hollowed out depressions beside its banks. These are filled with water when the pond water is let out and used as holding ponds for the fish caught in the trap.

The remaining sluice comprises an open fronted brick building which it partially cut into the bank, and which houses a small disused water wheel. The early plans show that the steep banks of the bay were covered by trees, only a few of which have survived, along with some large stumps. The remaining trees were felled in the early 1980's to comply with the requirements of the 1975 Reservoirs Act.

The origins of the Knepp Mill Pond, and hence the bay, are unknown but it is possible that it predates the 11th century Castle. Alternatively, it may have been constructed in association with the medieval iron industry, but it was certainly in existence by the 16th century when a furnace at Floodgates Farm was being worked by the Caryll

[15] Excluding Hedgerow banks and field boundary ditches.
[16] Mound on which a castle was erected
[17] This dig was not authorised, and consequently Sir Walter received a stern letter from the Ministry of Works for allowing such activities to go ahead on a Scheduled Ancient Monument in his ownership.

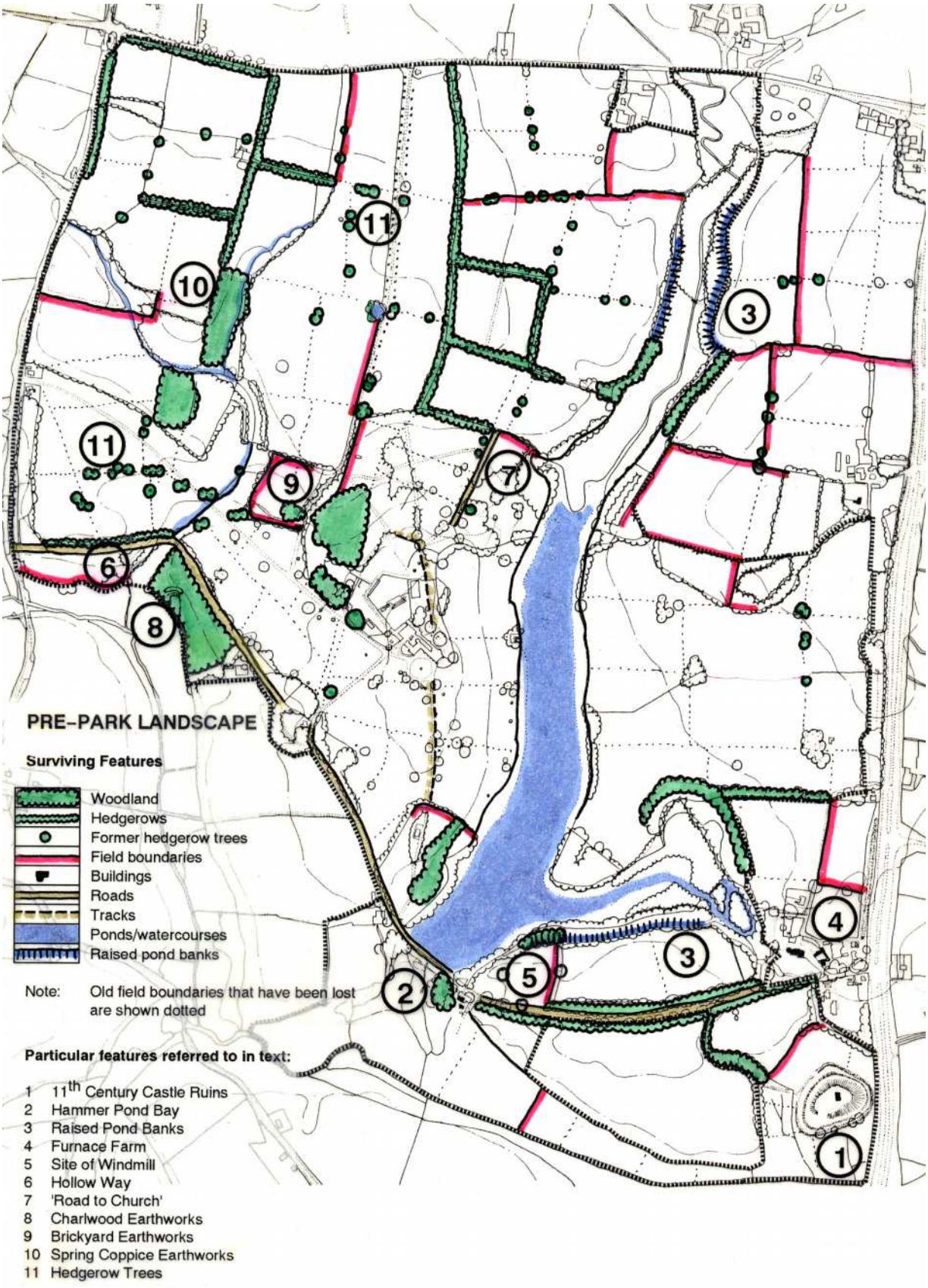


Figure 14
Pre-park Features

family. Although it is not shown on either Speed's or Saxton's surveys of Sussex, this does not necessarily mean that it did or didn't exist at the time

To the south of the bay there are a series of earth banks on the floodplain of the River Adur, which at first sight could be mistaken for some form of water meadow control system. However, according to the present owner, these features were constructed by his uncle some 20 years ago, as a way of impounding a shallow sheet of water in winter to form a skating pond.

3. Raised Banks

Distinctive bank profiles occur at certain points around the outline of the Hammer pond, but are raised some way above the present water level. These most probably represent an earlier bank line of the pond, indicating that the water levels were considerably higher than the current level, and thus the overall surface area of the pond would have been substantially larger. These banks generally correspond to the outline of the pond shown on the Crow Survey of 1754.[18]

Further evidence to support this theory is gained by studying the trees along the southern boundary of the pond. Generally speaking, the large mature trees exist above the level of the raised banks, whilst smaller trees and coppice stools exist below the line, and have probably grown up since the water level was lowered.

4. Furnace Farm (now Floodgates Farm)

This farm was referred to as Furnace farm on the Crow Survey and is the most probable location of the Carylls iron furnace in the 16th century. There is no evidence of the furnace itself but slag was uncovered during 20th century road works nearby. There is also believed to be an area of surviving slag close to the stream to the south of Castle Lane

5. Windmill Site

A levelled platform is evident in the field immediately to the north of the Knepp Mill House. Close by, the ground is uneven and shows signs of former earthworks. The terrace coincides with the location of a windmill shown on the Crow Survey, and depicted in the Grimm watercolours of 1788. The surrounding earthworks may be associated workings, or spoil heaps left when the windmill was demolished. During recent works, large sand deposits have been discovered in this area.

6. Hollow Way

This feature passes along the southern boundary of the West Lawn. Its alignment coincides with the road shown by Crow, which formed one of the few east to west routes in the locality. In some places it has a highly distinctive cambered profile,

[18] However, we have not attempted to analyse the relationship between the level of the raised banks and the height of the bay to assess whether the dam has been altered.

flanked by banks, which are in some instances very steep. This route appears to have fallen out of use by the time of the 1847 Tithe survey and all but the eastern end of the track had disappeared by the time of the 1st Edition OS Map in 1875. The western end has become overgrown, and some sizeable oak trees have become established in the middle of the road which confirms that it has not been in use for a considerable length of time.

