

The Parks Trust
MILTON KEYNES

Shenley Wood Management Plan 2017



SHENLEY WOOD - MANAGEMENT PLAN 2017

Site Summary

Site name:	Shenley Wood
Location:	Shenley Wood is situated 2.4km south-west of Central Milton Keynes within the Shenley Wood & Medbourne grid-square
Grid reference:	Within OS grid squares: SP: 8235 & 8236
Area:	29.9 ha (73.9 acres) total land that consists of; <ul style="list-style-type: none"> • 24.1 ha (59.5 acres) of woodland • 5.8 ha (14.3 acres) of land surrounding the woodland
Height:	92 metres above sea level at its high point
Age:	The Wood is 'Semi-Natural Ancient Woodland' (continuous woodland since before 1600) and woodland in this area was mentioned in the Domesday Book of 1086.
Designations:	A Buckinghamshire & Milton Keynes Local Wildlife Site (Site of Importance for Nature Conservation).

Aim

The management aim is to maintain and enhance the Semi-Natural Ancient Woodland character, biodiversity conservation interest, recreational and landscape value of the woodland and edge environs of Shenley Wood.

Summary of Objectives

- Conservation of habitats and biodiversity, including preserving and enhancing the Wood's characteristic W8 habitats and conditions for the resident and native flora and fauna.
- Maintaining and enhancing the Wood's landscape and visual character.
- Providing access for relaxation and enjoyment.
- Providing information about the Wood and enabling it to be used as an educational resource.

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Publication date:	September 2017
Approved by:	David Foster (Chief Executive, The Parks Trust)
Review Date:	August 2022

Contents

Section 1: Site Description and History

Section 2: Aim and Objectives

Section 3: Assessment and Management Prescriptions

Section 4: Work Programme Autumn 2017 to Autumn 2022

Plans

Plan 1: The Management Plan Boundary

Plan 2: Ownership

Plan 3: Vegetation Zones & Compartment Numbers

Plan 4: Footpaths, Rides & Car Park

Plan 5: Benches, Signs & Noticeboards

Plan 6: Ponds & Watercourses

Plan 7: Grounds Maintenance Specification

Plan 8: Thinning & Coppicing Operations

Plan 9: Shenley Wood and the Wider Landscape

Plan 10: Historic Mapping

Appendix

Conclusions of selected 'Ecological Studies in Milton Keynes' reports and their implications for management of Shenley Wood

References

Section 1: Site Description and History

1.1 Ownership

Since 1992, Shenley Wood has been owned and managed by The Parks Trust, the self-financing charity dedicated to caring for over 2,000 hectares (5,000 acres) of parks, woods, lakes, grasslands and other landscapes in Milton Keynes. The wood is held on a 999-year lease from the freeholder, Milton Keynes Council. Previously the land was owned by Milton Keynes Development Corporation who purchased it in 1985 from a private owner – Mr D S Johnson of Dovecote Farm, Shenley Church End – as part of their city-wide land holdings to develop the New Town of Milton Keynes. *Plans 1 and 9* show the boundaries of the woodland's management plan and the ownership of green space in the vicinity of the wood.

1.2 Location and structure

Shenley Wood lies to the west of the old village of Shenley Church End. Before the development of Milton Keynes, the wood was surrounded by agricultural land that was divided between arable and pastoral use, with some managed as common land. The woodland itself covers 24.1 ha (59.5 acres).

Shenley Wood is situated 2.4km south-west of Central Milton Keynes and covers approximately a third of the Shenley Wood & Medbourne grid-square. This area includes: the old Westbury Farm buildings, Medbourne housing estate (built in the 2000's) and playing fields with a pavilion. On the east side of the wood the 'extra-care' village for older people, and areas of light industry and offices. To the immediate south of the wood a new primary school can be found that was constructed in 2016 and 2017 and is due to be opened in September 2017.



Illustration 1. Entrance to Shenley Wood on the south side

The wood is served by one car park to its south west (remodelled and enlarged in 2017 to also serve the new primary school). There are houses and playing fields directly against the wood's western side. On its north-east edge, the wood boundary adjoins the V3 Fulmer Street grid-road landscape (planted in the 1980's). Between the wood and V3 is a long-distance bridleway, 'Swan's Way', which runs for 66 miles from Goring-on-Thames to Salcey Forest; this follows an ancient track through Medbourne, part of what was Oakhill Road, which used to connect Shenley Church End with Oakhill Wood, and is flanked by mature shrubs, including extensive *Prunus spinosa* Blackthorn. Over this length through Milton Keynes, the route of Swan's Way is largely followed by another long-distance bridleway, Midshires Way, which runs for 225 miles from Bledlow in the Chilterns to Stockport.

On the east side of the wood is a Sustainable Urban Drainage System (SUDS), which primarily takes water run-off from the industrial and commercial areas. It has four dammed ponds stepping down northwards, with flanking grasslands (see plan 6.). To the south of the wood is landscape with a mixture of grassland, developing scrub and shrub areas. Beyond Merlewood Drive is the new primary school and Westbury Farm buildings (used as an arts centre) a large assembly factory and further development sites for light industry.

The wood has three direct links to the wider landscape. Two of these are where the wood connects with the grid-road landscapes along V3 Fulmer Street found on its north-east edge, including a finger of linear parkland that leads down to Oxley Park roundabout and the H6 and its associated grid road landscape. This section also has a footbridge along its way, that gives access to Shenley Church End and the historic 'Shenley Toot'.

The third link is to the V2 Tattenhoe Street and its associated landscape found to the south-west of the wood, which includes a footbridge across the road, leading to more grid road landscape and to Oakhill Wood and the North Bucks Way.

1.3 Area covered by management plan

This management plan covers (see plan 1.) Shenley Wood itself and also parts of the sustainable urban drainage system (SUD) to the east of the wood, sections of the grid-road landscape alongside V3 Fulmer Street and V2 Tattenhoe Street, and the land up to the car park at Merlewood Drive on its south side. These areas collectively are an additional 5.8 hectares of land. The total area covered by the management plan is 29.9 hectares.

1.4 Topography, geology, hydrology

The whole wood slopes downwards from its southern end to its northern end. At its southern end (close to Merlewood Drive) Shenley Wood is 103 metres above sea level and drops to 93 metres at its northern end. The western side of the wood also has a pronounced slope towards the west and north-west, and the woods eastern edge dips towards the east.

The wood has two smallish ponds within it: one on the southern edge and the other on the wood's western boundary where it adjoins the playing fields. The four SUDS ponds just east of the wood were constructed in 2010 and are 'teardrop' in shape, a total 2,075 m² in size, these are full only at times of high rainfall. The wood has a series of small streams and drainage ditches, with some formed in association with a 1960s tree planting scheme and others created to drain new paths that were constructed or re-opened in the later 1980's.

The soils are developed from calcareous boulder clays and range from free draining clay loams to seasonally waterlogged gleyed clay loams. The topsoil is generally around pH 6.9, becoming more alkaline at depth. The soils can be affected by both summer drought and winter waterlogging.

1.5 Woodland history and archaeology

Broadly, the history of Shenley Wood has probably been along the following lines:

- a) Natural development of woodland following the last ice age from c.10,000 BC with a succession from pioneer species to the tree species which have largely dominated it for at least a thousand years
- b) Probably some woodland clearance in the wider area to form wood pasture in the early medieval period
- c) Formation of wood banks and fencing in the later medieval period to enable it to become managed woodland and parkland to hunt deer and to stock other animals
- d) Management of the woodland by coppicing with standards to provide a range of timber, wood products and firewood, probably with pannage for pigs, up until the mid-Victorian era, with timber removed for construction of buildings, but the canopy trees continuing to be replaced by ongoing age-classes
- e) Perhaps 100 years of neglect leading to a semi-derelict woodland by the mid-20th century by which time its size of over 100 acres in the 1600s had been reduced to its current size of 64 acres

- f) Before and during the two world wars, there was a decline of woodland management, a general cessation of coppicing and extensive removal and non-replacement of Oak and other timber
- g) Re-afforestation schemes of 1959 and 1965, mainly of conifers, which were not maintained and largely failed
- h) In 1985, purchase of the wood by MK Development Corporation
- i) Transfer to Parks Trust management from 1992
- j) Over the last 30 years, programmes of woodland management have been implemented and the woodland has been opened up for public access.

The name 'Shenley', which was the collective name for the wider area in the Domesday Book of 1086, derives from an Old Anglo Saxon word 'Senelai' or in Old English 'Sciënan-lēage'. The modern word Shenley derives from Sene' or 'sciënan' meaning bright and 'Lai' or 'lēage' (now 'ley'), meaning clearing. The name strongly implies the area was significantly wooded with clearings. In 1086 the wider area was still known collectively as 'Senelai' but nearby woodland was known as Westbury and was owned by Richard Engraine.

Records show that during this period Buckinghamshire had extensive woodland: The Domesday Book describes Whaddon and its neighbouring manors as being of "well wooded character". The boundaries of Whaddon Chase, which was once royal hunting grounds, were probably close to, but beyond Shenley Wood, which may have been managed in conjunction with the Chase over some periods.

The distinction between Shenley Brook End and Shenley Church End was made in the 12th century, when a new manor house was constructed in Shenley Brook End by the Mansell family. By 1426 the two manors were owned by the same person and the distinction between the two places was less significant.

The Shenley Church End and Shenley Brook End areas have three Ancient Monuments, one close to the north-east end of Shenley Wood and the others within 1km. The closest is 'The Toot' within 100 metres of the wood but now separated from it by a grid-road. The others are both mediaeval moat sites: one just east of Medbourne roundabout (V3/H5) and the other south-west of Shenley roundabout (V3/H6). All three are owned and managed by The Parks Trust as land for light grazing.



Illustration 2. A mature Oak towering above Blackthorn found at the northern end of the wood.

Woodland existed at Shenley Wood before 1600, so it is 'Semi-Natural Ancient Woodland'. A woodland in this area was mentioned in the Domesday Book of 1086. A wood called 'Shenley Park' is shown in the location of Shenley Wood on the Salden Estate Map of 1599 and was part of land owned by Sir John Fortescue at that time. Records and maps indicate that in 1693 the wood was 105

acres. By 1771 the eastern side of the wood had been cut down, reducing it to 79 acres, and before 1950 a further slice of the eastern side of the wood had been turned into fields, leaving only 64 acres of wood, which is what still remains as woodland.

A few large coppice stools remaining in the woodland provide evidence of long-term coppicing. It is highly likely the wood would have been coppiced in much the same way as Linford Wood and Howe Park Wood and would have supplied woodland products, underwood and brashings for heating homes, and timber for the medieval manors and villages of Shenley Church End, Shenley Brook End and the surrounding area, as well as grazing for pigs (pannage) and possibly for other animals. In the late 1700s or early 1800s Rev. Primatt Knapp built a cottage near the northern end of the wood, possibly near The Toot (a fortified eminence now listed as a Historic Monument) and apparently “*cut walks through the woods*”. It is thought that the old-established rides were left untouched from before 1939, possibly from the early 1800s.

It is not known when the Shenley Wood Estate came into the ownership of Mr W S Johnson of Dovecote Farm, Shenley Church End. In 1958 the wood was described as comprising: 6 acres of Broadleaved & Mixed High Forest and 51 acres of Scrub, Coppice, & Coppice with Standards. A Forestry Commission description of these woodlands in October 1958 was: “*The wood appears to have been treated on coppice with standards methods but over considerable areas the coppice is poor or absent. Oak has been the principle standard tree but ash has come in fairly freely contributing both to the standards and coppice growth. Heavy fellings took place some years ago leaving a fairly scattered stocking of small oaks and ash but the ash is mostly dying back though only 30/40ft in height. The oaks are mainly trees which have suffered from suppression by the older crop removed in the last felling and are consequently poor in quality and vigour.*” and “*Where the underwood of coppice hazel and ash is absent there is a fairly heavy ground vegetation of bramble, briar, rush and coarse grasses but these have been suppressed by the coppice where it forms a fairly continuous canopy leaving a relatively clear forest floor conditions ideal for establishment of young trees with a minimum of weed competition and well sheltered*”.

1.6 Compartments

From 1985 (and perhaps just before) when the Development Corporation started active woodland management of the wood, the wood was broken into 16 compartments (see plan 3). In 2016 and as part of a new application to the Forestry Commissions Woodland Countryside Stewardship Scheme, the compartments were re-numbered, so to follow a sequence with numbering used in other mature woodlands on the Parks Trust green estate, such as Linford and Howe Park Wood that are also part of the scheme.

As discussed elsewhere in this plan it is envisaged that each compartment will be worked (thinned/coppiced etc.) on a 15-year cycle. This is compatible with the expected growth rates and the understorey species found in Shenley Wood.

Table 1. Shenley Wood compartments and associated areas in hectares (2016 onwards).

31 (2.6 ha)	37 (1.7 ha)	41b (2.4 ha)	Surrounding younger landscape included within the Management Plan boundary = 5.8 ha
32 (0.8 ha)	38 (1.9 ha)	42a (1.0 ha)	
33 (0.8 ha)	39a (1.3 ha)	42b (0.9 ha)	
34 (2.4 ha)	39b (0.7 ha)	42c (0.7 ha)	
35 (1.7 ha)	40 (1.9 ha)		
36 (1.2 ha)	41a (0.8 ha)		Total = 29.9 hectares

1.7 Tree species

Three comprehensive vegetation surveys of Shenley Wood have been carried out: the first by Penny Anderson in 1980, the second by Bioscan (UK) Ltd in 1988, the third by Dr Joanna Francis in 1994.

The method for the Anderson study involved survey of 100 quadrats (each of 10m/10m). This sample was intended to be broadly representative of the wood’s 24.1 hectares. This survey provides a remarkable snapshot in time of tree species, girth, height and cover as it was in 1980. They found 17 species of tree and shrub in their samples in the following quantities (though they did not extrapolate these figures to total numbers in the wood):

- 438 Ash

- 405 Aspen
- 332 Goat Willow
- 181 Hazel
- 88 Oak
- 60 Blackthorn
- 57 Field Maple
- 19 Elder
- 18 Midland Hawthorn
- 17 Beech
- 13 Norway Spruce
- 4 Lawson's Cypress
- 1 Elm
- 1 Silver Birch
- 1 Guelder Rose
- 1 Dog Rose
- 1 Field Rose.

Some canopy trees that were found in smaller numbers were of considerable girth. For example, girth of Oaks were in the following ranges and quantities:

- 18.5% had been coppiced.
- 16.7% (18) had a girth of 100-499mm
- 41.7% (45) had a girth of 500-999mm
- 23% (25) had a girth of over 1,000mm.

The Anderson Report gave an account of the 1958 Forestry Commission planting scheme, its general failure and its effects on subsequent ecology of the wood. She concluded that the lack of some expected flora species in Shenley Wood probably results from the replantings of 1959 and 1965, but also other disturbances.

No further surveys of trees or the wider vegetation have been commissioned since the third study by Dr Joanna Francis in 1994. There is therefore an absence of comprehensive survey information on what has happened to the woodland's trees since the 1990s. For instance, it is evident that self-seeded Ash have proliferated since the removal of alien species such as Norway Spruce *Picea abies*. Some sapling Sycamore *Acer pseudoplatanus* are also to be found in the wood, which were not recorded in the 1994 study, and evidently these have also self-seeded. Nor is there recent data available on the height and girth of trees or on the extent of younger generations of trees towards achieving a spread of age-structure. The canopy of some areas of the wood (for example Compartment 34) seem to be predominantly Ash with few other species in the canopy, while other compartments have more of a mix of species of mature tree.

1.8 Woodland characteristics and NVC

Shenley Wood is a 24.1 hectare (60 acre) remnant of a 42.5 hectare (105 acre) ancient woodland, but has been subject to prolonged neglect followed by substantial clearance and replanting, largely with conifers, that failed before being taken back into management by the Development Corporation and then The Parks Trust.

Under the National Vegetation Classification (NVC) the woodland in 1994 was 'W8: *Fraxinus excelsior-Acer campestre-Mercurialis perennis* Woodland' (Ash, Field Maple, Dog's Mercury Woodland) which are typically wet woodlands on clay. More specifically, there were twelve stand types: five W8 sub-communities and; 'W7 Ash-Alder'; 'W9a Ash-Rowan'; 'W21 Atlantic Hawthorn scrub' and W21b sub-community; 'W22 Blackthorn-Bramble' and W22a and W22b sub-communities.

The woodland edges have been substantially changed since the 1940's (As shown in Plan 10). Playing fields and housing have been constructed close to its western edge. A grid-road in a cutting has been constructed close to its northern edge. To its east, the SUDS scheme of small lakes and dams stepping down the slope now mark its eastern edge, with a substantial development of the Shenley extra-care retirement village just east of this. To its south-east are existing and potential future industrial sites and the ancient Westbury farmhouse buildings used as an arts centre, with a

primary school constructed during 2016 and 2017. To the south-west is another grid-road in a cutting. This leaves relatively little width of woodland edge, which makes what remains an even more important transitional habitat.

1.9 Woodland management

In October 1958, a Forestry Commission description of Shenley Wood reported: "The wood appears to have been treated on coppice with standards methods but over considerable areas the coppice is poor or absent".

A Forestry Dedication Scheme in 1959 led to the planting of conifers and some other tree species, between 1959 and 1965 across the more easterly compartments. The then Plan of Operations was intended to last from 1959 to 1968 and to cover 57 acres). Over the winter of 1959/60, six acres of the east side of the wood were cleared, re-planted, fenced and subsequently 'beaten-up' to replace failed trees. This pattern was repeated in other parts of the wood so that by 1965, 8.2 hectares (20 acres) had been cleared and replanted in this way covering the eastern and central parts of the woodland. Clearance involved: cutting for firewood as well as use of chemicals and diesel for weeding. The last recorded weeding was in 1966 when some compartments were ditched to benefit growth of the new trees. A revised Dedication Plan was approved by the Forestry Commission in March 1965 but was not fully implemented.

The 1965 Forestry Commission Dedication scheme envisaged a ten-year programme, leaving only a few of the best of the Oak and Ash. Planting mixtures were to be two lines of Oak to each four lines of conifer. Conifer species were to be: Norway Spruce *Picea abies*, Hemlock Spruce *Tsuga heterophylla*, Lawson Cypress *Chamaecyparis lawsonia* and Douglas Fir *Pseudotsuga menziesii*. Larch *Larix decidua* were to be planted if better-drained sites could be fully cleared on the east side. Trees were to be planted at 5ft spacings except for Douglas Fir and Larch at 6ft spacings. Six feet would be left between Pedunculate Oak *Quercus robur* and conifer lines. In 1965 alone, the planting operation included; 11,500 trees: 2,000 of Oak & Beech *Fagus sylvatica*, with 7,800 Norway Spruce, 1,700 Lawson Cypress and Western Hemlock *Tsuga heterophylla*.

The re-forestation scheme and its management ceased around 1967 when Milton Keynes was designated as a New Town. Another reason for stopping the clearance and planting was the disappointing growth of the newly-planted trees. Although rides continued to be maintained for some time, undergrowth and regrowth of the former deciduous trees almost swamped the planted conifers. It is said that the wood continued to be used by a local syndicate for pheasant rearing to shoot foxes and part of the northern end was used to keep chickens: the hunt is also said to have used the wood. At this time farmyard slurry was allowed to seep into this northern part of the wood.

MK Development Corporation (MKDC) purchased the wood in on 8th March 1985, much later than its other two ancient woods.

MKDC started actively managing the wood from the mid-1980's. The wood had not been actively managed since the later 1960s just after it had been planted with high numbers of non-native species such as Norway Spruce and Beech under guidance from Forestry Commission favoured planting schemes of the time. This style of planting is certainly not desirable in a semi natural ancient woodland nor is it compatible with the objectives as outlined in section 2 of this plan.

One of MKDC's first objectives was to remove these alien species as each compartment was worked, so compartments such as 34 and 35, where much of this planting style existed, received early attention.

A file note of April 1985 sets out MKDC's initial woodland management objectives, which included:

- An aspiration to achieve high forest but with a multi-age canopy with different levels of storey
- Some areas of high forest single-storey; other areas of multi-age multi-storey cover.

The file note also contains initial thinking about wider objectives, suggesting that they should be to:

- 1) Maintain and enhance visual amenity of woodland
- 2) Conserve variety and range of flora
- 3) Provide an informal, yet well-structured environment for passive recreation

- 4) Produce high quality timber underwood
- 5) Provide the opportunity for the educational use of the wood.

Practical activities listed in the file note were:

- Drain maintenance and access
- Opening rides
- Creation of glades
- Underplanting
- Coupe planting.

A report in December 1985 – ‘Shenley Woodland Park: Development & Management’ – to MKDC’s Executive Management Committee from its Recreation Unit, set out seven objectives:

1. To provide a continuous area of woodland park accessible to the public via pathways which exploit a variety of woodland settings and offer a circuit walk.
2. To provide points of interest and passive recreation along the path system appropriate to the character of the wood.
3. To conserve and enhance the variety of flora and fauna in this woodland, as consistent with the important conservation resource represented by the wood.
4. To maintain and enhance the visual amenity of the woodland and provide a high quality backdrop for surrounding development.
5. To produce high quality timber and underwood.
6. To develop the woodland structure so that it will be manageable by voluntary/community groups, minimising long term publicly funded management costs.
7. To provide opportunities for educational use and use by special interest groups.