7. 'Road to Church'

One of the principal routes through the Pleasure Grounds follows the alignment of a track shown on the Crow Plan. Some large old oak trees that survive alongside this track will certainly be remnants of a trackside hedgerow. The track extended northwards to the northern end of the pond, passing alongside fields with names such as '*6 acres going to church'* and *'5 acres going to church'*. The track is also shown on the subsequent Greenwood and Tithe maps, but the northern end had fallen out of use by the time of the 1875 OS survey.

8. Charlwood Earthworks

A substantial set of earthworks occur in Charlwood Wood. These consist of a large hollowed-out area in the side of the slope and a very steep bank which is crescent-shaped in plan. The feature is known locally as the 'Rifle Butts' and it is shown on the 1875 OS plan forming the end of a 900 yard rifle range which extended southwards along the level flood plain of the River Adur.

9. Brickyard Earthworks

A number of banks and small hillocks lie within Brickyard Wood in what appears to be a random pattern. The origins of these are unknown, but they may be spoil-heaps and diggings associated with a brick-working site which existed in this area, and gave its name to the wood. A small artificial pond on the southern boundary of the wood, formed by the creation of a bay across a small stream, may also be connected with these workings.

On the Crow Survey (1754) the area is shown as two open fields, Acre Platt and Dunghill Mead. By 1847 (Tithe Map) both the pond and the wood were in existence and referred to as 'Old Brick Wood'. If they had not existed in 1754, but were already 'old' by 1847, it is possible that they were in operation in 1809 and were the source of bricks for the construction of the house.

10. Spring Coppice Earthworks.

A series of parallel ditches pass through Spring Coppice Wood, aligned diagonally across the slope leading to a stream in the valley floor. These are most probably the remnants of early drainage works.

11. Hedgerow Trees

Many of the free-standing trees in the parkland are of such size and age that they clearly pre-date the laying-out of the designed landscape during the early 19th century. These trees represent the remnants of former hedgerows that were grubbed out to form the open parkland. Evidence for this is found in West Lawn where the line of large oaks which cross the field diagonally coincide with the alignment of a field boundary shown on the Crow Survey. Furthermore, if one overlays a survey of all the parkland trees that exist today onto the Crow Plan it becomes clear that most of the larger surviving oaks originated as hedgerow trees[19].

The same is true of the free-standing trees in the arable land to the north of the Castle. Here, many hedgerows shown in 1754 have survived intact, but in some instances only an irregularly-spaced line of trees, or even just an individual specimen is all that remains of the hedgerow, providing evidence of the former landscape pattern.

[19] However, alignment of former hedgerows with the surviving large ornamental species, such as the limes or pines is merely coincidence.

2.3 Surviving Features of the 19th Century Parkland Landscape

The 19th century designed landscape was slotted into the framework of the landscape that had existed before it, and its broad layout was defined not only by the huge pond in the centre of the park, but also by the pattern of hedgerows, woods and roads that are shown on the Crow Survey of 1754. In other words, it is clear that with the exception of the pleasure grounds, there does not appear to have been a grand 'design' as such, but rather an adaptation of the features that were already present. Which is one reason why so much of the pre-parkland landscape survived.

Figure 15 shows an analysis of the 19th century landscape, as shown on the 1875 OS plan, and indicates those elements that have survived and those that have been lost. The plan also shows features that have been added (mostly areas of woodland). The plan demonstrates that despite changes in the land use of the parkland itself, the structure of the original designed landscape, as it can be interpreted from the 19th century maps, has survived largely intact through to the present time.

1. Knepp Mill Pond

Knepp Mill Pond has clearly always been one of the most prominent features of the landscape at Knepp, and it seems that combined with the topography, it was the overriding influence that would have determined the siting of the Castle. However, its size has been substantially reduced since 1875, and the area of open water is now only 50% of the area shown on the 1st edition. Because of siltation and the growth of scrub and reeds, the water is now far less visible than it would have been originally. This will have had a dramatic effect on the setting of the Castle, as demonstrated on figure 17, which shows a comparison of the size of the lake in 1847 and 1996.

2. Parkland

The spatial definition of the parkland area is intact, and many of the original parkland trees have survived. But, the Collins English Dictionary defines parkland as *'grassland with scattered trees'*, and it is defined in the Glossary of Garden History as being *'developed as an area planned for visual enjoyment, naturalistic in appearance, with rolling downs, careful location of trees, often a lake, and maintained by those cheapest of gardeners, deer and sheep'*. Within these narrow definitions, it could be said that none of the area of the original 'parkland' that extended to the east and west of the Castle has survived.

Virtually the whole parkland area is in arable rotation. At the time of survey, the larger part of this area was under ley pasture, designed to last 2 to 3 years before being ploughed up and sown with an arable crop. Although it was mostly in grassland at this particular time, the character of the grassland is very different to that of permanent pasture normally associated with parkland. And when much of the area comes back into arable cultivation, its parkland character will be further diluted.