The report also proposed and costed installation of wood-chip paths, boundary hedge-laying, thinning and management of initial woodland blocks, and drainage. Rides were to be cleared and widened. With hindsight, objective 6 is probably unrealistic and largely unachievable.

Three years later, a draft ‘Shenley Wood Structure Plan Brief’ (October 1988) was issued for the wider Shenley Wood grid-square which proposed leisure routes along the south and east edges of the wood (later installed as Redway and Leisure path) and an east-west path across the middle of the wood. An ‘equestrian route’ was also planned and was later installed along the north-eastern edge of the wood, fulfilling earlier proposals to discourage horse-riding within the wood, but to enable riding past the wood. The structure plan repeated the objectives set out in the 1985 report, but also set out visual landscape objectives that the landscape structure which included:

The edge of Shenley Wood should be protected with a margin of parkland providing a peripheral leisure route linking car parking, access points to the District Park [*the Wood*] and providing view points to the south.

The draft ‘Shenley Wood Structure Plan Brief’ also set out “proposed development and management objectives for the wood:

- To function as part of a district park within the Linear Park system
- To provide a continuous area of woodland park accessible to the public via pathways that exploit a variety of woodland settings and offer a circuit walk
- To provide points of interest and quiet recreation along the path system appropriate to the character of the wood
- To conserve and enhance the variety of flora and fauna in the woodland
- To maintain and enhance the visual amenity of the woodland and provide a high quality backdrop for surrounding development
- To develop the woodland so that it will be possible to promote eventual management by voluntary / community groups, minimising long term publicly funded management costs
- To provide opportunities for educational use and use by special interest groups”.

From the mid-1980s MKDC initiated a new programme of woodland management for public access and to maintain the flora and flora characteristic of semi-natural ancient woodland. One aspect that was considered was the retention of ‘non-intervention belts’. Several were identified in 1988 in the east and south-east of the wood.

In 1990, the County Officer for the Nature Conservancy Council (now Natural England) made a visit to Howe Park Wood and Shenley Wood, which later led to Howe Park Wood being designated as a SSSI (Site of Special Scientific Interest). Shenley Wood had been under restoration for a much shorter time than Howe Park Wood and had also suffered from large-scale conifer planting and more prolonged neglect. By 2017 Shenley Wood has been brought to a much more satisfactory state and has many qualities as restored ancient woodland.

In 1991 and 1992 the Development Corporation installed the tar-spray paths and bark-chip surfaced paths and the car-park and adjoining picnic area¹.

In the period from the 1980's until 2015 the principle woodland management objectives were;

- Removal of non-indigenous trees species
- Return the wood to standard and coppice style
- Develop a cycle of works based on a 15-year rotation
- Include ride sides and ditches into a regular maintenance regime
- Promote non-intervention belts within worked areas
- Remove unsafe trees found along the woods various rides.

Alongside these woodland management activities, the wood was made accessible through clearance of rides and provision of a network of paths, designed to give a series of visual experiences of this woodland landscape. A series of ecology studies were commissioned, on the basis of which increased protection was given to the special flora and fauna of the wood.

1.10 Landscape character

Shenley Wood is a hill-top woodland leading to an open plateau to its east from which there are views over the south-west of Milton Keynes and beyond to the Brickhill woodland ridge and, much further in the distance, to the Chiltern Hills. Shenley Wood is therefore a prominent landscape feature when viewed from the south and west, but is also visible from most other directions. It is of particular importance as a landscape setting for the five-storey retirement village and for the residents of Medbourne, but is an attractive woodland for visitors from all over the Milton Keynes area and beyond.

The wood's principal trees are mature Ash *Fraxinus excelsior*, Pedunculate Oak *Quercus robur*, Aspen *Populus tremula* and Field Maple *Acer campestre*, with coppiced Hazel *Corylus avellana* and shrubs such as Hawthorn *Crataegus* spp., Blackthorn *Prunus spinosa* and various wild Rose *Rosa* spp. species as understorey. Wild flowers are at their most obvious during the spring when there are Bluebells *Hyacinthoides non-scripta*, Wood Anemones *Anemone nemorosa*, many small patches of Violet species *Viola* spp. and other wildflowers, including various species of Orchids. Autumn brings gold and brown leaves and dark berries such as those of Black Briony *Tamus communis*.



Illustration 3. View of Shenley Wood, looking towards its centre from the south end.

1.11 Management for landscape and visual value

The principle tasks of management of the woodland for its visual value is to maintain the distinctive and different characters of a semi-natural woodland that holds a range of different species (tree, shrub and herbaceous layers) and in the case of trees and shrubs, a range of age and size classes which are also evident throughout the wood.

Path, forward views and the the central 'long-grass' triangle are managed to remain relatively open that includes that ride-sides are kept open with scalloping to different depths. This in turn will help retain a varied ground flora and associated butterflies and other insects that will further offer visual value.



Illustration 4. Central glade that is cut annually to allow the herb layer to flourish.

1.12 Biodiversity and ecology

The ecology of Shenley Wood has been the subject of many surveys, with 19 professional ecological studies undertaken up to 2017 of which 13 are specific either to Shenley Wood, or that and Howe Park Wood and Linford Wood, which therefore provide useful comparisons. These reports are listed in Appendix 1, with a summary of those of most significance for an understanding of the wood's ecology, including consultants' recommendations for ongoing management. Surveys have covered: field layer vegetation, trees and shrubs, birds, moths, butterflies and beetles. There have been no professional studies of pollinators such as ants, bees, wasps (Hymenoptera), hoverflies or other flies (Diptera), or of spiders (Arachnida), or mammals, or of bryophytes or lichens. Generally, surveys have found that the woodland is ecologically relatively rich and is of significant wildlife conservation value, and reports have made specific recommendations for future management.

1.13 Woodland flora and fungi

The flora of the woodland's field layer is generally considered to be the most important aspect of its ecology aside from its woodland structure, older trees and a few specific fauna and flora. There have been three botanical studies of Shenley Wood: in 1980 by Penny Anderson Associates; in 1988 by Bioscan; and in 1994 the 'Shenley Wood Vegetation Survey' by Dr Joanna Francis.

The Francis report recorded 163 vascular plant species within the field layer, understory and canopy of Shenley Wood. Of those recorded, 32 are Ancient Woodland Indicator (AWI) species, comprised of seven AWI trees and shrubs and 24 AWI field layer species. These included strict ancient woodland specialists such as Wood Anemone *Anemone nemorosa*, Early-purple Orchid *Orchis mascula* and Greater Butterfly-orchid *Platanthera chlorantha*. Unlike Linford Wood and Howe Park Wood, Shenley Wood did not contain the AWI Herb-Paris *Paris quadrifolia*. The 1994 Survey contains a list of all the plant species with a thorough analysis of the characteristics of the woodland flora and its relationship to this historic woodland. It also contains maps of the distribution of many tree, shrub and other plant species, including five rarer field layer species. One species found in Shenley Wood has not been recorded as still present in either Linford Wood or ever present in Howe Park Wood; this is the Narrow-leaved Everlasting-pea *Lathyrus sylvestris*.



Illustration 5. Wood Anemone, Bluebell and Lesser Celadine showing in the Spring.

The 1994 survey report found that the amount of deadwood was low, with a mean coverage of only 6.6%, compared with 5.9% at Linford Wood and 10% at Howe Park Wood. It also found that the cover of persistent leaf litter in Shenley Wood is generally low, with a mean of only 15%, largely of the slowly-decaying Pedunculate Oak *Quercus robur* leaves.

As large areas of the woodland tend to hold water, mosses and liverworts (Bryophytes) cover substantial area of the woodland floor, an average of 56% cover (compared with 56% in Howe Park Wood and 39% in Linford Wood).

1.14 Insects

1.14.1 Butterflies

At Shenley Wood, the 2002/03 butterfly survey found 18 UK resident butterfly species and two migrant species. The species list included three species classified as 'Local': Grizzled Skipper *Pyrgus malvae*, Essex Skipper *Thymelicus lineola* and Purple Hairstreak *Neozephyrus* (now *Favonia*) *quercus* a woodland specialist which requires mature Oaks.

Silver Washed Fritillary *Argynnis paphia* has been found in the wood in low numbers since 2010 and is known to breed here. Eggs are laid on the trunks of oak trees in close proximity to dog violets.

Since 2015, the Purple Emperor *Apatura iris* has also been recorded.

Part of Shenley Wood is now included in a butterfly transect established in 2009 and conducted by Parks Trust staff so annual records are generated for many species.

1.14.2 Moths

The 1999 survey of moths found more species and higher numbers in Shenley and Howe Park Woods than in Linford Wood. 225 moth species were recorded in Shenley Wood compared with 217 in Howe Park Wood and 199 in Linford Wood. Moths found in Shenley Wood included three rarer species of Notable B status and 34 of Nationally Local Status, many of which have specialised habitat requirements. Two other species were found that are relatively uncommon elsewhere in Buckinghamshire.

1.14.3 Other invertebrates

The importance of deadwood ecology has become increasingly recognised by ecologists and woodland managers. A 1996 study of beetles ('A Survey of the saproxylic Coleoptera of Howe Park, Linford & Shenley Woods' by Colin Plant) found 182 beetle species in Shenley Wood (compared with 132 in Linford Wood and 141 in Howe Park Wood) including 15 saproxylic species. Two non-saproxylic species of Notable B rarity status were found: *Prionychus ater* (a Tenebrionidae beetle similar to Darkling beetles) and *Bruchus atomarius* (a seed beetle). This study recommended further study of fly species, such as hoverflies (Diptera), and bee and wasp species (Hymenoptera). The report concluded that there was a need to increase the resource of standing and fallen deadwood in Shenley Wood and the other woods.

At the time of writing, a thorough survey of saproxylic invertebrates is being undertaken in Shenley Wood. A number of national rare and Red Data Book species has been recorded with a full report due in late 2017.

1.15 Birds

Four Common Bird Census surveys carried out in 1984, 1987, 1993 and 2007 found fewer species than might be expected for this size of ancient woodland, even allowing for decline in particular species nationally. In 1987 the number of bird species breeding in Shenley Wood was 35, compared with 36 at Howe Park Wood and 27 in Linford Wood (a much larger wood). A later survey in 2007 showed a decline to 26 breeding species in Shenley Wood and Howe Park Wood and some recovery in Linford Wood to 28. These figures reflect national declines in woodland bird species, such as: Starling *Sturnus vulgaris*, Cuckoo *Cuculus canorus*, Turtle Dove *Streptopelia turtur*, Lesser-spotted Woodpecker *Dendrocopos minor*, Willow Tit *Poecile montanus*, Mistle Thrush *Turdus miscivorus*, Spotted Flycatcher *Muscicapa striata*, Tree Sparrow *Passer montanus*, House Sparrow *Passer domesticus* and Yellowhammer *Emberiza citrinella*; but the differences between these three woods may reflect more local factors such as stage of urbanisation of their surrounding areas and differences in the stage reached in management practices in each of the woods. Willow Warbler *Phylloscopus trochilus* numbers had increased in Shenley Wood but had declined in the other two woods. It favours large glades, broad rides and woodland edges of scrub and coarse grasses. Further comparisons were made by the Common Bird Census carried out in 2007. This showed that in Shenley Wood the 28 breeding species then present included, in very small numbers:

- Two National Biodiversity Action Plan species – Bullfinch *Pyrrhula pyrrhula* and Song Thrush *Turdus philomelos*.
- Three Red List Species of Conservation Concern – Marsh Tit *Poecile palustris* as well as Bullfinch and Song Thrush.
- Three Amber List Species of Conservation Concern – Dunnock *Prunella modularis*, Green Woodpecker *Picus viridis* and Willow Warbler *Phylloscopus trochilus*.

Fuller information from this 2007 Common Bird Census report can be found in Appendix 1.

1.16 Bats and other mammals

1.16.1 Bats

Shenley Wood supports a good variety of native bat species and possibly supports a larger number of bat roosts than the other woodlands situated in Milton Keynes. It has a relatively high number of trees containing some dead wood compared with Linford Wood for example. To date, three distinct Noctule bat roosts have been located in the wood, all of them in ash trees containing a number of old woodpecker holes. A number of bat surveys have been carried out in the wood including several carried out by Bernwood ECS (2009, 2010) and more recently by Parks Trust staff and volunteers. Bat species recorded in the wood include common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, noctule *Nyctalus noctula* and brown long-eared bat *Plecotus auritus*. There is also a single record of the rare Barbastelle *Barbastella barbastellus*, picked up during a transect 2009.

Over twenty bat boxes have been installed within the wood, and these are checked annually and bat numbers recorded. Up to 2017 brown long-eared and soprano pipistrelle bats have been found using these boxes.

1.16.2 Other (terrestrial) Mammals

No survey has been undertaken of terrestrial mammals in Shenley Wood, so there are no comprehensive records for this wood. As with most woodlands in Milton Keynes, introduced Muntjac deer *Muntiacus reevesi* are present, and occasionally seen. Muntjac can cause considerable damage to young trees and also wild flowers in woodland. Since 2015, there have also been isolated sightings of native Roe Deer *Capriolus capriolus*. Roe seem to be colonising Milton Keynes from the south with recent records also from Howe Park Wood and the Bletchley area. Grey Squirrels *Sciurus carolinensis* are present and if their numbers are not controlled can cause serious damage to trees by bark stripping. They also have a negative impact on the wider ecology of the wood, for example, by raiding bird nests. There is a Badger *Meles meles* sett located close to the southern edge of the wood which has been in continual use since at least the 1980s. The ongoing (2017) development of the surrounding area to east and south of the wood are reducing the amount of open grasslands that provide some of their feeding opportunities, so it may prove more difficult for them to sustain a sett in this wood.

There are no official records of small mammals for this woodland. However, both Woodmice *Apodemus sylvaticus* and bank voles *Myodes glareolus* have been found foraging in the ditches and brash piles within the wood and both these common rodents are likely to be widespread in the wood.

1.17 Amphibians and reptiles

There are two ponds situated within the wood, one close to the main southern entrance gate, the other on the western edge of the wood, close to playing fields. Both can experience dog activity which leaves the water permanently turbid. These two ponds have been subject to amphibian surveys and have been found to hold breeding great crested newts, as well as smooth newts and common frogs. There is also a series of four ponds located just to the east of the wood which are associated with the SUDS floodwater scheme. The locations of these are shown on Plan 6. Common toad, common frog and smooth newt are known to breed in these ponds.

In 2010, Shenley Wood was one of a number of parks in which a reptile survey was undertaken. Twenty-five cover objects (metal tins and carpet tiles) were placed in the wood and were checked monthly between May and October. No reptiles were found, although common toads and smooth newts were observed using the covers for shelter. There are no records of grass snakes from Shenley Wood but this highly mobile species has been observed nearby and may visit the wood's ditches and ponds from time to time.

1.18 Legislation and Protected Species

Legal protection

Legal protection is provided for some species and habitats found in Shenley Wood, under:

- The Wildlife and Countryside Act 1981 (as amended)
- The Protection of Badgers Act 1992
- The Countryside & Rights of Way Act 2000
- The Conservation of Habitats and Species Regulations 2010
- The Countryside & Rights of Way Act 2000

This list will require updating as the Government introduces new legislation and regulations when separation from the European Community is concluded, following the 2016 referendum.

Under legislation as it stands in 2016, it is an offence to take, damage or destroy the nest of any wild bird while that nest is in use or being built. All wild birds, their eggs, nests and chicks are protected from disturbance, whether "intentionally", or by "reckless disturbance" (an additional offence under The Countryside & Rights of Way Act 2000). Other animals are provided with protection, as listed in Schedule 5 of the Wildlife and Countryside Act 1981, which includes protection from injury and death, from being taken from the wild, and for the places they use for shelter, as well as protection from

disturbance to an animal occupying such a place. This applies to: Common Frog, Toads, all Newt species, all bat species and their roosts and badgers.

Bat protection

All of the UK's bat species enjoy full protection under UK and European law. Under the Wildlife & Countryside Act 1981 it is an offence not only to take, injure or kill bats but also to wilfully damage their roosts and habitats, or to "cause reckless disturbance" to such Protected Species. It is essential that all woodland operations in Shenley Wood take account of the requirements of bats.

Great Crested Newt protection

Two Ponds and their wider surroundings in and around Shenley Wood support Great Crested Newts, and these are legally protected amphibians.

1.19 Public Access

The opening up of the woodland to public access in the late 1980's by the Milton Keynes Development Corporation (MKDC) was to enable extensive public access through the woodland and this objective has been continued by The Parks Trust.

MKDC developed the wood's network of paths, making some of them hard surfaced with an objective to help reduce pressures on areas off the paths and provide extensive access (these are shown in Plan 4). The woods paths have three types of surface, these being: metalled (tar spray and chip), woodchip, and grass. The extensive footpath layout allows users a choice of walk and length of visit, within and alongside the wood. (see plan 4).

As soon as walkers enter the wood, nearby urban development disappears from view. From the southern end, the main north-south ride is straight and provides long views to an open triangle in the centre of the wood where it joins another straight ride that leads to the north-western end of the wood. A further turf path connects this with the north-eastern entry to the wood. This central ride is flanked by substantial Oak *Quercus robur* and Ash *Fraxinus excelsior* trees which provide a sense of grandeur. The two north-south rides both follow the shape of the land as it drops steadily from south to north. A hard-surface path winds through the western part of the wood and is crossed by three turf rides that cross, or partially cross the wood from west to east, rising quite steeply up the slopes of the western edge. An extension of the hard-surface path curves through the eastern part of the wood until it meets the grassy triangle at the heart of the wood. There are therefore numerous cross-road intersections between paths, each providing distinctive and extended views through the wood. There are also paths along the western and eastern edges of the wood. The path around the western edge is hard-surfaced and passes over a woodland-edge pond on a footbridge. The path along the eastern edge has an entirely different character. It draws the eye up the little valley of mini teardrop lakes, whereas views from this into the wood are restricted by dense shrubs and understorey. This eastern path leads up to the south-east corner of the wood alongside which is a fine veteran Oak.

The accessibility of the wood enables regular users and occasional visitors to view and experience the mature woodland in a variety of ways, informally.

There is a total of eight entrance points (see plan 4) into the wood that generally link into the wood's central paths. One of these is a gravel chipped path that forms a circular walk in the wood's southern end. A gravel chipped path can also be found on the outside of the wood which forms a loop around the southern end of the wood. The entrance to this path is found 30 metres or so from the main car-park, that also serves the school found on the wood's south side. All entry points are relatively open and served with a path of one form or another (see plan 4.).

The wood has four direct links to the wider landscape. Two of these are where the wood connects with the grid-road landscapes of V3 Fulmer Street and V2 Tattenhoe Street, on its north-east and south-west sides respectively. On the north-east side of V2, new linear parkland meanders down to Oxley Park roundabout. On the south-west side a footbridge over V2 connects with shrubberies

flanking a Redway which leads westward to join the North Bucks Way long-distance footpath and Oakhill Wood, of which the eastern strip is also owned and managed by The Parks Trust (see plan 9). The fourth link is the narrow but important strip flanking Swan's Way which connects different habitats and provides an attractive walking and riding route link between the city and the countryside.

There is only one-horse riding trail found within the management plan area, this runs alongside the northern edge of the wood and connects to the city's 'highway adopted' (MK Council-managed) bridleway system. There are lengths of deep ditches that limit public access to wider areas of woodland, so plants and associated wildlife are free from excessive intrusion. The woodland's paths are connected to the city's network of adopted Redways at the wood's southern edge, and these are managed by Milton Keynes Council and provide for pedestrians and cyclists. The length of woodland paths found within the area covered by the Shenley Wood management plan are as follows:

- There is 679 linear metres of tar-spray and chip footpaths (2-3m wide) found in the wood itself.
- 2396 linear metres of other woodland paths (grass/unsurfaced or subsequently surfaced with woodchip 2-3m wide) found in the wood itself.
- 350 linear metres of horse-riding trails (generally hoggin surfacing and 2-3m wide) found in the vicinity of the wood.
- 2065 linear metres of tar-spray and chip footpaths (2-3m wide) that circles the outer side of the wood itself.
- 665 linear metres of surrounding hard-surfaced MKC owned Redway (3 metres wide) found to the south of the wood.

There are a total of 18 wooden benches (see Plan 5) and 6 picnic table sets found within and around the wood. Four of the picnic tables are found just off the Merlewood Drive car-park.

1.19 Management of anti-social activities

In any such woodland, some anti-social activities inevitably take place which have to be managed. Dropped litter is picked up on weekly and monthly cycles of varying intensity (fewer in winter, more in summer), supplemented by volunteer litter-picking and action by Rangers when more significant littering or dumping takes place. Woodland like this can also attract illicit camping or fires and creation of unregulated paths, all of which the Trust's staff address. Although not all damaging activities are a result of deliberate anti-social behaviour inappropriate use of the wood needs to be assessed and monitored. This may include people creating informal tracks through the main body of the wood or dogs swimming on a regular basis in newt ponds and the need to understand the impact of such activities.