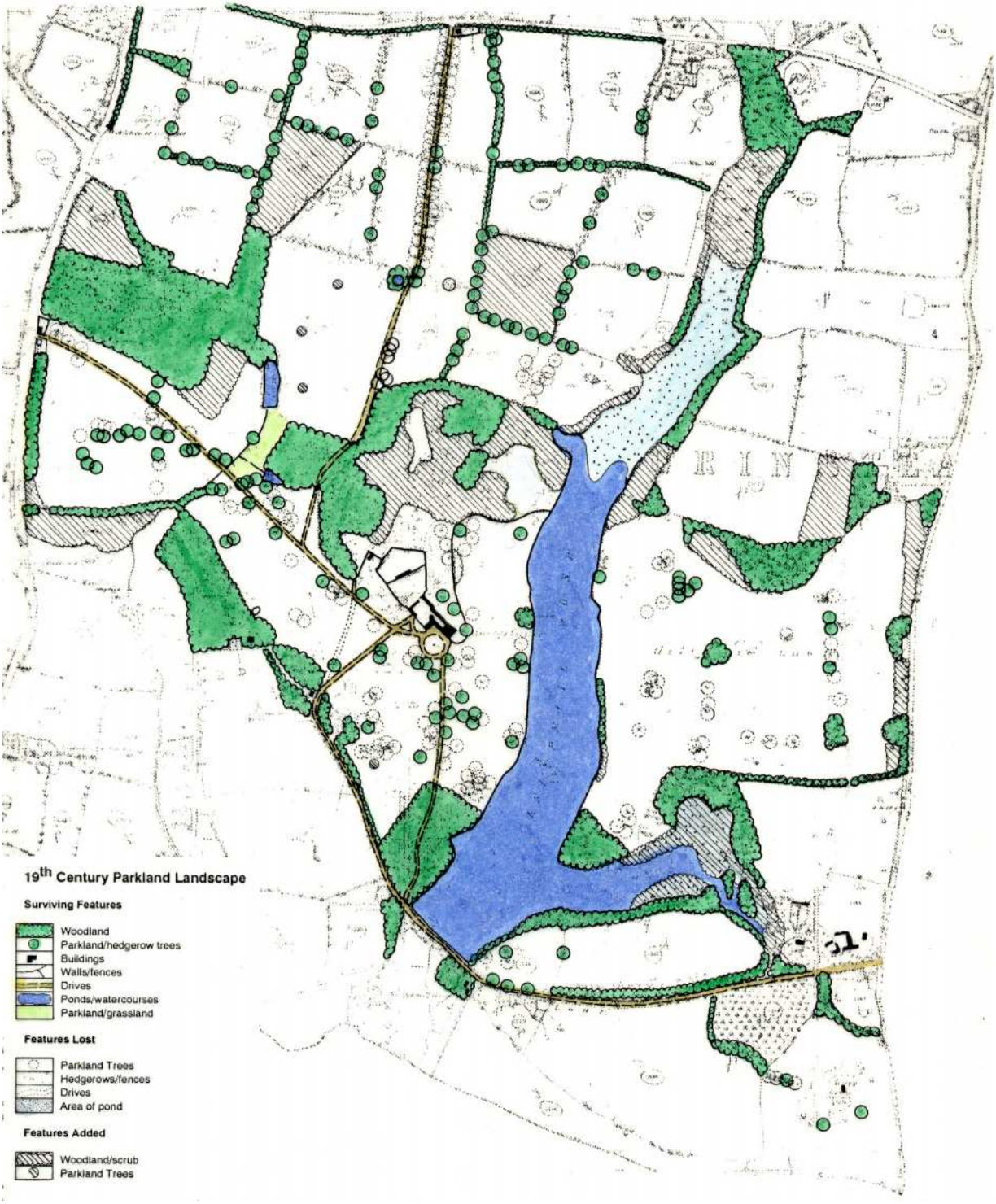


Figure 15
Surviving Features of the 19th Century Parkland Landscape

Figure 16 describes how the development of the parkland has progressed from 1754 to the present day.

3. Woodlands

All of the areas of woodland shown on the 1st edition plan have survived, although obviously some of the plantations may have been felled and replanted. These woodlands have been supplemented by a considerable amount of new woodland planting around the park, such as Matchetts Wood and Merrick Wood, and the expansion of Spring Wood. The new woodlands will have interrupted views around the park and reduced the apparent openness of the landscape.

There has also been a considerable development of scrub woodland in certain key areas which has also adversely effected views, particularly around the Knepp Mill Pond

4. Pleasure Grounds.

New planting and growth of scrub in the Pleasure Grounds has had a very dramatic impact upon the character of this area of the designed landscape. Figure 17 shows an interpretation of the layout of the woodland garden in 1875, depicting an elaborate, sinuous path system leading through areas of dense woodland (possibly with dense shrubbery) and open glades with specimen trees in large swathes of grassland. This design is very much in keeping with the gardenesque style of the period and would have made a great play upon the contrasts between the open and enclosed areas of the garden, and the manipulation of views from the paths.

Subsequent planting and scrub encroachment has lead to most of this area now being woodland, with only a few open areas and few views to be had either internally or to the wider landscape. At first glance there is little obvious evidence of the original design. However, a number of specimen trees from the glades have survived, albeit that they are now enclosed by later planting, and the area of original woodland remains dense, and is still clearly identifiable by the older age of the trees within it. Furthermore, within these original woodlands there is a system of sinuous linear earthworks which almost exactly correspond to the layout of the path system shown on the 1st edition. It is apparent that the paths in these areas were sunk down, sometimes by a number of feet, relative to the surrounding ground level. This would have been designed to increase the sense of enclosure, especially if the flanking banks were also planted up with shrubs.

In the areas that were originally open glade and grassland, the path system is less distinct and would most probably not have involved such extensive earth working. Nevertheless, certain sections are still apparent, although the development of scrub is a considerable hindrance, making it almost impossible to trace these paths successfully over any length. Certain sections of some of the current paths through these areas are a remnant of this original network.

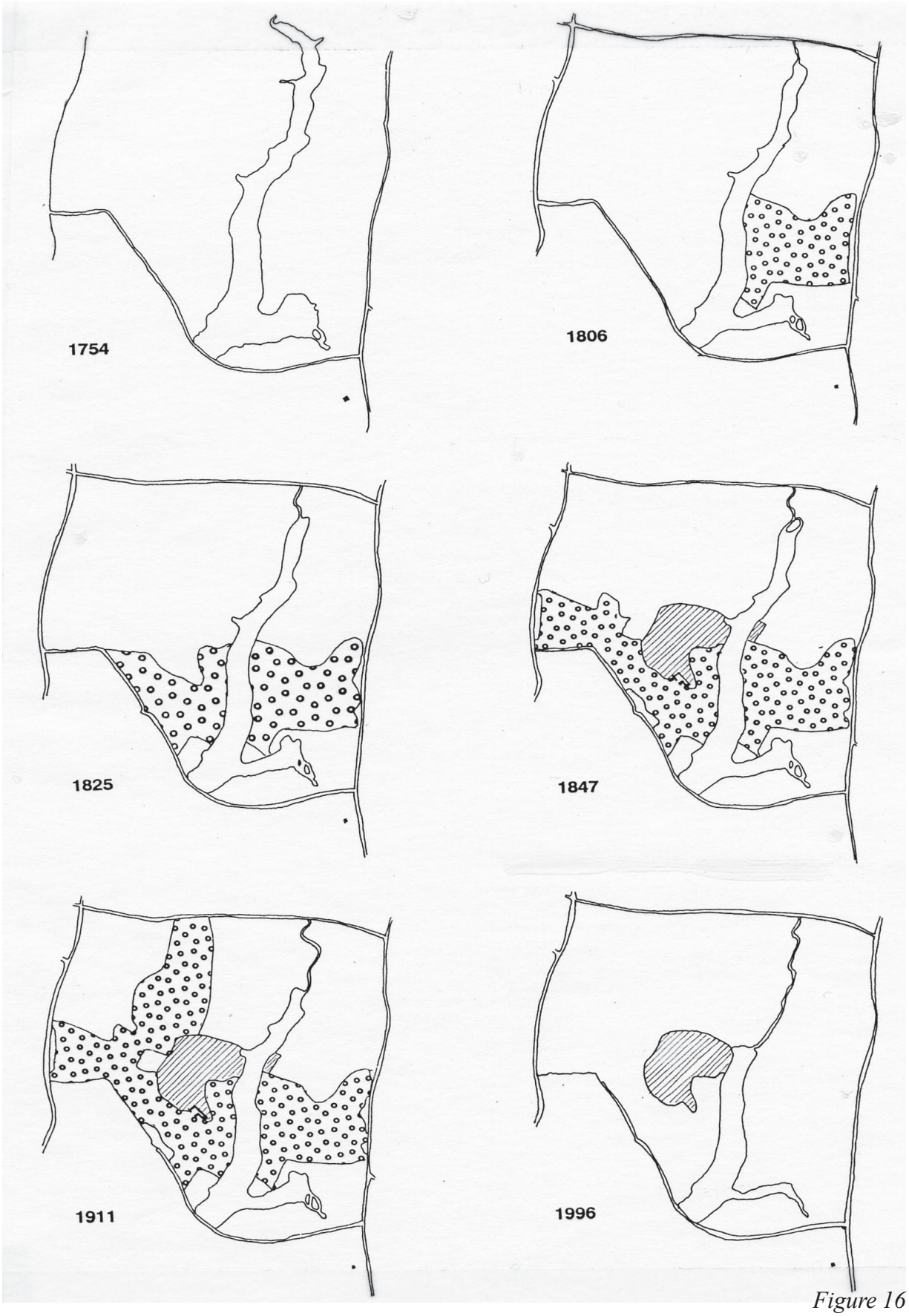


Figure 16
The Development of the Park from 1806 to 1996

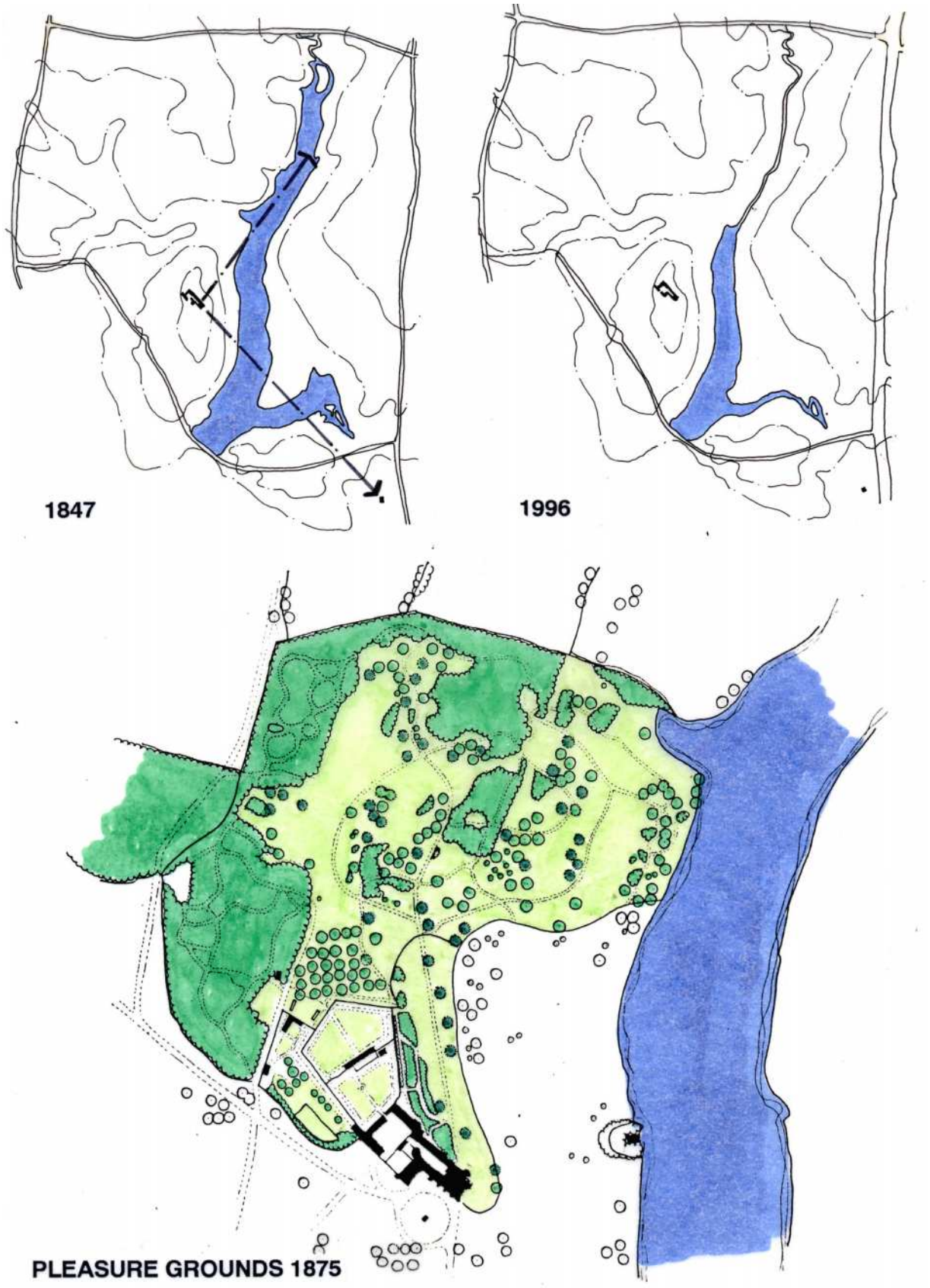


Figure 17
Setting of the Castle

A small pond located in the north west corner of the woodland has also survived, but at the time of the survey it was empty. However, the surrounding vegetation indicates that it still holds water at certain times of the year, or is at least moist.

5. Buildings

Most of the buildings shown on the 1st edition have survived, as have the major built structures such as the walled kitchen garden and the ha-ha, although this is in a fairly dilapidated state. The castle itself was severely damaged by fire in 1904, but was rebuilt largely to the original design, but incorporating an additional storey.

Other than farm buildings, no new buildings have been constructed, with the exception of an additional lodge at the western entrance to the parkland.

6. Drives

Most of the original drives have survived, with the exception of the northern half of the original north drive leading from Lodge Farm, and a short section which crossed the park, leading from the south lodge to the entrance to the kitchen garden.

The North Drive is shown on the 1847 Tithe Map with an alignment that has a slight kink at its southern end. But on the 1875 plan it is shown with a straight alignment, and planted with an avenue of trees. At sometime between 1875 and 1911 this area of the park was cleared of its hedgerows and appears to have been incorporated as parkland. This suggests two things, firstly that the avenued approach was not an original design feature, and secondly that this area was not a part of the original designed landscape.

The avenue has been almost entirely lost. The trees were reputed to have been elms that were lost to Dutch elm disease during the 20th century. However, the four trees that have survived alongside the drive are all oaks.

3.1 The Extent of Garden and Other Land of Historic Interest

The park was not included in the Register of Parks and Gardens of Special Historic Interest when it was first published in 1987. However, following an inspection of the park to the extent of storm damage in April 1988 the site was assessed for its historical value, resulting in its subsequent inclusion on the register (Grade II). The boundary of the registered park as defined by English Heritage is indicated at figure 18.

On the basis of the archival and field work undertaken for the present study we recommend that the following areas of land should be added to the registered area.

1. Merrick Wood

This plantation was created at the same time as the areas on either side of the North Drive were emparked.

2 Matchetts Wood (upper section)

This area of woodland was added to Spring Wood at the same time as the areas on either side of the North Drive were emparked.

3. Charlwood Wood

Charlwood Wood contains some ornamental planting.