1.20 Education

In the period leading up to 2017 Shenley Wood has been used less for education purposes than Linford and Howe Park Wood, the Parks Trusts other ancient semi-natural woodlands. However, the construction of a new primary school in 2016-2017, directly south of the wood (with its shared car park) creates an opportunity for the Trust work in partnership with the school to encourage and facilitate them to use the wood for outdoor learning activities. This partnership working with the school will be led by the Trust's Education Team. There may also be opportunities for joint work relating to the wood with the nearby arts centre at Westbury Farmhouse.

Section 2: Aim and Objectives

2.1 Aim

The management aim is to maintain and enhance Shenley Wood's character, nature conservation, recreational and visual amenity values, while improving the educational opportunities the woodland and the environment offers.

This overall aim is to be achieved by pursuing the following complementary objectives. A fundamental requirement of any implementation is that any works or operations carried out should fulfil as many of these objectives as possible and not focus on achieving individual aspects in isolation.

2.2 Objectives

- 1) **Nature conservation and ancient woodland:** To maintain, extend, enhance and monitor the diversity and continuity of habitats within the wood, particularly those necessary to retain the rarer species of flora and fauna associated with its ancient woodland structure and to protect and promote the essential characteristics of this woodland. A limited range of woodland products should also be a consideration of management and will be produced as by-products of woodland management, and be consistent with achieving all the other objectives.
- 2) **Woodland character, landscape value and visual appeal:** To protect the overall landscape value and visual appeal of Shenley Wood and promote the essential character of this semi-natural ancient woodland, while continuing to develop the surrounding landscape in ways that are sympathetic to the woodland and ensure the woodland is ecologically and visually connected to the surrounding landscape and open space and the bio-diversity function of its edges are recognised and managed for.
- 3) **Access and recreation:** The woodland and its environs are to function as a distinctive part of the overall park provision in the western flank of Milton Keynes and to provide public access via paths which exploit a variety of woodland settings and which link to recreational through routes and the wider countryside. The woodland should have well-connected to entry points such as car parks and public transport stops. The woodland should offer an accessible, stimulating and varied environment for people's relaxation and enjoyment.
- 4) **Education:** Shenley Wood should be promoted as an educational resource encouraging visitors and the local schools and populations an understanding of Shenley Wood and its surrounding environment. The wood will offer to facilitate an understanding of the biodiversity, history and amenity of this semi-natural ancient woodland, as well as a broader understanding of the green estate and the work of The Parks Trust.

Section 3: Assessment and Management Prescriptions

Objective 1 Nature conservation and ancient woodland:

To maintain, extend, enhance and monitor the diversity and continuity of habitats within the wood, particularly those necessary to retain the rarer species of flora and fauna associated with its ancient woodland structure and to protect and promote the essential characteristics of this woodland. A limited range of woodland products should also be a consideration of management and will be produced as by-products of woodland management, and be consistent with achieving all the other objectives.

Objective 2 Woodland character, landscape value and visual appeal: To protect the overall landscape value and visual appeal of Shenley Wood and promote the essential character of this semi-natural ancient woodland, while continuing to develop the surrounding landscape in ways that are sympathetic to the woodland and ensure the woodland is ecologically and visually connected to the surrounding landscape and open space and the bio-diversity function of its edges are recognised and managed for.

3.1 Ancient woodland characteristics and biodiversity

The essential ecological character of these woodlands is primarily as semi-natural ancient woodlands with an assemblage of trees and flora characteristic of NVC W8: *Fraxinus excelsior-Acer campestre-Mercurialis perennis* type of woodland, and twelve more specific stand types within W7, W8, W21 & W22.

Continued management of these woodlands should be done in ways that protect the distinctive ancient woodland trees and enhance growing conditions for its flora, which includes flowering plants, grasses, sedges and rushes, mosses, fungi and lichens. Another important aspect of ancient woodland is the sustained activity of particular mycorrhizal associations between specific fungi and the roots of specific tree and other plant species. This will be best sustained by natural regeneration.

The woodland has a known assemblage of breeding birds which is relatively limited for this kind of woodland, possibly because of its limited connections with surrounding countryside and urban green corridors, but also because of its neglect in the early 20th century and the necessity of disruptive restoration management for some decades from the 1970s. There have also been downward trends nationally for some woodland bird species. Reinstatement and coppicing work carried out over the last 30 years should enable the number of breeding bird species in these woodlands to be maintained or even increased and for this to be a specific management aim for future woodland management.

Bats, various other mammals and amphibians are all present in the wood. Operations undertaken should take all these species into consideration and opportunities should be taken to conserve or increase habitat potential for these and other species by such measures as: retaining deadwood and trees with habitat potential, and maintaining ponds appropriately. Operations should also maintain the wood in mixed layers, for example by providing non-intervention and other scrub areas, irregular forest, coppiced areas of various ages, areas of grassland, and by channelling public access away from certain sections of the woodland. One objective over recent decades has been to leave some trees to age in ways that increase niches for woodland invertebrates and particularly for saproxylic species for which rot-holes, red-rot, dying trees, fallen deadwood and fungi are essential. Achieving a well-balanced age-structure of trees will ensure a continual progression of ageing trees which have these assets. Holes and cracks in trees are essential for several bird species and many bats. A dense woodland floor including rotting leaf-litter can benefit many of the smaller invertebrates at the base of the food-chain, such as springtails (Collembola), so providing food for larger invertebrates such as ground beetles and for animals such as birds and mammals further up the food-chain.

Much ecological monitoring and survey was carried out in these woods by the Development Corporation when they needed to understand the ecological character of the woods to guide their woodland management. Now that a more settled state has been reached in the life of the woodland, further monitoring will be needed to establish what progress is being achieved and to provide more specific information to shape future plans for woodland operations. This information will also have an educational value.

3.2 Implications of 'Ecological Studies in Milton Keynes' reports

As mentioned earlier in this document, MKDC commissioned ecological reports that were published as 'Ecological Studies in Milton Keynes' and The Parks Trust has continued the series. Those most relevant to Shenley Wood are summarised in Appendix 1. Many of these studies made specific recommendations for management of the woodland. These recommendations were considered at the time and many of them have influenced subsequent site management, though in some cases competing proposals had to be prioritised. The preparation of this management plan is a good opportunity to review these recommendations to see if they shed fresh light on the management of the woodlands. Previous surveys have covered: field layer vegetation, trees and shrubs, birds, moths, butterflies and beetles. Issues raised by these studies are addressed in what follows.

3.3 Management of ancient woodland

An Ancient Woodland of this kind – NVC W8: Ash-Field Maple-Dog's Mercury, wet woodland on clay – requires careful management of light and shade levels and the woods hydrology. The most important aspects relating to its age are to maintain the Ancient Woodland Indicator flowering plants and other significant plants in the field layer, and a management regime to sustain shady and sunlit areas in a progression relating to coppicing of underwood and maintenance of the tree canopy. To achieve this, a balanced age-structure of the over-storey of canopy trees as well as permanently lighter areas along rides and paths is required.

There is a need to minimise trampling of the ground flora and soil compaction, which is important to achieve, as much as possible, when coppicing and scrub management is carried out.

Management of the woodland trees should continue to use the traditional system of coppice with standards which incorporates irregular shelterwood with mixed age/size classes that includes non-invention belts and areas. In essence, work will be undertaken on an approximate 15 year cycle and in each worked compartment appropriate sections of understory will be coppiced, while leaving selected areas as non-invention belts (with scrub habitat value). Upper and middle canopy trees will be removed as required, allowing:

- The development of retained canopy trees, with middle and lower storeys
- Varied intensities of light to be available to the ground layers
- Ecological factors (e.g. mixed aged trees and varied habitat layers) to develop
- Health and safety considerations to be applied.

In 1980, Penny Anderson was commissioned by MKDC to conduct a 'Botanical Survey of Shenley Wood'. Penny Anderson is now very well known as chair and former chief executive of the prestigious ecological consultancy, Penny Anderson Associates. She was a founding member of the Institute of Ecology & Environmental Assessment (IEEM) and co-author of the book 'Habitat Creation & Repair'. She has been a member of boards of: IEEM, British Ecological Society, The National Trust, National Wildflower Centre, the Canal and River Trust and the Peak District National Park Authority.

The 1980 Anderson Report is summarised in Appendix 1. It concluded with recommendations of "*management possibilities in Shenley Wood*" including:

- Tracks and ditches which discourage trespass into the rest of the wood, as in Linford Wood.
- Improvement of the woodland structure through a combination of re-coppicing and selective thinning to achieve high forest, with regrowth areas selectively thinned to enable all tree species present to grow to maturity.
- Gradual removal of planted trees except Oak.
- Much of the un-cleared area was not fit to be coppiced as the trees were less dense, shade not intense and the ground flora was complete.
- Some coppicing of the moribund Hazel.

- Conserve some dense scrub as cover for deer, some birds and invertebrates.
- Achieving a woodland with a diversity of habitats.
- Less intensive management than Linford Wood.

In 1988, the Development Corporation commissioned Bioscan to carry out a study to describe botanical change in Shenley Wood between 1980 and 1988 and to assess effects of a recently initiated management programme. Their report, 'Botanical Survey of Shenley Wood' (Ecological Study No. 105) is summarised in the Appendix. In drawing their conclusions, they examined the potential conflicts of interest relating to the variety and intensity of uses envisaged for Shenley Wood and pressed for resolution of these:

- 1) Promotion to high forest for timber production may require too long a rotation to achieve a varied seasonal flora. Application of partial coppice management combined with multi-age high forest stands would circumvent this.
- 2) The risk of damaging the flora communities of rides, particularly the unusual wetland species, by changes to rides to benefit public use and forestry. Diversion of activity to rides away from species-rich wet areas, combined with reduced frequency of verge cutting (to a rotation of several years) should prevent this.
- 3) Over-rapid management of all of the wood within a few years could jeopardise the future of bird and invertebrate species that require overgrown areas. This could be addressed by long-term set aside of some areas to be without management and slowing the pace at which management was reintroduced.
- 4) Excessive public use could damage some of the flora, especially along the rides. This could be addressed using a well-tried technique of concealing some rides behind thickets, providing only narrow and indirect access (as was done in Wytham Woods in Oxfordshire and as used by some game-keepers).

The third botanical report was commissioned by The Parks Trust in 1994. This was 'Shenley Wood Vegetation Survey 1994' by Dr Joanna Francis (Ecological Study No. 126). This report is also summarised in Appendix 1. One conclusion was that the Wood has two very distinct field layer communities, relating to wet and dry areas.

Shenley has less continuous transitions between wet and dry communities in comparison to Linford Wood: "The wet, open plots in Shenley are considerably wet and have a distinct and diverse group of species ... In drier plots most of these species are absent, as are some associated with base-richness such as *Paris quadrifolia* Herb-Paris and *Sanicula europaea* Sanicle (both found in Linford Wood ...)." (Francis 1994, p.24).



Illustration 6. Pressure on the wood includes changing water tables and increased use and disturbance

In 2014 and as part of the Common Agricultural Policy (CAP) reform and subsequent measures, the English Woodland Grant Scheme (EWGS) was replaced by Countryside Stewardship (CS). The new scheme (like the old EWGS) includes; woodland grant funding and issuing of felling licences. This is administered by the Forestry Commission (FC). Regarding Shenley Wood, the new CS scheme came into effect in December 2016. Shenley Wood's registration onto the CS scheme was included as the Parks Trust application that parcelled all our mature and notable sized woods (Shenley, Howe Park, Linford, Hazeley, Kingsmead, Oakhill) into one application. The scheme is licensed to run for 10 years and the current scheme runs through to 2016.

The relatively newly numbered compartments that are now used in the management of Shenley Wood can be found on pages 10 and plan 3. The relatively high numbering (31 to 42c) relates to the overall CAP application, with each wood's compartmental number running on from a previous number used in the other woods, hence Shenley Compartment numbers start from 31 and finish at 42c.

3.4 Canopy trees

Shenley Woods upper canopy is predominately dominated by Ash that is punctuated by Pedunculate Oak, Field Maple and Aspen are also found in the upper canopy. In 2016 Ash covered approximately 70% of the upper canopy, with Oak filling approximately 20% of the upper canopy, with other species (mainly Aspen and Field Maple) accounting for the other 10%.

From the mid 1980's to the turn of the 21st century there was a successful effort to remove non-native species, these mainly being Norway Spruce *Picea abies* and Beech *Fagus sylvatica*, that were planted in the period 1959 – 1965 as a misguided plan to establish a commercial crop. From the late 1980's to the early 2,000's these non-native trees were removed, as the wood emphasis and make up was returned to native trees species. More Aspen and Sallow are now being experienced in the wood than in that earlier period. Interestingly the Botanical Survey of the wood carried out in 1988 does not acknowledge any large (above 30cm dbh) Aspen at all. Aspen in Shenley Wood are generally found in groups in the southern sections of the wood. Given a chance it would appear Aspen regeneration is fairly prolific. Field Maple are found dotted throughout the wood but not in any great density of numbers.

If light in the right quantities is available, the wood's shrub layer is quite prolific with Hazel and Hawthorn, along with Ash regeneration tending to dominate. Found predominately in the northern and western sections of the wood Blackthorn are found in quite dense groups. With native species now being treated more favourably, Sallow has been allowed to grow on and is found more widely in 2016, than in the 20 or so years before.

A silvicultural assessment shows that the Wood has been managed for several centuries, with varying degrees of intensity, as coppice (Hazel and Ash) with standards (Oak and Ash). Many of the standards were removed in either the 19th or 20th centuries. In the 1950's, as part of a more general Forestry Commission drive to make woods of this size more commercial the wood was under-planted with Norway Spruce and Beech. Until the time that MKDC took ownership and started to manage the woodland in the 1980's the wood, this relatively new planting and indeed the rest of the wood had not been actively managed for some years.

3.5 Responding to Ash Dieback

The spread of Ash Dieback *Chalara fraxinea* across mainland Europe, into the UK and now into Milton Keynes (Chalara was officially identified as being in Linford Wood and in the Westcroft area of Milton Keynes in November 2016) and now it is highly likely that the disease has already arrived in Shenley Wood, but at the time of writing this plan has not yet been confirmed. The arrival of Ash Dieback in this Wood (as in the area's other mature woods) is a real concern, as it has the potential to totally change both the visual experience, the biodiversity and current balance of the city's woodlands. The real effects will not become fully clear until it reaches the city's woodlands. With such a large amount of Ash found in Shenley Wood, the affects could potentially be devastating. The Parks Trust have no plan to remove a disproportionate amount of Ash trees, which are dominant in much of the upper canopy of the wood and cover a significant proportion of the understorey. However, in anticipation of the disease and its affects coming to the wood, the Trust have been

looking to favour for retention other tree species (such as Oak, Aspen and Field Maple) as thinning and clearing work is undertaken.

As Ash Dieback arrives at the wood there will be a need to assess individual trees to evaluate the best actions, options which will include: fell, manage the decline, or take no action. Such actions will depend on such things as the extent of the disease, how quickly it takes hold and health and safety issues e.g. how far infected trees are from paths, as well as any other constraints.

Younger Pedunculate Oak are under-represented in the Wood, so this could be a good opportunity to redress this balance. Other appropriate species found in the wood suitable to replace diseased Ash are: Aspen and Field Maple; but also to a lesser extent Goat Willow *Salix caprea* (previously known as Great Sallow) and Grey Willow *Salix cinerea* (previously known as Common Sallow), all of which are present in the woodland, although in generally small numbers. Aspen is found in the woodland mainly in small groups or as the occasional individual. It is worth noting that Aspen is a food plant of 44 moth and butterfly species (Lepidoptera) in Britain. Aspen should be retained, as this and other tree species that traditionally have been a minor element in some NVC W8 woodlands might find opportunities to expand their numbers if Ash dieback has a catastrophic effect.

In anticipation of the arrival of the disease and to support the woods canopy trees and the above comments, in November 2016 (with the help of volunteers) the Parks Trust collected 100 viable Pedunculate Oak acorns from the wood. these acorns were taken off site and propagated, with the aim of planting them out in the wood in 2018, as two-year seedlings. A similar exercise was conducted at Linford Wood last year and such exercise should be repeated as appropriate.

The spread of *Chalara fraxinea* and other diseases should be continuously monitored as analysis will need to be made of how it affects the Wood. The re-stocking strategy will need further analysis and potential modification at each five-yearly review of this management plan.



Illustration 7. Aspen present in the upper canopy along with Oak and the dominant Ash

3.6 Restocking of the Wood

Since the Parks Trust took ownership of Shenley Wood (and probably during the ownership of MKDC as well) there has been no planting of species non-indigenous to this Wood; this policy should continue. Undoubtedly, with diseases such as Ash Dieback, there will be a need to re-stock the wood. Re-stocking of the Wood shall take place through:

- The encouragement of natural regeneration of species native to the wood (e.g. Aspen) or the use of layering (e.g. Hazel).

- Developing a population of young Oak in the wood. As Oak acorns have difficulty in propagating in woodlands (one reason being lack of roaming pigs rooting around and accidentally burying the acorns) This will be done through gathering acorns from selected Oak trees within the wood, and propagating them to plant in appropriate locations.
- When considering using alternative tree species to Pedunculate Oak and Ash it must be remembered that although some ground flora AWI indicator plants tolerate shade, many are situated in more open conditions along paths and rides and flower early in Spring, where they benefit from the late-leaving characteristics of the main canopy species, particularly Pedunculate Oak and Ash. If disease were to substantially affect the viability either of these tree species in these woodlands, very careful consideration would need to be given to which alternative species are compatible with the light needs and other habitat requirements of AWI field layer flowering plants. For example, Hornbeam tends to create heavy shade which may be incompatible with many plants found in the wood.

3.7 Coppicing of understorey, thinning of shrub layer and management of scrub

Restoration work involving thinning of trees (see plan 8) and coppicing scrub and shrubs started in 1985 and has helped strengthen the underwood by means of removing some of the upper canopy trees and coppicing the over-maturing shrubs, these actions have consequently allowed more light to reach the understorey. Planting of species such as Hazel *Corylus avellana*, which are suited to coppicing, has also contributed to the improvement of the understorey. Part of the coppicing works includes working on self-set seedling Ash, which in parts of the wood is quite prolific.

Dr JL Francis in her 1994 'Shenley Wood Vegetation Survey' recorded that only 38% of sampled quadrats had more than 60% understorey cover (compared with 53% in Howe Park Wood. Hazel *Corylus avellana* was the most abundant understorey species, found in 78% of sampled plots. Blackthorn *Prunus spinosa* was sometimes dominant in the shrub layer, mostly in the north and west of the Wood. Bramble *Rubus fruticosus* was present through much of the Wood and there was a scattering of both the Hawthorns: *Crataegus monogyna* and *C. laevigata*.



Illustration 8. Understorey of mixed species having been coppiced two years previously.

A prescriptive style of woodland management that has been implemented in Shenley is 'Coppice with Standards'. It is imperative that re-creation of 'Coppice with Standards', incorporating mixed age classes and non-intervention belts, should be continued. As part of the system used in the wood, management and treatments incorporate retention of some of the mid-storey, non-intervention areas

and rotational scrub cutting. Coppice management and associated thinning is generally applied on an approximate 15-year cycle, targeting those areas where the coppice stool potential is high.

Non-intervention belts will involve leaving small islands or linear lengths of denser shrubs and trees to be left within areas of new coppicing. Such areas will help provide protective habitat and feeding areas for breeding birds and other wildlife. Willow species such as Goat Willow *Salix caprea* and Grey Willow *S. cinerea* are found in wetter areas. These species should be generally retained and managed by coppicing and by letting elements of them mature and even over-mature, if they start collapsing, this can benefit biodiversity.

3.8 Veteran, declining, dead and dying trees

Apart from one English Oak tree found at the south-east corner of the wood, Shenley wood has very few trees that are obviously of a character and age that could be described as 'veteran' trees. Often, small and isolated woodland units such as Shenley Wood, that have received little or no management over previous years tend to be dominated by trees or layers which are all, very broadly, of equal age. This may have serious implications for a consistent stock of decaying timber to benefit a wide range of biodiversity. Several studies of the city's woodland have emphasised the lack of deadwood and the importance of increasing this substantially. The issue is wider than deadwood found on the ground, as it applies to the need for more ancient, veteran and mature trees along with some younger tree to provide hollows, rot-holes, sap-runs and habitat on which fungi and plants can grow, in which hole-nesting birds can nest, and in which various specialist saproxylic beetles and hoverflies can live. The need is for dying and dead wood, both standing and fallen. A case was made for the felling of some younger and healthier trees – where they were not otherwise needed – to be left to rot on the woodland floor, and for old and dying trees to be left standing wherever possible. These principles and aims should be more commonly applied to Shenley Wood. Holes in trees are an absolute requirement for many species, ranging from some bird species to bats, mammals and insects. For example, one of the preferred nesting sites for Marsh Tit *Poecile palustris* is a hole less than 3m from the ground in trees or stumps. A proportion of old coppice stools should also be left even if they are no longer producing poles as these also provide valuable habitat. Fallen deadwood is an important substrate for many fungi, so consideration should be given to leaving fallen branches in such locations. Fires should be avoided wherever possible as they change the local habitat and certainly should not be used close to old coppice stools or fallen wood. Where they are unavoidable, consideration should be given to use of a raised fire platform.



Illustration 9. Deadwood found in the wood that has been left in situ. To ale this dead wood more viable habitat this deadwood needs to be lying on the ground

The Forestry Commission publication 'Life in the Deadwood: A guide to managing deadwood in FC forests' states that dead limbs can be as important as trunks for saproxylics. These should be left where fallen unless there is a significant risk to public safety; dead branches can also protect the sensitive rooting zone around veteran trees. Where possible fallen deadwood should be left where it falls. If deadwood has to be moved then it should be moved as short a distance as possible, preferably into dappled shade near rides or glades and near other deadwood. Though any deadwood can be of value, CW Plant in his 1996 survey of Saproxylic Coleoptera of Shenley, Howe Park and Linford wood (Ecological Study No. 133b) states that "*timber of a large diameter, both standing and fallen are especially important*". He suggested that selected species of a variety of species, including large trunks of Oak *Quercus robur*, should be felled and left to decay, stating that "*the richest fauna tends to be supported by material in partial shade*".

3.9 Field layer

The 1994 'Shenley Wood Vegetation Survey' contains much important information about the plants of the Wood, including all the Ancient Woodland Indicator Plants, so needs to be consulted fully. A summary of it is included in the Appendix. The species most widespread in the field layer, and found in over 60% of quadrats, can be divided into those associated with drier areas and those in wetter areas. The distribution of these species of dryer and wetter areas is uneven across the Wood because some areas hold water more than others. All the following field layer species found in Shenley Wood are characteristic of NVC type W8 woodlands:

Plants in drier areas included:

- Bluebell *Hyacinthoides non-scripta*
- Yellow Archangel *Lamiastrum galeobdolon*
- Dog's Mercury *Mercurialis perennis*
- Greater Stitchwort *Stellaria holostea*.

Plants in wetter areas included:

- Tufted Hair-grass *Deschampsia cespitosa*
- Meadowsweet *Filipendula ulmaria*
- Floating Sweet-grass *Glyceria fluitans*
- Soft-rush *Juncus effusus*.

Another influence on the distribution of field layer species is the amount of light they receive, so some are concentrated along rides and paths (particularly those that are east-west and those without hard surfaces and ditches), others are hidden within more shaded areas. Dr Francis noted that a main effect of increased woodland management since 1984 had been to raise light levels and increase plant diversity, though ground disturbance had also caused some ruderal (wasteland) species to proliferate.

Seeds of Ancient Woodland Indicator (AWI) plant species are not generally found in the dormant seed store in the soil and these species are poor at spreading and colonising. Many of the rarer field layer species exist vegetatively in shady, undisturbed areas, but can proliferate for a while in recently cleared areas before competition from other plants builds up. Some are maintained by the coppicing cycle but cannot readily spread; these include Early-purple Orchid *Orchis mascula* and Greater Butterfly-orchid *Platanthera chlorantha*.

Four rarer plants were locally abundant in Shenley Wood (compared with seven in Howe Park Wood). These were:

- Pale Sedge *Carex pallescens*
- Narrow-leaved Everlasting Pea *Lathyrus sylvestris*
- Greater Butterfly Orchid *Platanthera chlorantha*
- Early-purple Orchid *Orchis mascula*.

Base-rich species absent from Shenley Wood but found in Linford Wood were: Herb Paris *Paris quadrifolia* and Sanicle *Sanicula europaea*.

The Anderson study of 1980 noted species that would be expected in such a woodland but were not found, which were: Goldilocks Buttercup *Ranunculus auricomus*, Wood Melick *Melica uniflora*, Spurge-laurel *Daphne laureola*, Sanicle *Sanicula europaea* and Herb-Paris *Paris quadrifolia*.

Seven specific management recommendations were made on the basis of the 1994 survey. They were:

1. Future management plan

As almost the whole wood had been subject to disturbance over only five years (1991-1996) to regenerate it after many years of neglect, this should be followed by a less-intensive, phased management rotation of compartments about every 7-10 years (the interval chosen to be subject to growth rates), with some compartments on a longer cycle, to achieve a greater range of ages of *Prunus spinosa* Blackthorn, and others left as non-intervention areas. Rides, tracks and clearings, meadows and woodland margins – which require openness and light – would need more frequent maintenance. Compartments should be relatively large blocks.

2. Maintenance of soil moisture levels

Ditch clearance in 1988 may have contributed to drying out of the woodland. Evidence for drying out was the spread of *Mercurialis perennis* Dog's Mercury, which needs to be monitored as its spread is an indicator of likely decrease in species diversity.

3. Maintenance of wet, open areas

One of the features of Shenley Wood is its high species diversity of vegetation in wet, open areas, including some of the rides and the central triangle. The improved management of ride edges since 1991 should be maintained in ways that maintain species diversity.

4. Rare species

"Many of the rarer field layer species exist vegetatively in shady, undisturbed areas, but are able to proliferate in recently cleared areas prior to the build-up of competition". Some, such as *Lathyrus sylvestris* Narrow-leaved Everlasting-pea, *Stachys officinalis* Betony, and *Carex pallescens* Pale Sedge, will benefit from maintenance of open areas. Other species, including: *Orchis mascula* Early-purple Orchid, *Platanthera chlorantha* Butterfly Orchid will be maintained through cycles of coppicing; this is particularly the case in the south-west of the Wood (Compartments 3B-D and 3E).

5. Control of Bramble *Rubus fruticosus*

It has been suggested that the dominance of *Rubus fruticosus* Bramble must be reduced in certain areas, to allow for the proliferation of field layer species. Bramble is shade tolerant and does not die back cyclically, as do other species. It can overarch coppice stools and inhibit the natural regeneration of other species. Its vigour can be accentuated by soil eutrophication. Bramble's dominance is, in part, a consequence of previous neglect of coppicing. A management regime is needed to reduce Bramble's dominance in this Wood. Where there was little existing understorey (especially Compartment 1B) the recommendation was that new shrubs should be planted, such as *Corylus avellana* Hazel to increase shade at ground level and structural diversity. When these are coppiced in future years, their wood should be removed to reduce the overall level of nutrients and decrease eutrophication.

6. Maintenance of ancient woodland characteristics

One recommendation was that the few remaining conifers and specimens of *Fagus purpurea* Copper Beech should be removed. In any future planting, *Quercus robur* Oak should be encouraged and *Acer campestre* Field Maple: *Fraxinus excelsior* Ash will regenerate naturally.

Ancient woodland characteristics will also be maintained by not introducing unsuitable materials into the Wood. Chippings for paths should originate only from native deciduous hardwoods and should certainly not contain conifers; this is to prevent increases in soil acidity and to avoid introducing an uncharacteristic range of fungi.

Burning of brushwood directly on the woodland floor will eventually cause soil eutrophication, altering the base-richness of the soil. This would encourage the germination and proliferation of species more characteristic of places such as wastelands, such as: *Chamerion angustifolium*

Rosebay Willowherb, *Juncus conglomeratus* Compact Rush, *Juncus effusus* Soft Rush, and *Urtica dioica* Common Nettle. Instead of burning, brushwood could be stacked as wood-piles or chipped for paths.

7. Deadwood

Deadwood was poorly represented in Shenley Wood. It had been removed to provide fuel for a nearby farm until 1985. Deadwood should be retained in the woodland and, wherever possible, as standing deadwood. Hollow trees are an essential habitat for specialist birds and invertebrates and without them species will be lost to the Wood. Deadwood will also assist fungi in their role as recyclers of essential nutrients.

3.10 Climate Change resilience

A Forestry Commission Research Note 'Climate change: impacts and adaptation in England's woodlands' (2010) presents 'Factors to consider when managing ancient and native woodlands'. ([http://www.forestry.gov.uk/pdf/FCRN201.pdf/\\$FILE/FCRN201.pdf](http://www.forestry.gov.uk/pdf/FCRN201.pdf/$FILE/FCRN201.pdf)). The most relevant of these to Shenley Wood are:

- 1 Wetter winters in the future could exacerbate soil compaction, rutting and erosion and may place additional constraints on operations.
- 2 Warmer and longer growing seasons will promote productivity and provide more food for herbivores, both invertebrates and mammals. Deer, grey squirrel and rabbit populations will tend to increase in response to food availability and milder winters, requiring robust control measures in the future, particularly where natural regeneration is a priority.
- 3 Invasive species including; grey squirrel, edible dormouse, rhododendron, laurel, Japanese knotweed and Himalayan balsam should be monitored as a warmer climate will promote expansion of their range/population.
- 4 Some non-native tree species may present a future risk of becoming invasive.
- 5 With changing climate and as already being experienced, other pests and diseases may move into the country and region, so there will be a need to keep aware of such events to meet these challenges. Strategies will have to be developed to deal with such issues e.g. supporting/encouraging other native species (gathering and propagating Oak acorns)
- 6 Coppice can improve resilience to drought as stools have deeper roots than regenerating seedlings and planted material, and coppiced shoots tend to have a higher vigour than young plants.
- 7 Natural regeneration is likely to be affected by climate change although this may vary from species to species.
- 8 Where the likelihood of increased colonisation of unwanted invasive species occurs, create buffer areas around core woodland where invasive species are absent, or remove small isolated patches of invasive species if already present at the site. However, it must be remembered that climate change is driving species range shifts, and attempts to prevent natural colonisation may exacerbate woodland fragmentation in the future.
- 9 Avoid management that would result in a less wind-firm stand where frequent gales and wetter winters are likely to cause more damage.
- 10 Where impacts affect age structure through the mortality of older trees, release smaller trees to promote rapid development of the next cohort.
- 11 Long term change should be monitored, recorded and reviewed at regular (perhaps 10-year) intervals. Monitor the range of habitats, age range, vertical structure, deadwood, and field layer vegetation composition to provide evidence of long term change.

- 12 Ancient woodland could also provide a long term, resilient, resource for monitoring climate change impacts and the diverse range of species in native woodlands may provide some evidence to guide adapted species choice in other types of woodland.

3.11 Vegetation associated with the rides and paths

Of the 163 plant species found in the Wood in the 1995 'Shenley Wood Vegetation Survey' 130 were recorded along rides and ditches, where there is more light. Appropriate mowing and clearing regimes in these areas should be maintained to conserve diversity of these species within these locations, but with great care not to damage the perennial plants, some of which are very long-lived. For example, some of the rides provide examples of unimproved grassland with flowering plants such as Greater Bird's-foot Trefoil *Lotus uliginosus* and Purple Loosestrife *Lythrum salicaria* both of which are attractive to insects. Ride cuts should not be intensive. A single cut of the grass in these locations in September would promote these plants better than frequent cutting and some rides-side areas would benefit from cutting less frequently.



Illustration 10. Ride side vegetation – photographed in early Spring.

Established practice is to create uneven widths and heights to plants at the edge of paths and rides by leaving graded 'scalped' areas. The purpose of this is to create broader sunlit areas in which flowering plants can thrive and insects such as butterflies can bask. It has been desirable to create much larger clearances in some areas with the specific purpose of creating broad sunlit clearings to support more diversity of species. To increase habitat value, while creating forward and side views for the wood users, the edges of rides and glades should be regularly cut (usually every two or three years) and coppiced to create and maintain a graduation from the field layer to low shrub and sub-shrub growth through to the woodland canopy (see diagram below). The edges will be cut following a scalped style, usually ranging from a depth of 2 metres to 5 metres from path or ditch edges. Further opportunities will be sought to create greater depth to edge transition in some areas of the woodland (e.g. along the south side of compartment 1d). To offer more light availability to paths and rides and associated transition edges (particularly those running on a west to east axis). One problem that has had to be overcome is that many of the soft paths lay wet for long periods of the winter. This has been partly overcome by placing layers of woodchip over some of these. As the level of these paths has risen they have become drier under foot. It is essential that this element continues to be managed. Management of rides must also include cutting of trees and vegetation along either side of the paths to create broad open scallops, which will allow more forward and side views, thus preventing the path user feeling uncomfortably hemmed in. It will also enable more ground flora to develop, to be seen from the paths, and will provide sunlit places for butterflies and other insects which will add to the attractiveness of the experience. Without proper management of the woodland

rides, they can degenerate into a muddy mess which encourages woodland users to find alternative routes, at the detriment of the surrounding vegetation.

3.12 Soils and pollution

Industrial emissions to air, and nitrogen dioxide pollutants from combustion sources, including vehicle emissions, are substantially increasing nitrogen deposition and concentrations in soil and water. A UN report explains that “The availability of nutrients is one of the most important abiotic factors that determine plant species composition in ecosystems. Nitrogen is the limiting nutrient for plant growth in many natural and semi-natural ecosystems. Most of the plant species from oligotrophic and mesotrophic habitats are adapted to nutrient-poor conditions, and can only survive or compete successfully on soils with low nitrogen availability. High nitrogen deposition causes changes in vegetation composition and vegetation structure.” (UNECE 2003). Although these effects are most pronounced in uplands and grasslands any effect on woodlands also need to be considered as many ancient woodland plants depend on lack of nitrogen enrichment. A more localised source of pollution is from dog faeces. Nitrogen phosphates and potassium from dog faeces can have a significant fertilising effect particularly along edges of paths and rides where many woodland plants are located.

3.13 Soil moisture levels

Over various periods of management of Shenley Wood, ditches and drains have been cut, either to benefit plantation growth or to make main paths drier. A lot of this work occurred in the 1980's (relatively recently with reference to the wood's history), as MKDC took ownership of the wood and opened up as public open space. The hydrology of Shenley Wood may have been changed by the construction of ditches but there is a lack of objective survey evidence of changes in the dryness/wetness of the Wood over time. There are subjective reports that some areas of the woodland seem to be drier than they used to be. Many of the more interesting species found in the woodland are associated with the wet ground conditions that are normally present. One indicator of changing hydrology will be evidence of spread of species that thrive in drier conditions, such as Dog's Mercury, Bluebell and Greater Stitchwort and decline of species that require wetter conditions such as Meadowsweet and Floating Sweet-grass. These distinctions are exacerbated on gleyed soils because water-logging temporarily alters the chemical composition of the soil, not simply because of poor aeration, as Oliver Rackham explained in 'Hayley Wood: its history & ecology' (1990 p.131), but because the iron compounds in gleyed soils are reduced to the soluble ferrous state sufficient to poison the roots of Dog's Mercury, which has poor tolerance to it. If Dog's Mercury is seen to spread this will be one indicator of the Wood drying out.

Drying out may be exacerbated if predictions of hotter drier summers as a consequence of climate change are borne out. This kind of woodland has its own distinct mix of flora, so proper awareness of the requirements of these species will enable the beneficial biodiversity to be maintained. The 1994 'Shenley Wood Vegetation Survey' report includes a plan showing damp and wet areas in the Wood, but this was based on a subjective assessment not measurements. Inevitably, there is some drying out initially in areas that have been cleared and coppiced recently, but some objective measurement of moisture levels and monitoring over time would enable a clearer understanding of any changes that are occurring, particularly in response to a changing climate. Instrument measurement would enable better management of future moisture levels to sustain the Wood's range of flora.

3.14 Ditches and watercourses

The ditches support a wide diversity of flowering plants and provide nesting and overwintering sites for some invertebrates, such as some of the Bumblebees *Bombus spp.* Ditches (which do not all necessarily pre-date MKDC) should perhaps be maintained by clearing of only the base and lower slopes, with the material piled on the woodland side of the ditch, rather than clearance of all the vegetation. Consideration should be given to less frequent ditch clearance, and of cutting either one side of a ditch at a time or shorter lengths in a particular year, so that plants and invertebrates that use these locations are enabled to survive and reproduce. Currently, ditches are managed between December and early February each year, as part of a two year programme of rotational cutting regimes. The organic arisings are thinly spread on the cut area on the woodland side of the ditch.

3.15 Ponds

The wood's two woodland edge ponds are in relatively good condition although both suffer from disturbance (e.g. dog intrusion) meaning that they are generally turbid. The pond located just inside the main southern entrance of Shenley Wood (see plan 8) is heavily shaded by mature trees and scrub. A badger sett is located on the bank above this pond which is gradually being filled with spoil from the badgers' excavations. However, surveys have shown that this pond is important for Great Crested Newt and is also used by smooth newts and common frogs. The pond located on the western side of the wood is much more open and is used by breeding great crested newts and other amphibians. It has a good variety of aquatic and emergent plant species. Unfortunately, this pond is prone to drying up during dry springs and summers. It also attracts large quantities of litter at times, including glass, and has to be cleared periodically.

The four teardrop-shaped SUDS ponds on the western side of Shenley Wood were created in 2007. These ponds add considerable value to the wildlife habitats of the wood and hold sizeable populations of smooth newt and common toad. They are less likely to be used by great crested newt which tends to avoid ponds with a flow. A variety of marginal plant species such as marsh marigold, flowering rush, water plantain and water forget-me-not has established naturally. The SUDS ponds appear to be very rich in invertebrate life despite considerable disturbance from dogs. These ponds are also well used by foraging bats.



Illustration 11. View of the SUD's system, with the main wood on the right and background.

The ponds should be monitored regularly enough to assess their continued suitability for amphibians and general invertebrate use.

3.16 Meadow and grass management

Floristically rich areas of long grass that are sheltered but with access to direct sunlight provide habitat for a wide range of species and species groups. Accordingly, it is intended to continue with the current approach of grassland maintenance and to seek opportunities to extend and enrich areas of long grass in and around the woodland. The grassland and grassy/shrubby areas found adjacent to the rides and the woodland edge (e.g. the SUD's system on the woodlands east side, see plan3) should generally be managed as long grass (cut once a year or less) and extended where possible,

with larger areas being encouraged to become wild flower meadows (e.g. removing cut arisings to reduce nutrient levels).

3.17 Integration of surrounding landscape and wildlife corridors

The Management plan incorporates some sections of younger landscape that is found along the woodland edge (see plans 2 & 9). These sections should be managed in a style that is sympathetic to the woodland itself. Although not part of the semi-natural ancient woodland, it is important to include these areas as they will have such an influence in connecting the woodland with the wider landscape. The need is to continue to develop the woodland's edges and see how this better integrates with the younger landscape. The establishment of longer grass or transition areas needs to be strongly considered to increase the biodiversity strength of the woodland's edge (invertebrates, birds etc.). Such areas are found predominately on the woodland's north and eastern sides and total 3 hectares. To the north side the said land is predominantly plantation that was planted in the 1980's. This is important as it links in with the general grid road green corridor and other such plantations that are developing into young woodland. To the east of the wood is found a Sustainable Urban Drainage system (SUD) that was created in the early 2,000's to deal with water runoff from local developments. The SUD area is a combination of ponds (dry and wet) and meadow grasslands that are managed as wild flower meadows, while having elements of shrub planting.

The need is to develop the woodland edge and take such actions as leaving uncut areas of grass and other ground vegetation, or at least cut on rotation, to form 'transition' sections that will offer opportunities primarily for invertebrates and small mammals, while offering habitat and feeding for birds. At the time of writing this plan (early 2017) a new primary school is being developed on the south side of the wood. Consequently, the land to the south of the redway found on this side of the wood has received quite a bit of disturbance and is fenced off and is part of the development site. As this site settles down and is handed back to the Trust and at the first review of this management plan (2022), it should be decided how much of this land falls into the management plan.

The land to the west of the Wood is mainly sports fields with associated short grass regimes. The Parks Trust has no influence as to how this land is managed and therefore it is not included in the management plan.

When operating within the constraints local land use offers, the integration of the Wood and the surrounding landscape is vital (Plan 9). Integration will enable spread and movement of species and help to avoid the more sedentary species from becoming genetically isolated.

3.18 Productivity

Some woodland products become available as an outcome of management activities in achieving the primary objectives for Shenley Wood (see section 2). Certain produce can be utilised without detriment to the wood's conservation or recreational value, provided care is taken, especially with regard to extraction. Produce should be regarded as a by-product of management for conservation and recreation. Historically woodland habitats were a by-product of ancient woods being managed as an economic resource.

Produce that is and can be sourced from the Wood include:

- Timber for firewood or other markets e.g. larger roundwood (produced in combination with leaving cut wood on the woodland floor for habitat value)
- Hazel stakes or binders for hedge laying purposes
- Gathering of tree or wildflower seed e.g. Bluebell seed.

3.19 Non-indigenous ground flora species

Britain is a hot-spot for the indigenous Bluebell *Hyacinthoides non-scripta*, which is present in relatively few other northern European countries. Two other Bluebell species have been introduced to gardens and woodlands in the UK: they have become naturalised and have spread. Even more intrusive is a hybrid of one of these which has been even more widely introduced and even planted in woodlands. All three can hybridise with the one Bluebell species indigenous to Britain, so risk the decline of the native Bluebell. The indigenous species is more delicate, has a drooping shape, and tubular rather than bell-shaped flowers which are deep blue. There is no case for planting any Bluebell in any of the ancient woodlands in Milton Keynes; nor should any be planted near these

woodlands. Unfortunately, the hybrid *Hyacinthoides non-scripta* x *H. massartiana* and possibly the Italian Bluebell *Hyacinthoides italica* and the Spanish Bluebell *Hyacinthoides hispanica* are present elsewhere in Milton Keynes and risk causing the spread of hybrids and non-native species into woodlands at the expense of *Hyacinthoides non-scripta*.