4. The American Garden

The small copse to the south of Charlwood Barn contains an ice house and ornamental bamboo.

5. Kneppmill House

One of the mills powered by the impounded waters of in the pond from which Knepp Mill Pond derives its name.

6. Floodgate Farm

The site of the original iron furnace powered by the waters of the pond.

7. Old Knepp Castle Ruin and Associated Earthwork.

A key feature in the views from Nash's Castle, and which influenced the siting of the new building.

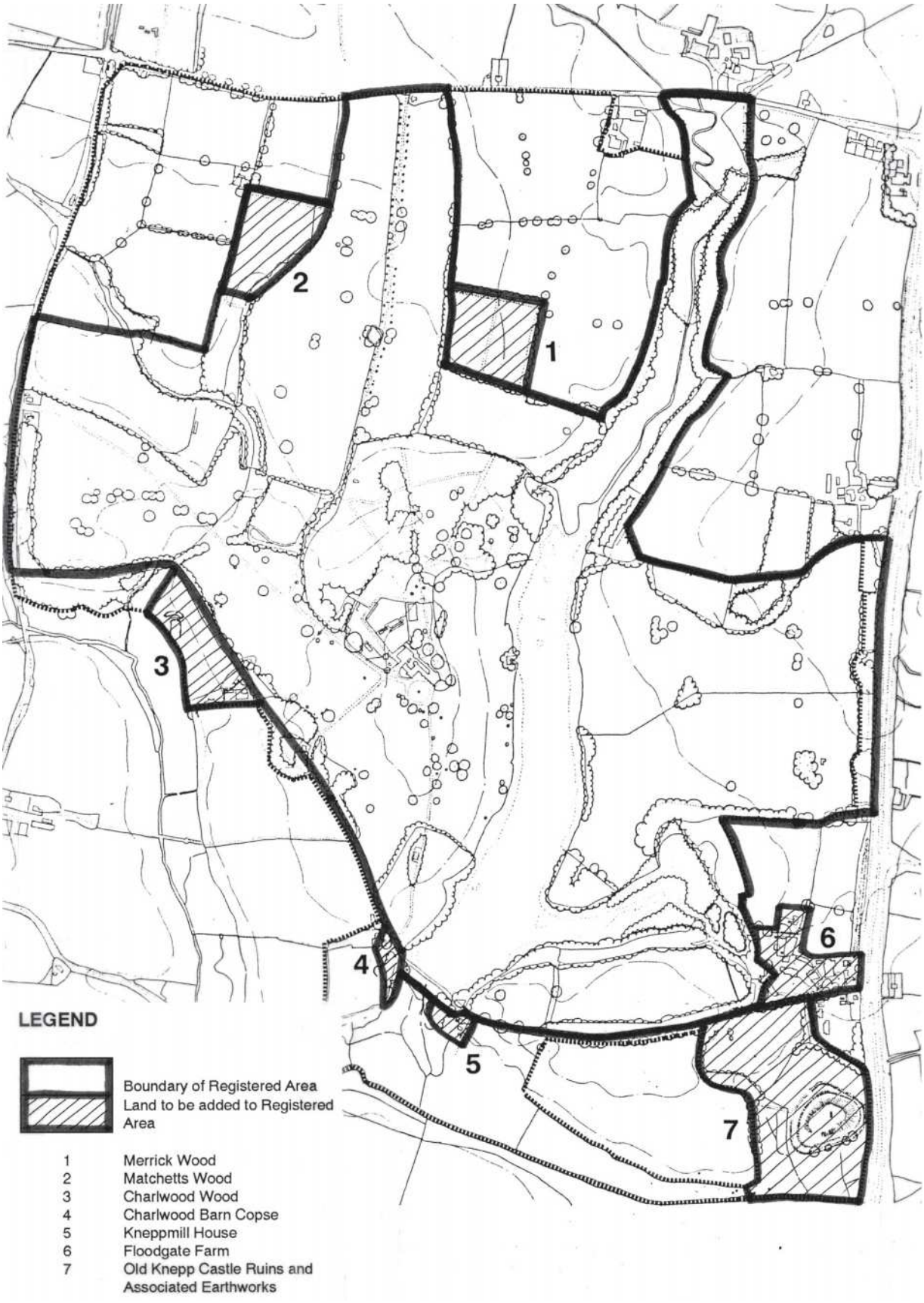


Figure 18
The Registered Landscape

SECTION 3

ECOLOGICAL SURVEY

SECTION 3 - CONTENTS

Introduction

This section of the report is divided into two parts. Part 1 provides a brief description of the broad habitats that exist within the study area, together with an assessment of their current value. Part 2 presents a description of the wildlife that is found on the park.

In Appendices E-G the flora of each habitat compartment is described in more detail and some brief species lists are given.

The following sources of information have been consulted:

- A number of previous ecological surveys that have been undertaken on the estate. However, not all of these have included the study area. Relevant reports that have been produced include:
    - Records from a preliminary botanical survey of the Pleasure Ground Woods (29.5.84) (authorship unknown)
    - Plant list for Pleasure Ground Meadow (1.6.88) (authorship unknown)
    - Report on the Amphibian and Pond Status of Knepp Castle Estate 1991 (David Buckingham 6.3.92)
    - Conservation opportunities on the Knepp Castle Estate (David Buckingham, undated)
- Sussex Environmental Survey Directory has been obtained from the Sussex Wildlife Trust.
- Biological records of the estate that have been made since 1989 by David Buckingham.
- Estate management files have been examined, particularly in relation to the planting and management of the woodlands. The owner and land agent have also been consulted for specific information

1.1 GENERAL

A first stage botanical and habitat survey of the study area was undertaken by Colson Stone Partnership during September and October 1996. This is not an ideal time of year for botanical recording and was particularly unfavourable this year because of the prolonged drought. As a result many early species will have died down and will have not have been recorded.

The surveys were carried out on a single walk through the area noting species found along the route. No attempt was made to cover the ground comprehensively nor to assess frequency of species distribution

The species lists (included at Appendix E) are not intended to be exhaustive, given both the time of year and the nature of the survey. They are, however, sufficient to give a general description of the habitat and to evaluate its nature conservation interest.

The study area contains the following broad wildlife habitats. Their distribution is shown on Figure 1.

- *Grasslands* - all of which are agriculturally improved with the exception of a few fragmented and unmanaged areas
- *Woodlands* - broadleaf and coniferous and plantations.
- *Hedges*
- *Water bodies* - ranging from the sizeable Knepp Mill Pond to small farm ponds and drainage ditches
- *Miscellaneous landscape features* - mostly associated with past or present disturbance, eg tracks, verges, garden boundaries and disturbed areas with ruderal vegetation.

1.2 HABITATS

1.2.1 Grassland

Description

The grassland in the study area comprises either grass leys (dominated by Italian Rye Grass) or agriculturally improved permanent pasture. All the grassland is extremely species poor and the scarcity of herbs here is notable.