Care should be taken not to introduce non-native ground layer plants into these ancient woodlands or near to them, as there are other examples of non-native species similar to AWI plants; for example there is an introduced sub-species of Yellow Archangel *Lamiastrum galeobdolon* which is found in the wild in Milton Keynes: *Lamiastrum galeobdolon* sub-species *argentatum* has whitish blotches or marbling on its leaves.

3.20 The Parks Trust's Biodiversity Action Plan

Woodland managers need to be aware and act in accordance with The Parks Trust's Biodiversity Action Plan (BAP) and act upon proposed and desirable projects as laid out in the BAP and set out elsewhere in this management plan, including Proposed Activities:

- Continuation of on-going conservation management activities (coppicing, thinning, and ride/glade management).
- Continue to retain standing and fallen deadwood to increase the deadwood resource.
- Maintain records of known bat tree roosts and retain their local environment.
- Continue to maintain and monitor the established bat box scheme.

BAP Desirable Activities

- Commission professional ecological surveys of woodland vegetation every 10 to 15 years; evaluate against previous surveys to identify change and any long-term trends.
- Locate, record, map and assess the condition of all veteran trees and coppice stools.

There are several further wildlife conservation/ habitat creation measures that should continue to be undertaken, these include;

- a) The installation and maintenance of tawny owl boxes and bat boxes.
- b) The construction of amphibian hibernacula and grass snake basking and breeding areas.
- c) Propagate seed from Narrow-leaved Everlasting Pea and plant seedlings in different areas of woodland. Monitor existing stands of this plant from year to year.
- d) Monitor woodland for continued presence of Purple Emperor butterfly (first discovered in 2015)
- e) Monitor known badger sett for continued use (annual).

3.21 Birds

Birds

Four Breeding Bird Surveys have been carried out over the 33 years from 1974 to 2007, covering Shenley, Howe Park and Linford Woods. These have provided invaluable evidence of changes in numbers of breeding territories in these woods, and trends regarding particular species. Some of these reflect declines in numbers that have occurred across Britain. These declines have often been attributed to factors that are less relevant to managed woodlands in Milton Keynes, such as woodlands elsewhere that have closed canopies and declining understoreys, or woods that suffer from intensive browsing by deer, which are more characteristic of many unmanaged woodlands elsewhere across Britain. Inevitably, there have been fluctuations in breeding bird territory numbers in Shenley Wood for each species; some may relate to external factors such as weather. Other changes may relate to development occurring around the wood, stage of woodland management, increasing disturbance, or extraneous factors affecting summer migrants.

In Shenley Wood the overall picture between 1974 and 2007 has been of an increase in bird territories, a loss of several species and gain of some others. In 1979 there were 27 species present and 212 territories identified. By 2007, 28 species of breeding bird held 282 territories. But, over the intervening 14 years all Starling *Sturnus vulgaris* and Coal Tit *Periparus ater* had gone, and numbers had reduced significantly of: Marsh Tit *Poecile palustris*, Bullfinch *Pyrrhula pyrrhula*, Dunnock *Prunella modularis* and Song Thrush *Turdus philomelos*. Some bird species had significantly increased territories; these were: Blackbird *Turdus merula*, Blackcap *Sylvia atricapilla* and Green Woodpecker *Picus viridis*. Also, Greenfinch *Chloris chloris*, that had been absent, occupied four territories by 2007.

Loss and decline of bird species may relate to local factors such as:

- Lack of suitable nesting sites
- Inadequate food sources, such as invertebrates, seeds or berries at specific times of year
- Increased predation
- Increased disturbance (e.g. dogs, domestic cats and people straying off the paths).

Decline of bird species may also relate to national and international factors such as:

- National decline of individual species for various reasons (e.g. Human, farming, climate influences).
- Climate Change that may affect migration routes or habitat elsewhere on the globe; For example, the regional and national decline of Spotted Flycatcher *Muscicapa striata* is thought to be largely a result of increased desertification in the bird's wintering grounds in Africa.
- Human influences in various associated bird habitat areas across the globe

It is notable that some of the more successful species in these ancient woodlands, such as Great Tit *Parus major*, nest and feed in the upper canopy and that some species that have declined or have been lost from the Wood nest either on the ground or close to it. For example: the Bullfinch forms a nest in dense woody cover between 1 and 2 metres from the ground; the Marsh Tit forms a moss cup in small diameter holes, usually as low as 3m from the ground; the Coal Tit forms a small cup in a cavity on or near the ground; the Willow Warbler *Phylloscopus trochilus* usually nests in a shallow depression on the ground, close to shrubs or tall vegetation. Species such as these may be suffering from either: increased predation, increased disturbance, or insufficient suitable nesting sites. Predation could be from Corvids, such as Carrion Crow *Corvus corone*, or from cats or other mammals. Disturbance could be from people, dogs off the leash, or woodland operations at critical periods of the life cycle. The lack of standing deadwood may account for a lack of low nest-hole sites.

It is likely that as the Wood was opened up with surfaced and other defined paths, more people entered the Wood than had happened for many decades. As housing has been occupied in the adjoining area, the number of cats and dogs entering the Wood has increased, and disturbance of species nesting low down has increased considerably. It may also be possible that people straying off the main paths when birds are nesting has deterred some species from nesting here. In 2016 The Parks Trust introduced a 'dogs on leads' requirement throughout the breeding periods for all three ancient woodlands. It may also be worth encouraging cat owners to fit a small bell to their pet, which would give some advance warning to birds.

Consideration could also be given to passive management of people's movement through the Wood, by use of: log-edges, dead-hedging, live-hedging or ditching; and careful direction of educational visits to areas where least disruption will be caused. Song Thrush nest relatively close to the ground, up to about 5m, usually in dense shrubby vegetation, often close to the woodland edge. They feed on the ground, mainly on earthworms and other invertebrates and require relatively soft and moist ground to enable them to probe the soil. Other declining species such as the Greenfinch specialise in hedges and woodland edge. Both these species benefit from transitional vegetation from trees to scrub, to tall vegetation, to open grassland, buffering the woodland edge. These habitat features require ongoing management to maintain this structure and to arrest a transition from scrub to woodland. The Song Thrush may also use woodland rides where these can provide transitional vegetation, similar to woodland edge, along broad sunny rides protected from wind-chill. Those rides of Shenley Wood that are straight are less able to provide protection than the more circuitous rides elsewhere in the Wood. These straight main rides need to be kept broad to ensure adequate light penetration to provide warmth that attracts invertebrate activity. They could be improved by creation of some broader widenings of the rides at a few locations, as well as scalloping, with gradation from low grass at path edges to scrub towards the tree stands, providing ground-level and prolonged nectar sources. According to the RSPB/Forestry Commission guidance in 'Woodland Management for Birds: a guide to managing for declining woodland birds in England' (2005) a rule of thumb is that rides should be at least one and a half times wider than the height of surrounding trees, to reduce the effects of shading and achieve adequate warmth. If this is possible in only a few locations it could provide more protected and warmer alcoves that would benefit some bird species and many invertebrates.

Some bird species feed primarily on seeds or berries so plants plentiful in these, over prolonged periods of the year, mainly in the ground-layer, shrub-layer and under-storey will assist these birds, but also beyond the woodland edge. Retention of more trees with holes and gaps for hole-nesting

species is needed and should look to be expanded where possible. Many woodland birds feed on caterpillars and adult invertebrates, for which the woodland canopy, the shrub layer, some scrub, deadwood, leaf litter and upper level of the soil are all important. Continuity of coppice rotation should assist in providing a wide range of age-classes in the Wood to provide for a diversity of invertebrates.

There are no bird boxes in Shenley Wood other than a single Tawny Owl box situated just off the ride in Compartment 39a. A Tawny Owl box well used in the early 2000's but then it became dilapidated. Direct Works put the new one up in 2016 and this has been occupied by owls in 2017. As we know that historically Tawny owls frequent all our semi-natural woodlands, there might be a case for putting up a few accommodating boxes in each of the woods, but with the 27 bat boxes already in Shenley Wood, we wouldn't want to over commit ourselves for several reasons.

3.22 Bats

It is essential that all woodland operations in Shenley Wood take account of the requirements of bats. Shenley Wood, in comparison with other local woodlands, has a relatively large quantity of standing dead wood, with features such as woodpecker holes, rot holes, sap runs and loose bark, making them attractive to roosting bats. To date, three trees have been identified as supporting roosts of Noctule bats but many other species will utilise these features. If any such trees need to be felled or reduced, they must first be inspected by staff trained in accordance with The Trust's 'Code of Practice for Bat Habitats' (2012 or later editions) and the relevant Natural England licence. Similarly, the locations of bat boxes have been carefully selected to ensure 50% canopy cover therefore works to thin the canopy in the immediate vicinity of the boxes should be minimal.

There are currently some twenty-seven bat boxes located in the wood. Twelve of these were funded and installed by Milton Keynes Natural History Society in collaboration with The Trust in 2009. A further fifteen were installed in 2010 to bring the number of boxes up to the recommended national standard of 1 per hectare. These boxes are checked twice a year and records kept of bats found. To date, two species have been found using the boxes: soprano pipistrelle and brown long-eared bat. The other species commonly recorded in Shenley Wood using bat detectors are common pipistrelle and noctule bat. There have been a number of emergence surveys of noctule bat carried out since the tree roosts were first discovered, with up to 75 bats carried out on any given night. The Shenley Wood population is considered to be of high local importance.

There is one record of barbastelle dating from 2011. One of the rarest woodland bat species in the UK, this species has been recorded sporadically in Milton Keynes and North Buckinghamshire in recent years.

Research carried out by North Bucks Bat Group has shown that if companion bird boxes are put up close to bat boxes, tits will use them in preference to the bat boxes. It is therefore a consideration to install wooden bird boxes close to bat boxes and we have begun to do this in Shenley Wood.

3.23 Managing habitat for butterflies

At the time of the 2002-2003 butterfly surveys Shenley Wood contained 18 UK resident species and two migrant species, including less common species such as Grizzled Skipper *Pyrgus malvae*. The survey report noted the scarcity of White Admiral *Limenitis camilla* and suggested it could return, subject to effective management of its foodplant, Honeysuckle *Lonicera periclymenum*. White Admiral is an uncommon woodland specialist which is present in Shenley Wood in low numbers. Its sole larval foodplant is Honeysuckle which can be found along the rides. The adult butterfly can sometimes be seen nectaring at the flowers of Bramble *Rubus fruticosus*. White Admiral also occurs at Oakhill Wood and along the North Bucks Way where it has been recorded in transect counts. The North Bucks Way is almost certainly a vital corridor enabling this shade tolerant species to move between woodlands, as may be the other corridors linking Shenley Wood, past Oxley Park and through Medbourne. Future vegetation surveys need to take special note of these foodplant species of the larvae and adults so we can better understand the extent that these plants are present.

In the last few years, the Purple Emperor *Apatura iris* has become established in Milton Keynes' woods with the first confirmed sightings coming from Shenley Wood in 2015. This large and spectacular insect needs plentiful sallow on which to lay its eggs. It is important that plentiful sallow, in full or partial sunlight, is retained for the benefit of this species.

The 2004 report of the 2002-2003 survey made several important recommendations to improve habitats for butterflies in Shenley Wood. These are set out more fully in Appendix 1, but in summary were:

1. Wider rides, leaving untidy edges and corners in sunny situations
2. Less frequent cutting of ride-side edges and managing these rotationally in sections, some left for two years
3. More nectar sources within the Wood, for a more prolonged season, including planting of late summer flowering species such as Hemp Agrimony *Eupatorium cannabinum* and Fleabane *Pulicaria dysenterica*
4. Leaving grassy habitats to set seed and leaving a proportion to stand uncut over winter, including grassy tussocks
5. Establishing broad woodland edge zones of low scrub and tussocky grassland, including some wildflower seeding, to achieve a mosaic of different habitats.

3.24 Pests and diseases

There are many pests and diseases that at different levels may have a detrimental effect on the woodland, but the two currently affecting the woodland most are Grey Squirrels *Sciurus carolinensis* and Honey Fungus (various species of *Armillaria*). In addition, and with the confirmed presence of *Chalara fraxinea* (Ash Dieback) in Linford Wood and Kingsmead area in November 2016, this disease is also now a serious threat to the wood and its Ash trees.

Until the early 1990s Grey Squirrels had, over a period of years, caused great damage in the Wood, bark-stripping many of its trees as they reached the pole stage. From the mid-1990s until 2015 Squirrel numbers were controlled annually using baited hoppers containing Warfarin. In 2015 Warfarin was banned as a control method (secondary poisoning issues) by European legislation. To continue successful control of Grey Squirrel numbers, The Trust developed successful control by winter shooting, using air rifles operated by vetted volunteer marksman (recruited from a local air rifle range). The Squirrels are targeted on pre-set feeding platforms found below baited hoppers and away from the woods footpaths. The operation is subject to method statements and risk assessments. To help protect the wood and its developing trees control of Grey Squirrels will continue.

Honey Fungus *Armillaria* spp. attacks and kills roots of many woody and perennial plants. Trees can be infected by Honey Fungus, particularly those under stress from other pests and diseases, which can bring about early deterioration or death of individual trees. Its most characteristic symptom is white fungal growth between the bark and wood, usually at ground level and clumps of honey-coloured toadstools sometimes appearing briefly on infected stumps in autumn. Honey Fungus is seen to be part of the Wood's natural environment and there are no plans to try to control it (which would be extremely difficult) other than ensure any infected trees are not a danger to the general public.

With the imminent arrival in Shenley Wood of Ash dieback *Chalara fraxinea* we have a serious concerns about the future health of the wood. If the disease were to infect Shenley Wood in an aggressive way, the effect would be devastating as Ash *Fraxinus excelsior* is the most numerous species in the woodland at canopy, understorey levels and as a coppiced tree. Pedunculate Oak *Quercus robur* to a lesser extent is under threat from various diseases including acute and chronic decline. 'Oak decline' is a complex disorder or syndrome in which bacteria with other damaging agents, such as insect infestation or weather damage then interact to bring about a serious decline in tree condition. The woodland's managers need to continue to assess disease progress and continue to develop strategies to combat them. As a discussion point and for the future this may include limited use of native species of the surrounding area that have not been recently associated with Shenley Wood, such as Small-leaved Lime *Tilia cordata* and Alder *Alnus glutinosa*.

Although not widespread in the wood, Powdery mildew can be on occasions found in the wood. Powdery mildew of Oak is caused by the fungus *Erysiphe alphitoides* (also known as *Microsphaera alphitoides*) and it is a common foliar pathogen of Oak throughout Europe (first found in England in 1908). In the confines of the wood there is not much practically that can be done to tackle it. In mature trees the disease is generally less damaging than in younger trees, but in combination with other

factors such as defoliation by insects can contribute to tree decline. Water stress can be a contributing factor to plants suffering from this disease. *Erysiphe* attacks young leaves and soft shoots, covering them with a felty-white mycelium, causing them to shrivel and blacken. Mild overcast conditions are optimal for development of the disease, which usually appears in summer when warmer conditions prevail.

3.25 Domestic animals along with human interference

Since houses were built on the woodland edge in the late 1990's, the pressure on the natural environment has undoubtedly intensified. Extra footfall has the potential to cause damage to the woodland floor, especially if people are not generally directed along set paths and if those paths are not properly maintained. Illicit paths and wanderings should also be discouraged. Fly tipping, small scale fires and camping are all issues that can and do have an influence on the wood. Domestic cats are regularly seen in the wood. Cats can have a detrimental impact on bird breeding populations especially in lower canopy areas where species such as Marsh Tits and Wrens can be found nesting. Domestic cats will also predate on ground-feeding species and fledgling birds. The subject of the effects of domestic cats on breeding bird populations is a sensitive one, so the way to tackle this is to gain a better understanding of what is happening in Shenley Wood and offer local residents further information about impacts domestic cats can have on woodland wildlife. Dogs in the wood can also be detrimental to a wood's wildlife, particularly when dogs are allowed to run through the wood off the lead, or where continuous barking and movement through the undergrowth is likely to be unsettling to woodland mammals and birds, especially in the breeding season (research tells us that a dog's scent will linger for 30 minutes or more after it has passed through an area). To help counter this negative aspect, the Parks Trust introduced a policy with accompanying signage at the woodlands entrance, requesting dog walkers to keep their dogs on the lead in the breeding season (end of March through to September).

3.26 Ecological monitoring

We will continue with ecological studies of Shenley Wood while making comparisons with the previous 19 studies relating to this Wood and also to cover species and aspects these did not cover. Studies should be designed to provide advice on the appropriateness of management actions being undertaken and to inform future plans. The most recent study of the vegetation and ground flora was in 1994 and a review of the effects of management on the woodland flora over this period would enable an objective evaluation of how well the special ancient woodland and other species are doing. Inevitably, many of the previous ecological studies of Shenley Wood recommended follow-up studies to evaluate the effects of the gradual restoration of the woods. These recommendations included:

- A follow-up vegetation study to provide comparisons with the previous study, to show the effects of the last two decades of woodland management.
- A study of pollinators and associated insects: bees, wasps, hoverflies, and ants.
- Butterfly and moth studies to make comparisons with the 1999 and 2004 reports and previous studies.
- A Common Bird Census study to show changes since the 1987, 1993 and 2007 studies.

Thus far there have been no studies of pollinators such as ants, bees, wasps (Hymenoptera), hoverflies or other flies (Diptera), spiders (Arachnida), bryophytes, mosses, lichens or mammals undertaken in Shenley Wood.

True flies, including hoverflies (Diptera) and bees, wasps & ants (Hymenoptera) contain important pollinators of ancient woodland plants as well as species specific to veteran trees and deadwood, so a study of these invertebrates and the health of such populations in the wood would be really useful. Unfortunately, studies of such things are so specialised and there are very few people undertaking paid work and those that do are not cheap, making the practicalities of commissioning such studies difficult. However, we are currently seeking assistance from Bumblebee Conservation Trust to train up Parks Trust volunteers to undertake bumble bee surveys. Floodplain Meadows Partnership have volunteer led bumblebee surveys and these have been a great success. We will look for opportunities (resource and funding) to commission surveys on invertebrates as we move forward. In 2017 we will undertake a beetle/invertebrate survey in the wood. In 2017 we will also commission a survey of the woodlands bats as well as surveying all of the woodland's ponds.

3.27 Visual character

As stated in the 3rd Objective (2.4) management of the wood should protect the overall landscape value and visual appeal of Shenley Wood and promote the essential character of this semi-natural ancient woodland. Managers should also continue to develop the surrounding landscape in ways that are sympathetic to the woodland and ensure the woodland is visually and ecologically connected to the surrounding landscape and open space.

It is necessary to continue working towards having mixed age and size classes of trees and shrubs along with non-intervention belts/areas, to provide a variety of visual (and habitat) types. This will be done through management techniques such as selective thinning and coppicing, while continuing to develop ride-side clearings that will include work on the woodland edge and surroundings, while protecting historic features such as the wood-banks.

Continued consideration will need to be given to how visitors to the Wood will be able to enjoy its visual and historic features. The landscape value from the perspective of someone walking in the wood is quite involved and requires the woodland management systems that are sympathetic and appropriate to the manner of the woods daily use.

Vegetation management needs to provide:

- A good length of view into the woodland from the path or ride network with a good forward length of view along paths but avoiding views out of the woodland to developed areas.
- Where possible views to or framing of trees of unusual form or substantial trees that might be of visual interest for their size and obvious age, of which there are several in Shenley Wood
- Providing good visual access to aesthetically appealing wildflower areas, especially in spring to flowers such as Primrose, Violets, Wood Anemone, Lesser Celandine and Bluebell.

When managing Shenley Wood for its Visual Character, Objectives 3 and 4 also need to be considered. As a reminder, these are;

Objective 3. Access and recreation: The woodland and its environs are to function as a distinctive part of the overall park provision in the western flank of Milton Keynes and to provide public access via paths which exploit a variety of woodland settings and which link to recreational through routes and the wider countryside. It should be well-connected to entry points such as car parks and public transport stops. The woodland should offer an accessible, stimulating and varied environment for people's relaxation and enjoyment.

Objective 4. Education: To enable Shenley Wood to be used as a low key educational resource and provide information to encourage knowledge and understanding of Shenley Park Wood and its surrounding environment including such elements as bio-diversity, historic and management of the wood.

3.28 Public access and types of use

The Wood is regularly used by walkers. Pedestrian access into and through the wood is provided by a network of surfaced, woodchip and grass paths that run through and around the wood, including access to the car park (see plan 4).

There have not been any recent surveys of user or visitor numbers specific to Shenley Wood, though there have been some citywide surveys that are relevant. A 2012 survey of public use of parklands across the city (Parks Trust and Glow-worm Marketing) revealed that of the 603 responding to the question 'Which park do you visit most?' 3% of the responders cited Shenley Wood as the site they visit most frequently, Linford Wood had a return of 6% and Howe Park Wood had a return of 3% (in Howe Park Wood numbers have increased considerably since the opening of the Education & Visitor Centre in 2015). More study needs to be undertaken on visitor numbers and use relating to Shenley Wood.