The only areas of any interest comprise fragments of generally unmanaged grassland associated with non-agricultural areas. In particular, an area of grassland heavily grazed by rabbits in the south-east corner of the Pleasure Grounds contains a carpet of Devils Bit Scabious, together with other species such as Common Agrimony, Eyebright and Wall Speedwell. The broader rides in some of the woods (particularly Pleasure Ground Woods) also contain a greater number of grassland species, as do some of the newer plantations where the canopy has not yet closed over. The ha-ha to the east of the castle also contains a comparatively wide range of grassland species.

Management

The grassland area of the estate has been managed primarily for short term rye grass silage and secondarily for grazing sheep, cattle and horses (although grazing by cattle has recently ceased). None are managed for hay conservation. Hill House Lawn and the area of parkland immediately south of the castle are used for polo practice and are managed as amenity grassland.

Evaluation

With the exception of the fragments which are unmanaged, the grasslands have little nature conservation value. This however, means that they offer substantial opportunities for improvement.

1.2.2 Woodland

Description

Within the study area the woodlands are all plantations of broadleaves and conifers together with some areas of additional semi-natural woodland. The oldest plantation (Brickyard Wood) dates from 1851 and the most recent (Old Nurseries) to 1984.

None of the woodland is classified as ‘ancient’ which would mean that it had been continuously woodland since at least 1600. However, parts of some of the woods are shown on the Crow survey of 1754 and these areas may incorporate fragments of older or ‘ancient woodland’. Of these, only Charlwood has been continuously wooded since 1754, and this is therefore likely to be the oldest woodland in the study area.

The woodlands are predominantly broadleaf plantations of oak and ash standards with hazel coppice below. Hornbeam is also an important component of the woodlands, but mostly as coppice. Both ash and hornbeam are regenerating freely throughout the woods. Secondary species include field maple, elder, holly, and bramble. Spindle is also found quite frequently, and scots pine occurs in many of the woods as a planted species amongst the broadleaves. Whilst Oak and Ash are the dominant species in most of the woods, in the northern block of Charlwood Wood, Ash is notably absent. This wood appears to overlie an outcrop of more sandy soil which may explain this.

Most of the broadleaved woods have a well-developed ground flora. Although at the time of the survey this was dominated by Dogs Mercury and Ground Ivy, the remains of Blue Bells, and Primroses would indicate that the ground flora is rich in spring and early summer. A few species, such as Wood Spurge, which are indicative of ancient woodland were found infrequently. Records indicate the presence of Early Purple Orchids in Spring Wood and Lesser Centuary in the Pleasure Grounds (found in wheel ruts). Furthermore, the Greater Butterfly Orchid has been recorded in nearby Renches and Cuckoo Wood.

The woods vary considerably in their degree of semi-naturalness and some appear to be more managed and planted than others. Almost all of the woods contain some exotic broadleaved species, which for the most part appear to have been planted. In Pleasure Ground Wood, specimen exotics are found extensively amongst plantations and the regenerated semi-natural woodland. These specimen exotics have remained from the time when the area was an arboretum (a survey of the most notable trees in the Pleasure Grounds has been carried out by the Tree Register of the British Isles, a copy of which is reproduced in Appendix G). Exotics are also found extensively on the lake-edge wood, in the north east corner of Hill House Lawn. Again, these have remained from when this area had an ornamental character.

Apart from exotic planting for aesthetic and commercial reasons, it is evident that some of the exotics found in the woodland have regenerated naturally. In particular, Horse Chestnut appears to have become widely naturalised and is present throughout the site. Other more commonly naturalised species such as Sycamore, Sweet Chestnut and Norway Maple are also found, together with the under storey shrub *Rhododendron ponticum*.

Apart from the planting of native trees for commercial timber, native trees and shrubs have also been planted in the woodlands for nature conservation reasons. Recent estate records confirm that the Wild Service Tree (which is normally indicative of ancient woodland) has been quite widely planted. The shrub, Alder Buckthorn, which does not occur naturally at Knepp, has also been planted in Pleasure Ground Wood, presumably to encourage Yellow Brimstone butterflies.

The more recent plantations have included more diverse species. Poplar plantations have been established on the wetter ground in Pond Tail Rew (1969 and 1972) and in

part of Merrick Wood (1965). A Larch and Beech plantation has also been planted recently in the Rookery (1962)[20].

There are some coniferous plantations, but these are restricted to older stands of Scots Pine within the broadleaved woods, nurse crops for broadleaves or cash crops of Christmas Trees (Bridge Fields).

Management

The woodlands have been commercially managed for timber since at least the mid 18th century. Current policy is to produce good quality timber which is milled on the estate. Each year, about 10-15 oaks are selectively felled, milled and sold as air dried oak. Selective felling is carried out in preference to clear felling, which is clearly more sympathetic. This not only minimises disturbance but also creates a wide age range and structure within the wood. It has also produced some oaks of considerable size.

Whilst the under storey of the woods has traditionally been managed as coppice (to prevent epicormic growth on the oaks, keep the woodland floor clear, and provide small timber), this is no longer carried out as a commercial activity. Active coppice management is only carried out in part of Matchetts Wood for demonstration and conservation purposes. Apart from hazel, it is evident that hornbeam and other species have also been widely coppiced in the woodlands.

In some of the woods there has been an active policy to manage for conservation. This is apparent not just in the planting of particular species, but also in the management of rides and areas opened-up by storm damage. Therefore, the rides in some of the woods are botanically quite rich.

Evaluation

Together with Knepp Mill Pond, the woodlands in the study area are the main habitats which are of interest for nature conservation. Although none are thought to be ancient and none have been designated nature conservation sites, they are of great importance to the study area for the following reasons:

- They occupy a sizeable proportion of the study area and form the main terrestrial semi-natural habitat.

- They are widely distributed over the study area and are often linked, so creating a network of wildlife corridors.

- The woodlands, although varying in their degree of semi-naturalness, contain typical assemblages of species found in oak/ash/hazel woodlands. The spring ground flora is of particular interest.

[20] Except for isolated planted specimens, beech does not occur elsewhere in the study area.

- Because of the history of management by selective felling, the woods contain a good age-range of trees.

- There is a variety of different woodland within the study area, and a range of different conditions, varying from drier sandy soils at Charlwood to wet alluvial soils around Knepp Mill Pond. This diversity increases the nature conservation interest.

- The woodlands are relatively undisturbed as there is no public access through them. They are no longer managed for shooting. The only disturbance is that of woodland management.

1.2.3 Hedgerows

Description

Hedgerows occur predominantly in the northern part of the study area; the south retaining a more open parkland character. The hedgerows are predominantly blackthorn with large standard oak trees. Other species found are hawthorn, field maple, dog rose and spindle. In one hedge, near the old castle ruin, crab apple was found. Many of the old oaks in the hedgerows are suffering die-back and some have died. The reasons for this is unclear but it may be due to ploughing too close to the roots, changes in the water-table as a result of recent droughts, or general air pollution.

Management

Nearly all of the hedgerows are regularly flailed and kept quite low with a flat shaped top.