As more people use the woodland it is essential that access is managed effectively. Inappropriate use of the Wood could have a damaging effect on its conservation value and public enjoyment, especially by trampling of the valuable and sensitive field layer. The path network largely serves to avoid this type of damage by ways in which it guides people through and around the woodland. Although the

overall woodland area is generally referred to as public open space, use is channelled rather than entirely open.

Management of Shenley Wood will ensure the wood is fit for public access, this includes:

- Paths (hard and soft surfaces) and benches are appropriately maintained.
- All trees found along paths, rides and other areas of public access shall be managed in accordance with general principles of woodland management, along with the health and safety considerations of people visiting the wood. Under the terms of The Parks Trust's Tree Inspection Policy (July 2013 and reviewed in 2017) these trees will be monitored and formal inspections recorded, as they are undertaken (normally every three years in such woodland situations) while ensuring any consequential work is recorded.
- The Wood is regularly visited and patrolled by Parks Trust staff and volunteers.
- Anti-social issues are tackled (e.g. illegal camping, vandalism).
- Litter is effectively managed.

Any further extension of access would have to be very carefully considered as to how any increase in paths, rides etc. impacts on the wildlife and ecology of the wood.

3.29 Signage and interpretation

As part of the Trust's revised signage and interpretation strategy (2008) high quality signs were installed in 2013 and 2014. These included: 'badging' signs, notice boards, posts with route markers and site interpretation boards (see plan 5.). There is a need to ensure signage is well maintained and remains appropriate to the woodland users. In 2016 the Parks Trust adopted a policy of asking dog walkers to keep all dogs on leads during bird and general wildlife breeding period of March to September. As a consequence, temporary signs asking for dog walkers to keep dog on leads at this sensitive period are put in place at the woods entrances.



Illustration 12. General information sign found at the entrance to the wood from Medbourne housing

3.30 Outdoor Learning and Training

Shenley Wood and the surrounding area provides an opportunity for outdoor learning activities based on the ancient semi-natural woodland habitat, the flora and fauna present in that ecosystem and the heritage aspects of the woodland. As there is no meeting space/classroom available at the site and given the sensitivities of the ground flora to trampling and potential disturbance of wildlife, outdoor learning activities within the wood are run on a 'low key' basis.

The Parks Trust's Education Team deliver sessions in Shenley Wood to local schools and community groups aimed at helping both children and adults understand more about their local environment. Activities for school children may include bug hunting, guided walks and plant studies. Activities offered for adults include nature-themed guided walks such as tree or fungi identification or occasional volunteer practical working parties. Areas in the wood suitable for educational activities include the grassy rides, glades (subject to assessment of the potential impact of trampling) and the general path network. Access to woodland compartments away from these areas is generally avoided.

A small defined area of the wood is used on a regular basis term-time for forest school activities by a local pre-school nursery, who walk to the site from their premises. This is carried out under a licence, which is reviewed in regard of the impact on the wood and re-issued annually. This activity provides the young participants with a structured experience of a natural outdoor habitat. It is not intended to extend this type of licenced activity across a wider area of the wood or to more groups.

In September 2017 a new primary school (Oxley Park Academy Shenley Wood Campus) opens just to the south of the wood. This provides an opportunity for the Parks Trust and the School to develop a partnership through which the school will be encouraged to use the wood for learning activities and to develop a sense of ownership of the Wood, thereby helping to promote its responsible use and care. This could be established by promoting the Trust's Junior Rangers scheme at the school and by providing training and guidance to teachers on where and how they can run outdoor learning sessions.

Shenley Wood can also be used as a subject and venue for training sessions for Parks Trust staff and volunteers. For example, this may include seminars or training days covering topics associated with the woodland and may include courses and seminars about wildlife and birds encountered in woodland environments and also understanding about heritage and the history of such sites.

Section 4: Work Programme - Autumn 2017 to Autumn 2022

A fundamental requirement of any works or operations undertaken should be that actions fulfil as many of the objectives as possible and do not necessarily focus on achieving individual aspects of the objectives in isolation. To achieve the overall aim and objectives of this management plan the analysis and prescriptions discussed in previous sections of this report are to be applied in the following ways.

4.1 Site management and supervision

Directing and specifying works and implementation of the plan will be primarily carried out by the Trust's Operations Team that will include: Director of Landscape and Operations, Area Landscape Manager, Arboriculture and Biodiversity Officers, along with the Community Rangers. All work and actions will be suitably supported by the Trust's Communications and Community teams and will be assisted by volunteers who will assist in such activities as site patrols and litter picking. The expertise of staff will be developed with the provision of any required or appropriate training, while developing their experience of woodland management and all it encompasses. The Trust's Chief Executive and Trustees will oversee the strategic implementation of the Management Plan to ensure that aims and objectives are being achieved.

4.2 Organisation of works

All works within the plan area will be carried out in accordance with The Trust's 'Operational Practices and Procedures' document.

- Routine works

Works and short term cyclic work such as mowing, hay cropping, litter collection, pruning adjacent to footpaths etc. will mostly be undertaken as part of large performance-based term contracts.

- Long cycle and non-routine works

This category of work includes items such as coppicing and canopy thinning work, which is undertaken on an approximate 15-year cycle, as well as footpath resurfacing, pond maintenance or re-profiling.

The Parks Trust's own Direct Works team will generally carry out the tree and coppicing work while other elements, such as path re-surfacing will be competitively tendered (where and when appropriate) and carried out by skilled contractors.

4.3 Working around the woodland's flora and fauna

Generally, tree, shrub and compartment work will take in place in November and December when impact on the woodland environment is at its lowest. Working at this time of year gives consideration towards the wood's' fauna and ground flora by:

- Minimising ground compaction (before the water table or surface area gets saturated from the winter's rain)
- Ensuring emerging bulbs do not get trampled
- Undertaking general works at this time of year will not conflict with bird nesting (see Parks Trusts document 'Bird Nesting – Working Code of Practice')
- Minimising disturbance to amphibians associated with the ponds /watercourses and associated wetlands (e.g. Great Crested Newts)
- Because of the potential disturbance to bat roosts occurring in the wood, individual trees (usually those in the upper canopy that are beyond 'pole stage') will be appropriately inspected by qualified staff before work takes place.

4.4 Compartment work

Compartment work includes general coppicing and thinning works associated with the Wood's 16 main compartments (see plan 8). Thinning and selective removals in the individual compartments will be carried out on a targeted 15-year cycle. Generally, this work will take place from October to December when impact on the woodland environment is at its lowest (minimising ground compaction and conflict with bird nesting, newts and other amphibians, while ensuring emerging bulbs do not get disrupted). All work will take into consideration potential disturbance to bat roosts. Inspections of individual trees should be carried out, especially of trees that are above 'pole stage' size.

Although this management plan will be reviewed in 2022, the work programme as described in this management plan covers the period to 2024. This is because as part of our successful application to the Forestry Commission to receive felling licenses and limited grant aid through their Countryside Stewardship scheme, we needed to submit a work programme to cover the period up to 2024.

As each compartment is worked, previously planted species which are inappropriate (e.g. species introduced to the wood by planting) will be removed; this should be completed by 2025. As a general rule all trees and vascular plants not native to the wood should be removed from the woods.

4.4.1

Year 1 2016/17 - Compartment 40

The upper canopy that is dominated by Ash but also includes Oak and Aspen, will be thinned to a maximum intensity of 30%, while retaining a mix of native tree species that will include Aspen and Oak. The mid canopy that includes Ash, Oak and Hawthorn, will be thinned to a maximum intensity of 50%. The understorey that includes Hazel, Ash and Goat and Grey Willow will be coppiced in sections creating small coups, while not exceeding 50 % of the compartmental area. Where possible, Sallow and other Willow species will be retained. Non-intervention belts, dictated by thicker scrub and woodland edge areas will be left, as will selected tree species to grow on and form the next canopy. As suitable (e.g. away from footpaths), elements of standing dead wood will be left or created (i.e. via cutting into the cambium layer, where the where the water and nutrient supplying Xylem and Phloem cells can be found). Trees with good habitat opportunities (e.g. holes in the stem) will be left as appropriate. Approximately 50% of cut wood will be left to rot as lying dead wood.

4.4.2

Year 2 2017/18 - Compartment 33

The upper canopy is dominated by Ash, but includes Oak, will be thinned to a maximum intensity of 20%, while generally retaining all the Oak in a mix of native tree species. The mid canopy that is dominated by Hawthorn, Hazel and Ash, will be thinned to a maximum intensity of 50%. The understorey that includes Blackthorn and Hazel will be coppiced in sections creating small coups, while not exceeding 50 % of the compartmental area. Non-intervention belts, dictated by thicker scrub e.g. Blackthorn and woodland edge areas will be left, as will selected tree species to grow on and form the next canopy. As suitable (e.g. away from footpaths), elements of standing dead wood will be left or created (i.e. via cutting into the cambium layer, where the where the water and nutrient supplying Xylem and Phloem cells can be found). Trees with good habitat opportunities (e.g. holes in the stem) will be left as appropriate. Approximately 50% of cut wood will be left to rot as lying dead wood.

4.4.3

Year 2 2017/18 - Compartment 42a

The upper canopy that includes Ash, Oak and groups of Aspen, will be thinned to a maximum intensity of 10%. while retaining Oak and thinned out (only as required) Aspen in a mix of native tree species. The mid canopy that includes Aspen, Hazel and Goat Willow will be thinned to a maximum intensity of 50%. The understorey that contains mainly Hawthorn and Hazel, will be coppiced in sections creating small coups, while not exceeding 50 % of the compartmental area. Non-intervention belts, dictated by thicker scrub and woodland edge areas will be left, as will selected tree species to grow on and form the next canopy.

As suitable (e.g. away from footpaths), elements of standing dead wood will be left or created (i.e. via cutting into the cambium layer, where the where the water and nutrient supplying Xylem and Phloem cells can be found). Trees with good habitat opportunities (e.g. holes in the stem) will be left as appropriate. Approximately 50% of cut wood will be left to rot as lying dead wood.

4.4.4

Year 3 2018/19 - Compartment 38

The upper canopy that is dominated by Ash but also includes Oak, will be thinned to a maximum intensity of 30%, while retaining the Oak in a mix of native tree species. The mid canopy that includes Hazel, Field Maple and Hawthorn will be thinned to a maximum intensity of 50%. The understorey that has a lot of Bramble found within it, will be coppiced in sections creating small coups, while not exceeding 50 % of the compartmental area. Non-intervention belts (dictated by thicker scrub and woodland edge areas) will be left, as will selected tree species to grow on and form the next canopy. As suitable (e.g. away from footpaths), elements of standing dead wood will be left or created (i.e. via cutting into the cambium layer, where the where the water and nutrient supplying Xylem and Phloem cells can be found). Trees with good habitat opportunities (e.g. holes in the stem) will be left as appropriate. Approximately 50% of cut wood will be left to rot as lying dead wood.

4.4.5

Year 4 2019/20 - Compartment 42b

The upper canopy that is dominated by Ash but includes Aspen and Oak, will be thinned to a maximum intensity of 10%, while retaining the Aspen and Oak in a mix of native tree species. The mid canopy that includes; Hazel, Sallow, Field Maple, Aspen and Dogwood will be thinned to a maximum intensity of 50%, while retaining Goat and Grey Willow and Aspen where possible. The understorey will be coppiced in sections creating small coups, while not exceeding 50 % of the compartmental area. Non-intervention belts, dictated by thicker scrub and woodland edge areas will be left, as will selected tree species to grow on and form the next canopy. As suitable (e.g. away from footpaths), elements of standing dead wood will be left or created (i.e. via cutting into the cambium layer, where the where the water and nutrient supplying Xylem and Phloem cells can be found). Trees with good habitat opportunities (e.g. holes in the stem) will be left as appropriate. Approximately 50% of cut wood will be left to rot as lying dead wood.

4.4.6

Year 5 2020/21 - Compartment 39a

The upper canopy that is dominated by Ash but includes Oak, will be thinned to a maximum intensity of 20%, while retaining the Oak and a mix of native tree species. The mid canopy that includes Ash and Hazel will be thinned to a maximum intensity of 50%. The understorey that is dominated by Hazel but includes areas of Bramble, will be coppiced in sections creating small coups, while not exceeding 50 % of the compartmental area. Non-intervention belts, dictated by thicker scrub and woodland edge areas will be left, as will selected tree species to grow on and form the next canopy. As suitable (e.g. away from footpaths), elements of standing dead wood will be left or created (i.e. via cutting into the cambium layer, where the where the water and nutrient supplying Xylem and Phloem cells can be found). Trees with good habitat opportunities (e.g. holes in the stem) will be left as appropriate. Approximately 50% of cut wood will be left to rot as lying dead wood.

4.4.7

Year 6 2021/22 - Compartment 32

The upper canopy that is dominated by Oak (approx. 85%) but includes Ash, will be thinned to a maximum intensity of 10% targeting poorly form oak for removal. The mid canopy and understorey that includes Field Maple, Hawthorn, Blackthorn and Bramble will be coppiced in sections creating small coups, while not exceeding 50 % of the compartmental area and letting the natural regeneration room to develop. As suitable (e.g. away from footpaths), elements of standing dead wood will be left or created (i.e. via cutting into the cambium layer, where the where the water and nutrient supplying Xylem and Phloem cells can be found). Trees with good habitat opportunities (e.g. holes in the stem) will be left as appropriate. Approximately 50% of cut wood will be left to rot as lying dead wood.

4.4.8

Year 6 2021/22 - Compartment 41a

Although this compartment was worked in 07/08 and 09/10, areas on the eastern side near the path were not worked at this time. The upper canopy and understorey are thick in places and the ground flora is limited. The upper canopy that is dominated by Ash but includes Oak and Aspen will be thinned to a maximum intensity of 20%, while retaining the Oak and Aspen in a mix of native tree species. The mid canopy that includes Hazel, Willow species, Field Maple and Aspen will be thinned to a maximum intensity of 50%. The understorey that has a lot of Bramble found within it will be coppiced in sections creating small coups, while not exceeding 50 % of the compartmental area.

Non-intervention belts (dictated by thicker scrub and woodland edge areas will be left, as will selected tree species to grow on and form the next canopy.

As suitable (e.g. away from footpaths), elements of standing dead wood will be left or created (i.e. via cutting into the cambium layer, where the where the water and nutrient supplying Xylem and Phloem cells can be found). Trees with good habitat opportunities (e.g. holes in the stem) will be left as appropriate. Approximately 50% of cut wood will be left to rot as lying dead wood.

4.4.9

Year 7 2022/23 - Compartment 37

The upper canopy is dominated by Ash but also includes Oak. The Upper canopy will be thinned to a maximum intensity of 20%, while retaining the Oak in a mix of native tree species. The mid canopy that is dominated by Ash and Hazel will be thinned to a maximum intensity of 50%. The understorey that is dominated by Hazel with areas of Bramble will be coppiced in sections creating small coups, while not exceeding 50 % of the compartmental area. Non-intervention belts (dictated by thicker scrub and woodland edge areas will be left, as will selected tree species to grow on and form the next canopy. As suitable (e.g. away from footpaths), elements of standing dead wood will be left or created (i.e. via cutting into the cambium layer, where the where the water and nutrient supplying Xylem and Phloem cells can be found). Trees with good habitat opportunities (e.g. holes in the stem) will be left as appropriate. Approximately 50% of cut wood will be left to rot as lying dead wood.

4.4.10

Year 8 2023/24 - Compartment 31

The upper canopy that is dominated by Ash but includes Oak will be thinned to a maximum intensity of 20%, while retaining the Oak in a mix of native tree species. The mid canopy that is dominated by Hazel but includes Hawthorn and Ash, will be thinned to a maximum intensity of 50%. The understorey that is dominated by Blackthorn and Hazel will be coppiced in sections creating small coups, while not exceeding 50 % of the compartmental area. Non-intervention belts, dictated by thicker scrub e.g. Blackthorn and woodland edge areas will be left, as will selected tree species to grow on and form the next canopy. As suitable (e.g. away from footpaths), elements of standing dead wood will be left or created (i.e. via cutting into the cambium layer, where the where the water and nutrient supplying Xylem and Phloem cells can be found). Trees with good habitat opportunities (e.g. holes in the stem) will be left as appropriate. Approximately 50% of cut wood will be left to rot as lying dead wood.

Ride side Maintenance/Coppicing & General Concepts

A rolling five-year programme of cutting back and coppicing vegetation and scrub found along paths, rides and woodland edges shall be undertaken, going to a depth of up to 15 metres in places, using a scalloped and undulating line style, in order to create a graduated transition from the field layer through to scrubby regeneration and then on to the woodland canopy. Where site lines are not affected (e.g. along straight sections of ride) sections of Blackthorn and Honeysuckle should be retained where possible.

4.5 Declining, dead and dying trees and the management of dead wood

To improve the Wood's biodiversity and apply the Trust's Biodiversity Action Plan (BAP) and as stated in each compartmental action plan (4.4), larger diameter dead and dying trees (e.g. standing deadwood or crown die-back) shall, where possible and appropriate to the location, be left in situ, including standing deadwood (which could be artificially created as described in 4.4) or those trees with crown die-back. This will comply with the BAP's Habitat Action Plan, HAP 01 and can be done in areas with limited public access, thus ensuring the environment is relatively safe for public use. Amounts of fallen and cut deadwood, particularly material of large diameter, will be left on the woodland floor and allowed to decay naturally. Approximately 50% of felled timber from the upper canopy should be left as lying deadwood habitat. To reduce disturbance (e.g. from the public), where possible this timber will be left on the ground in tree lengths, with only the heavier (less moveable) wood being cut into smaller lengths. Lengths of wood should be left well away from paths and ditches. Ideally felled timber should be left with maximum contact with soil so it will slowly rot into the soil, thus providing habitat for particular invertebrates that inhabit this rotting timber. Remaining cut lengths of

wood will be cut into 2.2 metre lengths and removed from the wood to be sold locally as top-grade firewood.

Provision needs to be considered for assessment and recording of the overall veteran and deadwood timber resource at regular intervals (in the order of fifteen years).

Ash Dieback may yet have a significant role to play in creating standing deadwood and until we understand its full impact on the wood there is a need to avoid such actions felling healthy Oak or creating standing dead wood from such species.

4.6 Management of individual trees and public access

Individual trees found alongside paths, rides and other areas of public access shall be the subject of formal and recorded inspections under the terms of The Parks Trust's Tree Inspection Policy (July 2013 and later editions). These inspections will take place every three years. An inspection of Shenley Wood is being completed in 2014, with the next one is due in 2017. All consequential required work will be undertaken and recorded.

4.7 Re-stocking of the Wood

With the inevitable arrival of Ash Dieback, there is a need to continue to develop a population of young Oak and other tree species (e.g. Aspen, Willow and Field Maple) in the wood. Generally, any re-stocking of the wood should be undertaken by encouraging and developing natural regeneration. This can include the gathering and propagating seeds/acorn from the existing stock. A planned action is to gather acorns from selected Oak trees in the wood, then propagate and grow them on and then plant them back in the wood in appropriate locations (e.g. recently coppiced and thinned areas). This will be completed over several years (depending years where acorns are found in good numbers). This process could involve the activities of the education the education team, local schools and volunteers. We will also monitor the re-generation of Aspen, Willow and Field Maple over the five-year period and review how we can help replenish the stock of these species. Generally, any re-stocking of the wood should be undertaken by encouraging natural regeneration including gathering of acorns, seed or using such methods as layering.

4.8 Management of the understorey

A prescriptive style of woodland management that has been implemented in Shenley is 'Coppice with Standards'. It is imperative that re-creation of 'Coppice with Standards', incorporating mixed age classes and non-intervention belts is continued. As part of the system used in the wood, management and treatments incorporate retention of some of the mid-storey, non-intervention areas and rotational scrub cutting. Coppice management and associated thinning should ideally be applied on an approximate 15-year cycle. Non-intervention belts will involve leaving small islands or linear lengths of denser shrubs and trees to be left within areas of new coppicing. Bramble *Rubus fruticosus* is a shade tolerant species and does not die back cyclically. Bramble should be reduced in certain areas where it is dominating other species found in the understorey including where it is overarching coppice stools and inhibiting the natural regeneration of other species. To help maintain a good understorey, new shrubs such as Hazel should be encouraged (e.g. management of natural regeneration or layering).



Illustration 13. Coppiced understorey 3 years after it was worked upon.

4.9 Maintenance of paths and rides

All paths and rides (see plan 4) will continue to be maintained to enable pedestrian access through the wood; re-surfacing of leisure routes will be carried out as required. Woodchip paths, bridleways and green paths will be topped up with woodchips as required, to ensure they remain good and viable paths. All woodchip and hoggin surfaced horse trails shall be maintained as an intermediate grass specification (max height obtained 200mm), to a width of approx. 2.5m, (as specified in the wood associated Landscape Maintenance contract).

Grass rides will be monitored for wetness. Woodchip should ideally be sourced from within the woodland. Where woodchip is sourced from outside the wood the woodchip should not contain chippings that arise from Ash or Oak that may hold diseased wood and coniferous species, that would in time increase the acidity of the soil, which would make it unsuitable for many woodland flora.