Evaluation

Most of the hedges in the study area can be traced back to the 1754 map and therefore must be at least 250 years old. It is possible that the majority date from the 16th century enclosures which were believed to have been established when the original 11th century deer park was abandoned. In hedgerow terms they are therefore likely to be quite young. This supposition is supported by the fact that they contain only a very small number of shrub species. Their main importance for nature conservation, is likely to be their value as corridors between woodlands, and as shelter for wildlife. The large oaks in the hedges are also likely to have value, particularly as dead wood habitat for invertebrates.

1.2.4 Ponds (excluding Knepp Mill Pond)

Description

There are 15 ponds within the study area (including Knepp Mill Pond). During a survey undertaken in 1991 by David Buckingham, one was found to be senescent, one neglected and three were dry. Of the 10 others, only 6 were found to contain amphibians. Species found were smooth newt (5 ponds) edible frog (2 ponds) and Common Frog (4 ponds).

The only sizeable pond is Spring Wood Pond. Many of the ponds are within woods or are heavily overshaded.

Management

Spring Wood Pond is managed to produce brood fish for the carp fishery enterprise in Knepp Mill Pond. The remaining ponds are not actively managed, but one on the north of Charlwood has recently been cleared out.

Evaluation

The ponds are widely distributed over the study area and although they have some interest for amphibians and dragonflies, one third of them are dry, senescent or neglected whilst others are over-shaded. There is, therefore, considerable scope for ecological enhancement, particularly by increasing light levels, clearing silt and vegetation and improving conditions for wildlife.

1.2.5 Knepp Mill Pond

Knepp Mill Pond forms the focus of the study area, and is one of the largest artificial water bodies in the region. It is now much smaller than its original size, as almost half of the former pond at the northern end has silted up and progressed to reed bed and alder/willow carr. The south-eastern arm is also substantially silted and has reverted to reed bed and carr. In the main area of open water, the average depth of water over the silt is thought to be around 750mm although over large areas it is only a fraction of this. The depth of silt has not been measured but is thought to be an average of 1.5m deep except near the dam where it is 2m deep. Despite the extent of siltation and reversion to reed bed and carr, the area of open water is still very substantial indeed, extending to approximately 28 acres.

The margins of the lake are particularly well developed with a wide swathe of emergent vegetation dominated by Reed Mace, with some areas of Bull Rush. There are also several areas of woodland associated with the lake edge, as well as a range of habitats in the silted areas ranging from reed beds and marsh to alder and willow carr. Water lilies occur at the southern end

The lake is particularly important as a habitat for birds and other wildlife including dragonflies and amphibians. These are discussed in greater detail in Section 2 of this report.

Management

The lake is managed as part of a commercial fisheries enterprise for carp. Every 3-4 years it is drained down and an average of 10,000 lbs. of carp are removed for sale. At the same time, necessary repairs are made to the sluices and the dam wall. Apart from carp, the lake also contains roach, rudd, tench and bream. There are no pike but when it was last drained down approximately 1.5 tonnes of eels were caught and sold.

Reed mace and water lilies are controlled by annual cutting from a reed boat. This operation takes about 9 days in total.

There are photographs showing dredging works to the pond in 1939, but no record was made of the volume of material that was removed. In 1996, a trial excavation was undertaken close to the dam. In this operation 2.2m depth of silt was removed from a small area and deposited in nearby Filleys Platt

The Bow, is specifically managed as a heronry which supports an average of 15 breeding pairs. The size of the heronry has recently expanded towards Floodgates and the south side of the pond since the storm of 1987.

*Evaluation***.**

Knepp Mill Pond is clearly the main site ecological interest on the estate and indeed it is designated as a Site of Nature Conservation Importance in the Local Plan on account of its importance to wildlife (a copy of the site description is provided at Appendix H). The combination of extensive open water, well vegetated margins, good cover and associated woodland, make it a valuable habitat.

However, as siltation continues unchecked, it is a habitat that is very much under threat. Unless significant work is carried out in the near future, the size of the area of open water will rapidly diminish, progressing to reed bed and carr, and the Estate's principal asset will be lost.

2.1 GENERAL

This part of the report has been based almost exclusively on information supplied by Mr David Buckingham, who is a local amateur ecologist who has been compiling records for the Knepp Castle Estate based on frequent observations since July 1989. Some of his detailed survey information has been included in appendix F.

2.2 WILDLIFE

2.2.1 Birds

To date the Knepp Castle Estate has attracted 122 different species of birds. The Knepp Mill Pond is without doubt the premier habitat for breeding and migratory birds. The following is a brief synopsis of the bird life of the pond together with is county relevance. Statistics relating to Sussex (East and West) refer to the 1988-92 survey from the Sussex Ornithological Society's publication, Sussex Birds.

Breeding Birds

Great Crested Grebe

Numbers have been steadily increasing with 6 pairs attempting to breed in 1996 (5 in 1998), though as has been the case elsewhere in the county, success appears to have been limited. Within the county there are 45 sites that had confirmed breeding between 1988 and 1992, and therefore this species is considered to be a widespread breeder.

Little Grebe

A single pair bred at Knepp in 1996, the first year that they have done so, and again in 1999. A scarce resident in Sussex, therefore, all sites where breeding occurs are important. Little Grebes prefer the heavily vegetated banks that a site like Knepp offers.

Grey Heron

A heronry exists in the tall oaks on the south eastern edge of the pond. There has been a slight increase in numbers of breeding pairs over the period from 1990 to 1996:

1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1999*
6	5	8	7	10	16	15	Min. 12

There are 15 heronries in Sussex supporting 200 pairs, which means that Knepp is a noteworthy site for the species in the county.

Cormorant

Another species that is steadily increasing. Predominantly a winter roost centred on the south eastern corner of the pond. Numbers have peaked at 50 during the evening (November 1995). Within the county there are only 6 other inland roost sites, making Knepp a notable site.

Wintering Wildfowl

In cold spells the pond becomes a magnet to wildfowl and numbers have increased over the past three years which may reflect the improved management for birds at the nearby RSPB reserve at Pulborough Brooks. Most Duck movements seem to take a south-west to north-east path linking the two sites.

Bewicks Swan

Knepp Mill Pond was once the main safe roost site of the Arun Valley herd in the mid 1960's and 70's although Pulborough Brooks is now their main refuge. Nevertheless, the only other wild swan flock in Sussex, the Adur herd, still occasionally use the lake. It is recorded there most years, although in small numbers (7 in 1999).

Mandarin

A scarce breeding bird in the county, this is an occasional visitor to Knepp. The first recorded visit to Knepp was in January 1965.

Wigeon

A common winter visitor to the county but confined to only 8 main localities since a large expanse of water is required to roost on. Knepp regularly hosts in excess of 200 birds throughout the winter and even larger numbers in March and April when the birds are returning to their breeding grounds and require a stopover (600 were counted in 1997).

Gadwall

A scarce breeder in the county. Up to 39 over-wintered at Knepp in 1999, and they have been staying later and later each year, suggesting that one year they might breed there.

Teal

This bird appears to thrive at Knepp. Regularly reaching treble figure counts this small species of duck is mainly found amongst the dense reed mace (200 in 1999). Away from Pulborough this is a particularly notable site for the species within the county.