A rolling five year programme of cutting back and coppicing vegetation and scrub found along paths, rides and woodland edges shall be undertaken (to a depth of up to 15 metres in places) in order to create a graduated transition from the field layer through to scrubby regeneration and then on to the woodland canopy. This work will be undertaken to achieve two primary objectives:

- a) Allow the development of a greater diversity of habitats, vascular plants and invertebrate species along the ride-side.
- b) Enable the public using the rides to do so with confidence, while not feeling the vegetation is overbearing or blocking views, as well as offering further opportunities to enjoy the sight of flowers, butterflies and other wildlife.

4.10 Herb layer management

All herbaceous growth overhanging the leisure routes, horse riding trails, grass and woodchip paths throughout the wood shall be managed in accordance with the principles shown on the stylised diagram inset found in the Landscape Maintenance (LM) - term contract specifications (TC390; Shenley Wood and Sheet 11, 'Herb Layer Management') and will be cut during mid to late July of each year. The operation shall be carried out using hand tools such as reap hooks, with the objective of cutting back the vegetation overhanging the footpath.

4.11 Grass-cutting

4.11.1 Formalised grass-cutting (measured)

Continue to manage and maintain the woodland and surrounding landscapes and the associated areas of long grass using various 'long grass' treatments, following specifications found in the Parks Trust's Landscape Maintenance (LM2015) document and 'Western Parks Contract TC390, Shenley Wood, Sheet 11, ' (see plan 7.).

Short grass areas which are predominately found in areas surrounding the wood, will again be managed within the terms of the LM (TC 390) contract.

The long grass and wildflower areas shall generally be cut in the later part of the season and as described in The Parks Trust document 'Landscape Maintenance by Term Contract Section 3', edition (LM 2015 and onwards: As appropriate, the arisings will be gathered and removed from site with the objective to improve the sward quality in terms of wildflower content by preventing nutrient enrichment from arising's rotting down in situ.

Look to develop the woodland edge and take such actions as leaving larger uncut areas of grass and other ground vegetation and cut on rotation or on an annual basis, to form 'transition' sections that will offer opportunities primarily for invertebrates and small mammals, while offering habitat and feeding for birds.

The establishment of more longer grass or transition areas needs to be implemented to increase the biodiversity strength of the woodland's edge (invertebrates, birds etc.). This can be done in the summer of 2018 as the Trust prepare the next LM term contract.

4.11.2 Grass-cutting (unmeasured)

The grass, herbaceous material and natural woody regrowth that is adjacent to leisure routes and woodchip paths, where there is no 'measured' grass cutting regime specified on the LM contract drawings ('Western Parks contract TC390 and onwards;', see plan 7.), shall be managed in the following manner:

- a) **Woodchip paths:** In circumstances where grass and other material has colonised and is growing through the woodchip paths the vegetation shall be cut to an intermediate grass specification (max height obtained 200mm) maintaining a width of 1.5 - 2.0 metres.
- b) **Ditch present:** In circumstances where there is a ditch immediately adjacent, the treatment shall be to cut the grass, herbaceous material and natural woody vegetation on both sides of the leisure route, grass and woodchip path as long grass, to the edge of the ditch. The said grass is to be cut in October and the arisings raked up and disposed of by thinly scattering them into the wood beyond the area of cutting.
- c) **No ditch present:** In circumstances where no ditch is present, the treatment shall be to cut the grass, herbaceous material and natural woody regrowth as long grass on both sides of the leisure route, grass and woodchip path to a distance of 1.5m and 5.0m from the path, forming a wavy or scalloped edge with occasional deep indentations into the wood and away from the leisure route, grass or woodchip path. The said grass is to be cut in October and the arisings raked up and disposed of by thinly scattering them into the wood beyond the area of cutting.
- d) **Green ride fringe management:** During the period from December to early February each year, all grass, herbaceous matter and natural woody regeneration found adjacent to the green rides shall be cut to a height of 100 - 150mm. The area of cutting shall be along both

edges of the rides. The cut area shall vary between 2.0m and 5.0m, forming a wavy or scalloped edged on the woodland side (fringe) of the green ride.

4.12 Ditch and watercourse maintenance

Currently ditches (see plan 6) are maintained as part of a two year rolling rotation, during the period December to early February of each year in accordance with the Western Parks Landscape Maintenance term contract and are managed in the manner specified below:

- a) All grass, herbaceous matter and natural woody regeneration shall be cut to a height of 100-150mm. The area of cutting shall be along both edges of the ditch and across the surface of the ditch itself. The cut area shall vary between 2.0m and 5.0m, forming a wavy or scalloped edge on the woodland side of the ditch. All the arisings from the works shall be roughly raked off and thinly scattered into the wood beyond the area of cutting.
When undertaking this treatment care needs to be taken not to 'scalp' vegetation too closely, particularly on upper ditch edges and banks which may well be used for over-wintering insects such as Bumblebees.
- b) The ditch shall then be 'bottomed' to allow the free passage of water. This shall entail the removal of fallen leaves and other accumulated debris. The arisings shall be thinly spread on the cut area on the woodland side of the ditch with the exception of any lumps of wood, old stakes, litter or any other inorganic material which shall be gathered up and taken off site to tip.

The above treatments will be reviewed as the current 'LM' Term Contract terminates in November 2020. In the meantime, we will cease 'bottoming out' the ditches in an effort to reduce the efficiency of them in clearing water from the wood and again review this treatment in 2020.

Further investigation of the hydrology of the wood needs to be carried out and perhaps with the use of clay dams, try to hold water back in the path/ride associated ditches that were created in the 1970's, which could be having an influence in the wood becoming a drier environment that it traditionally has been.

4.13 Ponds

As appropriate (e.g. habitat sensitivity or location) and if the ponds are being significantly interfered with, consider a combination of protection to pond sides by encouraging vegetation or fencing including using dead hedging that shall be provided by cutting and moving into position cut woody vegetation such as Hawthorn and Hazel). Removal of excessive vegetation found within the pond and re-excavating of ponds can be considered but all works shall be carried out as required with the overall objective of keeping the ponds open to light and available as good habitat.

To protect the woodlands ponds from regular dog intrusions we will consider protecting areas/banks of the woodlands internal or edge ponds again using dead or live hedging and in the case of the SUD's ponds consider locations for protective planting along the water's edge using such species as Gorse, Bramble or Wild Rose.

4.14 Control of pests and diseases

The spread of Ash dieback *Chalara fraxinea* across the UK is a real concern (see 3.23). Although there is no plan to remove our established woodland Ash trees (which account for more than 50% of the upper canopy) we need to encourage other species appropriate to this type of semi-natural ancient woodland by favouring other tree species (apart from Ash) that are native to the woodland (e.g. Pedunculate Oak, Field Maple, Aspen, Goat Willow or Grey Willow) for retention, when undertaking thinning or felling operations. To try and protect light levels associated with semi natural ancient woodlands, it is advisable to thin/remove individual Ash trees as they become infected to the point of there is no way back for that tree. As experienced by the Forestry Commission in Kent and

other parts of the south of England, by carrying out 'clear fell' control, there is a possibility of dramatically changing light levels and changing the nature of the ground flora cover.

Control of Grey Squirrels should continue using the best and most effective and humane control measure available, which is currently control by shooting with air-rifles, using our team of Pest Control Volunteer Marksman (PCVM's), who in conjunction with the Landscape Officer with special responsibilities for pest control use baited hoppers with back plates mounted on tree trunks as the points of control.

4.15 Surrounding landscape as identified in the management plan

Continue to develop the younger surrounding landscape associated with the woodland (see plan 9) to include the following measures;

- As opportunities present themselves and on selected sections of the woodland edge leave extended uncut areas of grass/ground vegetation (or cut on rotation). This grassland will help form 'transition' sections that will offer habitat opportunities primarily for invertebrates and small mammals alike, while offering habitat and feeding opportunities for birds.
- Surrounding plantations should be thinned as required favouring trees species associated with Shenley Wood. Enough light should be allowed in to the plantation floors to allow the development of the understories and ground flora.
- Sections of surrounding grass areas should be continued to be managed to allow it to develop as wild flower meadow (e.g. removal of cut arisings).
- Ponds found on the outsides of the woodland itself need to be managed in a way that allows the amphibians and invertebrate's habitat to develop (e.g. keep free of litter ensures they do not become over shaded, while ensuring they have a balanced ecology).
- As seen in *plan 9* and identified in the management plan, ensure the area immediately around the wood is connected to the bigger linear landscape through continued and consistent management techniques (e.g. plantation and grassland management), that allow the surrounding green spaces to link up with the woodland.
- Monitor how the surrounding landscape is developing and synchronising with the woodland.
- Extend the above treatments as best as possible into the landscape found beyond the management plan boundaries.

4.16 Development works (2017 -2022)

It is intended that the following development works will be undertaken as part of the 2017 - 2022 five-year plan:

- a) Encourage Blackthorn to re-generate by ensuring in worked areas are not getting over shaded by other species and as appropriate coppice competing species.

To enable more Blackthorn to reach maturity, make efforts to retain Blackthorn wherever possible so it can reach maturity and certainly do not coppice whole sections of immature Blackthorn.
- b) Further investigation of the hydrology of the wood and with the possible use of clay dams, influence and assess the effectiveness of the path/ride associated ditches.
- c) Consider changing, and in particular reducing, the frequency of ditch cutting by evaluating the need to cut the ditches every 2 years.

- d) Continue to assess how landscape/greenspace external to the wood can be connected to the wood itself.
- e) Continue to take account of new ecological studies and where practicable implement appropriate recommendations to ensure the ecological values continue to develop and thrive.
- f) Encourage and develop the spread and growth of *Honeysuckle Lonicera periclymenum*. The White Admiral butterfly is an uncommon woodland specialist, which is present in Shenley Wood in low numbers. Its sole larval foodplant is Honeysuckle.
- g) To support the low populations of White Admiral *in the area and acknowledging it could return we*. and suggested it could return, subject to effective management of its foodplant, Honeysuckle.
- h) Continue to take account of ecological studies and where practicable implement appropriate recommendations to ensure the ecological values continue to develop and thrive.
- i) Re-stocking of the wood shall take place in appropriate locations through the encouragement of natural regeneration and encouraging a population of young Oak in the wood using acorns gathered from Oak trees found in the wood. The re-generation of Field Maple and other species will also need to be monitored over this period.
- j) Continue to monitor the ponds and improve their biodiversity by carrying out general maintenance of them e.g. do not allow them to be shaded out, carry out minor cleaning and re-profiling work and removal of litter etc.
- k) Service and top up the woodchip rides with woodchip to ensure the paths remain walkable and so that people are not walking off the path and in the wood land to avoid constant wet spots. As required look to improve drainage of such areas at specific and localised sections that constantly remain wet.
- l) Look to improve the integration of the wood to the surrounding landscape, using such methods as; encouraging/developing wildlife corridors and transition areas, analyse surrounding grass cutting regimes, promoting less frequent grass cuts and wild flowers enrichment. Favour and cultivate tree and shrub species that surround the wood to those found naturally occurring in the wood.
- m) Further understand how the wood is being used and the amount of footfall being experienced in the woodland and plan measures to cope with areas of excess pressure.
- n) Continue to monitor and be aware of how people and domesticated animals (e.g. cats and dogs) affect the wood and its wildlife and consider any preventative actions that could be taken to reduce their impacts.

4.17 Specific wildlife and Bio-diversity conservation measures

There are several further wildlife conservation/ habitat creation measures that should continue to be undertaken, these include;

- a) The installation and maintenance of tawny owl boxes and bat boxes.
- b) Propagate seed from Narrow-leaved Everlasting Pea and plant seedlings in different areas of woodland. Monitor existing stands of this plant from year to year.
- c) Monitor woodland for continued presence of Purple Emperor butterfly (first discovered in 2015)
- d) Monitor known badger sett for continued use (annual).

4.18 Bench, seat and sign maintenance

Vegetation adjacent to all benches and seats shall be cut as necessary using hand tools such as reap hooks to maintain free and comfortable access to the facilities and to prevent vegetation growing over and through the installations. The benches will be appropriately maintained, which will include cleaning, painting and replacement of failing or damaged timber. Over the five-year period (2017 - 2022) and beyond we will ensure signage is well maintained and remains appropriate to the woodland users.

4.19 Education and events –

Education and events associated with Shenley Wood will include;

- Interpretation, using a variety of media describing and explaining aspects of the immediate and local environment, including its social and natural history.
- A programme of events will be run throughout the year, including guided walks, talks, practical exploration and traditional crafts to encourage the use and understanding of the wood.
- Environmental and ecological information from the many ecological studies will be made available.
- Volunteer groups helping with restocking of the wood through natural regeneration or the use of traditional management techniques, such as layering of Hazel, or developing a population of young Oak for the wood, by gathering acorns from selected trees in the wood, to propagate, grow on and then plant back in appropriate locations.
- A programme of curriculum enhancement education activities for all school Key Stages will be provided, as well as programmes of community and adult education to further understanding of the natural environment.
- Developing a relationship with the newly built '*Oxley School Academy at Shenley Wood*' that will hopefully lead to the school's pupils participating in educational activities in and around the wood. This may include walks, talks, simple monitoring and practical tasks.
- Encouraging people to just visit Shenley Wood, which in turn will help introduce people to the wood and its environment.

4.20 Managing anti-social problems

The Wood is regularly visited and patrolled by Parks Trust Operations staff and Community Rangers, along with regular work visits conducted by employed contractors and Direct Works teams. Dropped litter is picked up on weekly and monthly scheduled cycles (within the term contract) and will be supplemented by reactive and volunteer litter-picking.

Although generally small-scale issues occur, such as: illicit camping, vandalism to benches & signs, small scale fires, dogs being walked off the leads during wildlife breeding seasons etc., such problems will be dealt with accordingly and promptly.

4.21 Productivity

In line and balanced against other woodland management objectives continue to produce woodland products from Shenley Wood, which include:

- Timber for firewood or other markets e.g. larger roundwood (produced in combination with leaving cut wood on the wood floor for habitat value)
- Hazel stakes or binders for hedge laying purposes
- Gathering of tree and wildflower seed e.g. gathering of Bluebell seed

4.22 Monitoring and surveys

Budgets and resource allowing (e.g. the appropriately qualified people/companies available at the right times), the plan is to undertake the following surveys and monitoring work at Shenley Wood in the stated years.

Moth Recording – this can be carried out by appropriate members of MK Natural History Society with support from Parks Trust staff. Moth Surveys to commence in Spring 2018.

Fungi Recording - Fungi are a very specialist group and not one readily tackled by many consultancies. Bucks Fungus Group have expressed an interest in recording in Parks Trust woods. BFG members will conduct fungus forays and additional recording days in Autumn/Winter 2017 and produce species lists and a summary for The Parks Trust.

Ground Flora – BSG Ecology have produced a Ground Flora for both Linford Wood (2015) and Howe Park Wood (2016) in recent years and will be invited to survey Shenley Wood's Ground Flora in 2018 thus providing us with a complete set of up to date woodland flora.

Common Bird Census – The most recent common bird census for Shenley Wood dates from 2006. We will approach ecological consultants for quotes with a view to conducting a full survey in 2019.

Pollinating Insects - This is rather specialised and very likely to be an expensive and time-consuming survey. We will approach known contacts who may be able to offer surveys with a view to carrying out a full survey by 2020.

Saproxylic Beetles – Mark Telfer has been carrying out a survey of saproxylic invertebrates, including beetles, in Shenley Wood, Howe Park Wood and Kingsmead Spinney in 2017. Although this survey is ongoing a high diversity of beetles and other dead wood specialist invertebrates have been found, with many Red Data Book and otherwise rare and scarce species identified in Shenley Wood. A full report will be available in the later part of 2017.

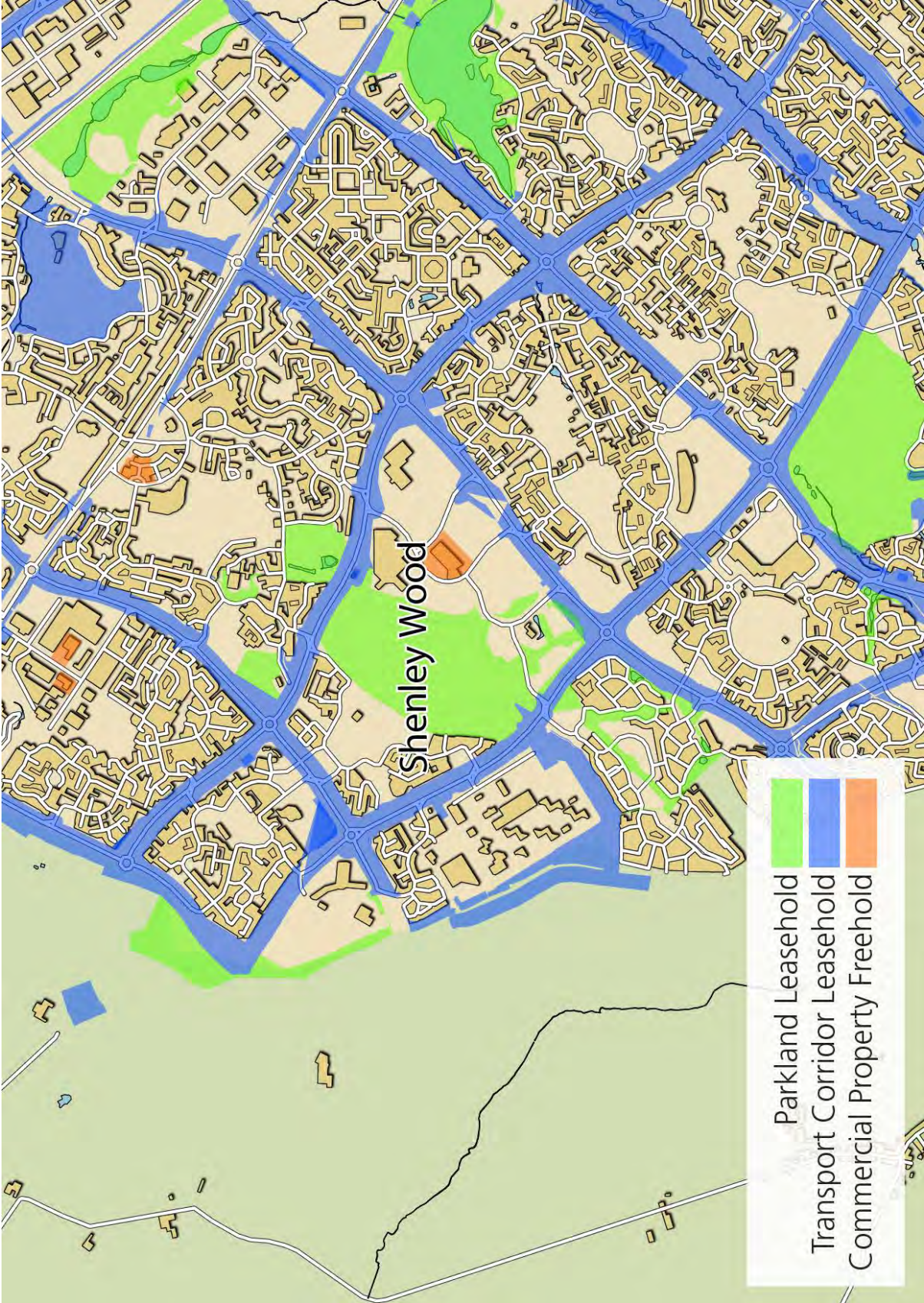
Study of People using the wood - Further studies as to numbers of people using the wood and what attracts them to the wood is required (e.g. dog walkers, enjoying the woodland environment or used as a through path) and we will look to do this in 2018/19.

Records of species found in Shenley Wood are held by the Buckinghamshire & Milton Keynes Environmental Records Centre (BMERC). These include all records from the 'Ecological Studies in Milton Keynes' reports, but also records provided by individual ecologists and naturalists. As new studies are carried out, new records will be submitted to BMERC.