Shoveler

Another species that increased in 1996 with 12 birds resident in early spring, but as yet none have bred.

Tufted Duck

There are generally a few of this diving species in the winter

Pochard

The only regular diving duck to visit Knepp in winter. Up to 130 were usual from October to March in 1996 (Average 60 in 1999). This represents 10% of the total number of Pochard in the county in December.

Other Birds

Other birds of interest on the site are Nightingale, Peregrine Falcon (1997) and Hobby (1999). Barn Owls are known to breed on the estate, with one pair in Cuckoo Barn to the north of the estate and one pair in Lower Barn. A further pair is nesting in Brookes Platt Barn in Spring 2000. This species is declining, with an estimated UK population of only 3,500 in 1994.

2.2.2 Mammals

All of the following mammals have been recorded around the estate as a whole and are common in Sussex.

Badger	Under recorded, although several setts exist on the estate. A sett in Charlwood is believed to be no longer in regular use. Sightings have increased in recent years
Brown Rat	
Dormouse	Possibly present in Horsham Common, no recent sightings
Fox	
Grey Squirrel	
Hedgehog	
Long Eared Bat	A single found roosting in the nearby Gashouse bungalow
Mink	Recorded around Knepp Mill Pond. Once regularly trapped
Mole	
Rabbit	
Short Tailed Vole	
Shrew	
Stoat	
Weasel	Under 5 sightings in the last 7 years
Wood Mouse	

2.2.3 Butterflies

Knepp enjoys an abundance of butterflies, which has much to do with the positive conservation work carried by the former head forester, the late Chris Wagstaff. 32 of the 43 species commonly recorded in Sussex have been noted at Knepp, although two of these, Purple Emperor and Dark Green Fritillary have only been recorded once in the last 20 years.

The main habitats for butterflies in the study area are Spring Wood, Spring Wood Pond, Charlwood and the Pleasure Grounds, especially the Scabious Meadow in the eastern part. The most notable species are:

Green Hairstreak

A small colony exists in the Pleasure Grounds but is elusive in certain years. Within the Weald it is only sparsely recorded, whereas on the Downs it is common.

Brown Hairstreak

An elusive species. Egg searching suggests that it is widespread throughout the estate although the practice of close flailing the hedgerows has kept the numbers down. They are particularly abundant in an area along the north side of the Pleasure Grounds. Recorded only in the West Sussex Weald in the county survey of 1990-94 this region is definitely a national stronghold for the species. The occurrence at Knepp is therefore quite significant.

White Lesser Hairstreak

Recorded on elms in the Rookery Wood, Floodgates and in Spring Wood. A total of only 36 colonies were recorded in the county. Therefore Knepp is one of the best places in the county to see this species.

Brown Argus

Recorded on the Scabious Meadow in the Pleasure Grounds and at Green Lane. This species is only rarely recorded away from the Downs and thus Knepp is a site of note.

White Admiral

This is a frequently recorded species in Sussex but within the study area it has only been noted in Spring Wood.

Silver Washed Fritillary

This is a frequently recorded species in Sussex and has been noted frequently in the Pleasure Grounds and Spring Wood.

2.3.4 Moths

Moths were first surveyed on the estate in the area near to the castle in 1994. 100 different species were recorded, but it is understood that none of these have a limited distribution within the county, and Knepp is, therefore, of no particular importance for moths.

2.3.5 Dragonflies

At least 18 species of dragonfly have been recorded at Knepp, most of which are widely found within the county.

Beautiful Demoiselle	A single record
Banded Demoiselle	Common along the River Adur to the south of the study area
Emerald Damselfly	Common along Knepp Mill Pond
Large red Damselfly	Common along Knepp Mill Pond and Spring Wood Pond
Red Eyed Damselfly	First recorded in 1995 along the Knepp Mill Pond
Azure Damselfly	Abundant in most ponds
Common Blue Damselfly	Abundant in most ponds
Blue Tailed Damselfly	The most common and widespread species of damselfly
Migrant Hawker	Abundant on Knepp Mill Pond
Southern Hawker	Occasional. Most of the woods hold a territorial male
Brown Hawker	The least common hawker but recorded most years
Emperor	Frequent on all of the larger ponds and along the river
Hairy dragonfly	First recorded in 1995. Found on Knepp Mill Pond and along the river. A locally distributed species confined to 4 main areas
Broad Bodied Chaser	Recorded at Spring Wood and Charlwood Pond
Black Tailed Skimmer	Relatively abundant in some years
Common Darter	Widespread
Ruddy Darter	Frequent on Knepp Mill Pond. A patchily though widely distributed species in the county
Yellow Winged Darter	Single record in the Scabious Meadow in 1996. A notable summer invasion of this species in 1995

2.3.5 Reptiles

There are only four reptiles present on the estate, Grass Snake, Adder, Slow Worm and Common Lizard. The main area of retile activity is centred around Knepp Mill Pond and the Pleasure Grounds, where Grass Snakes and Slow Worms breed each year, and adders have been sighted. The current owner is keen to encourage reptiles and he has created refugia throughout the Pleasure Grounds, in the form of pieces of corrugated tin laid at the edges of grassy glades.

Common Lizard has only been recorded twice on the estate in the last 7 years and is probably relatively scarce on the heavy Wealden Clays, although it is frequent but elusive on the Sussex heaths.

2.3.7 Amphibians

A detailed survey of all of the ponds on the estate was carried out in 1991. It found that the toad and frog were both quite scarce and that the Palmate Newt was the most abundant amphibian species.

Frog

Present in only 10 of the 70 ponds within the estate.

Edible Frog

An alien species that has colonised Knepp Mill Pond in some numbers and appears to be spreading to other large ponds including Spring Wood Pond.

Toad

Recorded breeding in only 5 ponds on the estate, one of which was Spring Wood Pond. The last count of Toads in this pond recorded 10 males and 4 females. Toad distribution is localised in the Sussex Weald though where they do breed they generally do so in very large numbers, such as at Wiston Pond. Knepp holds only a small colony which is, therefore, theoretically vulnerable.

Palmate Newt

A commonly encountered species in the county, but only recorded in 5 of the 19 ponds within the study area.

3.1 Conclusion

It is clear that a variety of habitats exist within the study area, supporting a broad range of flora and fauna. The principal interest, from a nature conservation point of view, centres on the woodlands and the Mill Pond.

However, the Pond is under considerable threat as a result of siltation and subsequent progression to reed bed and carr. Whilst these are valuable habitats in their own right, especially the reeds which provide cover for a variety of fauna, their value must be balanced against the overwhelming importance of such a large expanse of open water. The future management of the Pond must take account of these habitats but should be directed towards safeguarding and enhancing these areas of open water

With few exceptions the grassland habitats within the study area are very dull and there is therefore considerable scope to improve them through appropriate management. If the ambition of creating a deer park throughout the site is realised, and thus all of the arable land within the study area were to be given over to permanent pasture this would represent a magnificent opportunity to improve the ecological diversity of the estate.