Plan 1: The Management Plan Boundary



Plan 2: Ownership



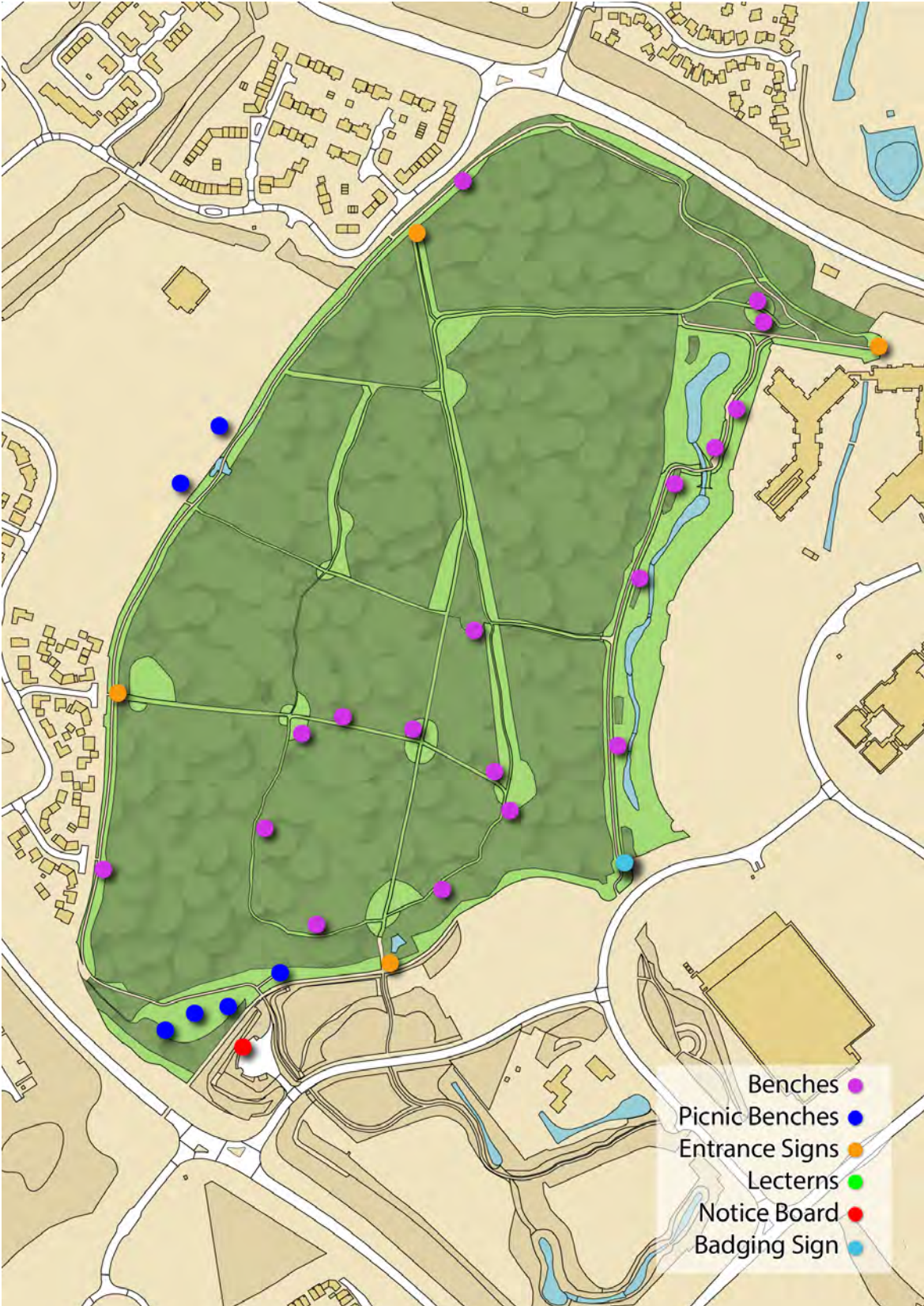
Plan 3: Vegetation Zones & Compartment Numbers



Plan 4: Footpaths, Rides & Car Parks



Plan 5: Benches, Signs & Noticeboards



Plan 6: Ponds & Water Courses



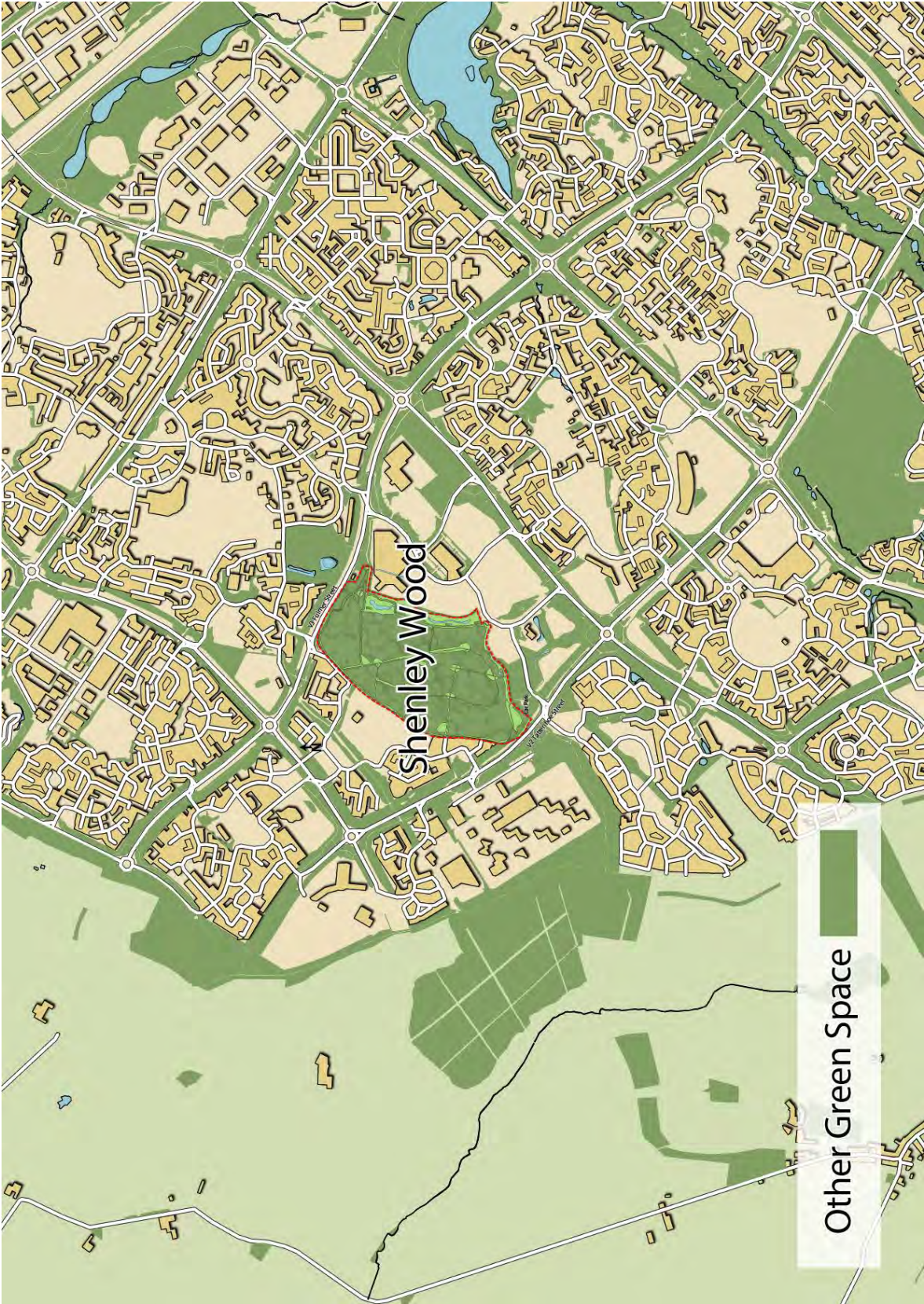
Plan 7: Grounds Maintenance Specification (April 2014 – Nov 2020)



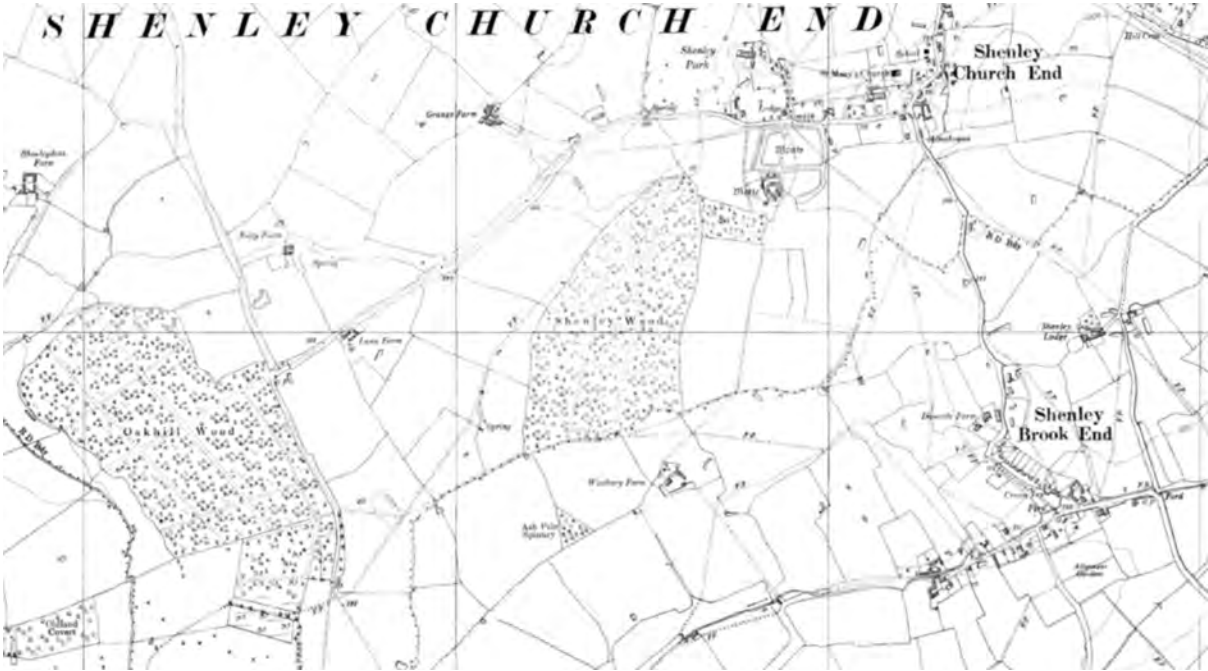
Plan 8: Thinning & Coppicing Operations (significant actions 2000 to 2023)



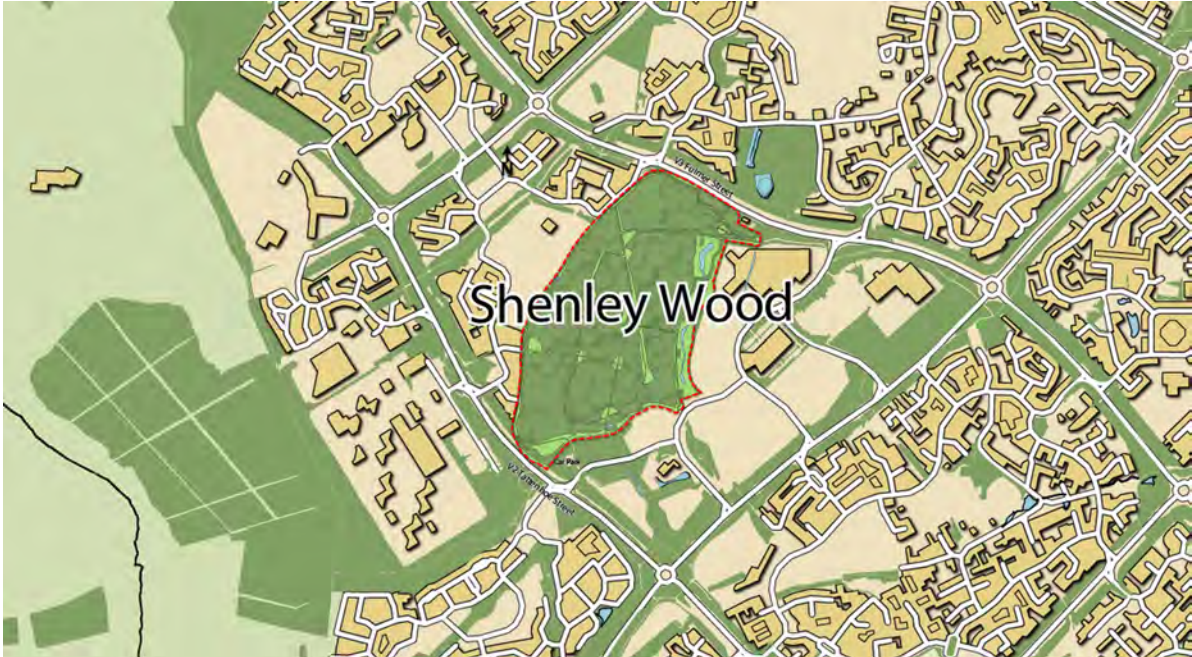
Plan 9: Shenley Wood and the Wider Landscape



Plan 10: Historic Mapping
1940s Epoch



2017



APPENDIX: Summaries and Conclusions of relevant 'Ecological Studies in Milton Keynes reports and their implications for site management of Shenley Wood

This section summarises the 'Ecological Studies in Milton Keynes' reports of most significance for an understanding of Shenley Wood and it covers the management recommendations made within these. Summaries of this Appendix are included in the main report above. When these studies were completed, the recommendations of individual studies had to be weighed with recommendations from other studies and against the overall objectives for the Wood. Some recommendations were implemented in subsequent management, many remain of relevance for future management of Shenley Wood.

Management planning should be based on an objective understanding of the history of woodland management and historical ecology of a site compared with a contemporary understanding of its biodiversity, condition and contemporary purposes. It is therefore important to recognise that the remarkable range and depth of ecological studies of Shenley Wood date largely from the period 1979 to 1996, with only a few more since then. The Ecological Studies reports of which relate to Shenley Wood are:

- 13. 'Bryophytes of Selected Habitats' – Mead, R (1975)
- 42. 'Terrestrial Invertebrates Part 1: Survey of Coleoptera' – Jackson, M (1979)
- 45. 'Common Bird Census of Shenley Wood' – Lackie, PM & Morgan RA (1979)
- 61. 'Butterflies' – Brown, D & Tasker, A (1981)
- 62. 'Moths' – Brown, D & Tasker, A (1981)
- 73. 'Survey of the butterflies in Milton Keynes' – Brown, D & Tasker, A (1982)
- 74. 'A Botanical Survey of Shenley Wood' – Anderson, P (1980)
- 82. 'A Survey of the Larger Fungi of Milton Keynes' – Osley, NJ (1983)
- 87. 'Ponds Survey 1984 & 1985' – Ridge, I (1985)
- 104. 'Common Bird Census of Howe Park, Linford and Shenley Woods' – Tasker, A (1987)
- 105. 'Botanical Survey of Shenley Wood' – Bioscan (UK) Ltd (1988)
- 121. 'Common Bird Census of Howe Park, Linford and Shenley Woods 1993' – Phillips, J (1993)
- 122. 'A Survey of the distribution of bats in parkland of Milton Keynes' – North Bucks Bat Group (1993)
- 126. 'Shenley Wood Vegetation Survey' – Francis, Dr J L (1994)
- 130. 'A Survey of Dragonflies in Milton Keynes' – Phillips, NJ (1995)
- 132. 'A Survey of the distribution of bats in parkland of Milton Keynes' – North Bucks Bat Group (1993)
- 133b 'A Survey of the Saproxyllic Coleoptera of Howe Park, Linford and Shenley Woods' – Plant, CW (1996)
- 141. 'A Survey of Moths at Selected Sites in Milton Keynes in 1999' – Townsend, M (2000)

- 144. 'A Survey of Butterflies at six selected sites in Milton Keynes 2002-2003' – Townsend, M (2004)
- 150. 'Common Bird Census of Howe Park, Linford and Shenley Woods' – Middlemarch Environmental (2007).

What follows are summaries of the most relevant of the above reports, with particular relevance to the ongoing management of Shenley Wood.

'Bryophytes of Selected Habitats' – Mead, R (1975) (Ecological Study No. 13)

'Terrestrial Invertebrates Part 1: Survey of Coleoptera' – Jackson, M (1979) (Ecological Study No. 42)

A more extensive study of Coleoptera in Shenley Wood was carried out as part of 'A Survey of the Saproxyllic Coleoptera of Howe Park, Linford and Shenley Woods' – Plant, CW (1996) (Ecological Study No. 133b): see below.

'Common Bird Census of Shenley Wood' – Lackie, PM & Morgan RA (1979) (Ecological Study No. 45)

'Butterflies' – Brown, D & Tasker, A (1981) (Ecological Study No. 61)

A more extensive study of butterflies in Shenley Wood was carried out as part of 'A Survey of Butterflies at six selected sites in Milton Keynes 2002-2003' by Townsend, M (2004) (Ecological Study No. 144): see below.

'Moths' – Brown, D & Tasker, A (1981) (Ecological Study No. 62)

A more extensive study of moths in Shenley Wood was carried out as part of 'A Survey of Butterflies at six selected sites in Milton Keynes 2002-2003' by Townsend, M (2004) (Ecological Study No. 141): see below.

'Survey of the butterflies in Milton Keynes' – Brown, D & Tasker, A (1982) (Ecological Study No. 73)

A more extensive study of butterflies in Shenley Wood was carried out as part of 'A Survey of Butterflies at six selected sites in Milton Keynes 2002-2003' by Townsend, M (2004) (Ecological Study No. 144): see below.

'A Botanical Survey of Shenley Wood' – Anderson, P (1980) (Ecological Study No. 74)

Penny Anderson is now very well known as chair and former chief executive of the prestigious ecological consultancy, Penny Anderson Associates. She was a founding member of the Institute of Ecology & Environmental Assessment (IEEM) and co-author of the book 'Habitat Creation & Repair'. She has been a member of boards of: IEEM, British Ecological Society, The National Trust, National Wildflower Centre, the Canal and River Trust and the Peak District National Park Authority.

The method for the Anderson 1980 study involved survey of 100 quadrats, each a single 10m/10m within a 50m grid. This sample was intended to be broadly representative of the Wood's 24.1 hectares. The survey provides a remarkable snapshot in time of tree species, girth, height and cover in 1980. They found 17 species of tree and shrub in their samples in the following quantities within the quadrats:

- 438 Ash
- 405 Aspen
- 332 Goat Willow
- 181 Hazel
- 88 Oak
- 60 Blackthorn
- 57 Field Maple
- 19 Elder
- 18 Midland Hawthorn

- 17 Beech
- 13 Norway Spruce
- 4 Lawson's Cypress
- 1 Elm
- 1 Silver Birch
- 1 Guelder Rose
- 1 Dog Rose
- 1 Field Rose.

Some canopy trees found in smaller numbers were of considerable girth. 59 in the sample areas were of girth more than one metre and two of these, both Oaks *Quercus robur*, were over two metres. The girth of Oaks were in the following ranges and quantities:

- 18.5% had been coppiced.

Of trees, the distribution of sizes was:

- 20% were under 100mm girth, so classed as scrub
- 16.7% (18) were 100-499mm
- 41.7% (45) were 500-999mm
- 23% (25) were of over 1,000mm.

The Anderson Report gives an account of the sequence of the 1958 Forestry Commission planting scheme, which is that:

- Compartment 1 was planted in 1959;
- Compartment 2 was planted in 1963;
- Compartment 3 was planted in 1964;
- Compartment 4 was planted in 1965
- A small area adjacent to Compartment 4 was planted after 1965.

Each area was cleared and rabbit-fenced before planting. Chemicals and diesel were used for weeding and drainage ditches were constructed. The last recorded weeding was in 1966 after which little, if any, management was carried out. This resulted in a "*dramatic and substantial regrowth of deciduous trees, many from the coppiced stools ... and others such as aspen and most of the willow from seed. The planted trees ... have as a result mostly been swamped, and have either died or remain as poorly-developed specimens*". Anderson reports details from a note by Cousins that the numbers of trees planted under the Forestry Commission Dedication Scheme 1959-65 were:

- Norway spruce – 7,800
- Pedunculate oak & Beech – 2,000 seedlings
- Lawson cypress – 1,700
- Western Hemlock – 1,700.

Anderson concluded that the lack of some expected flora species in Shenley Wood probably results from the replanting of 1959 and 1965 and other disturbances. Missing species included: Goldilocks Buttercup *Ranunculus auricomus*, Wood Melick *Melica uniflora*, Spurge-laurel *Daphne laureola*, Sanicle *Sanicula europaea* and Herb-Paris *Paris quadrifolia*.

Anderson concludes with some recommendations of "*management possibilities in Shenley Wood*".

These include:

- Tracks and ditches which discourage trespass into the rest of the wood, as in Linford Wood.
- Improvement of the woodland structure through a combination of re-coppicing and selective thinning to achieve high forest, with regrowth areas selectively thinned to enable all tree species present to grow to maturity.
- Gradual removal of planted trees except Oak.
- Much of the uncleared area was not fit to be coppiced as the trees were less dense, shade not intense and the ground flora was complete.
- Some coppicing of the moribund Hazel.
- Conserve some dense scrub as cover for deer, some birds and invertebrates.
- Achieving a woodland with a diversity of habitats.
- Less intensive management than Linford Wood.

'A Survey of the Larger Fungi of Milton Keynes' – Osley, NJ (1983) (Ecological Study No. 82)

‘Ponds Survey 1984 & 1985’ – Ridge, I (1985) (Ecological Study No. 87)

A more extensive study of ponds within Shenley Wood was carried out as part of ‘Shenley Wood Vegetation Survey 1994’ by Francis, Dr JL (Ecological Study No. 126): see below.

‘Common Bird Census of Howe Park, Linford and Shenley Woods’ – Tasker, A (1987) (Ecological Study No. 104)

Four Common Bird Censuses have been carried out which cover Shenley Wood. The results are presented in this 1987 report (Ecological Study No. 104), a 1984 report (Ecological report No. 86), a 1993 report (Ecological Study No. 121), and in a 2007 report (Ecological Study No. 150) which summarised evidence from the three earlier reports. A summary is provided in relation to Ecological Study No. 150: see below.

‘Botanical Survey of Shenley Wood’ – Bioscan (UK) Ltd (1988) (Ecological Study No. 105)

The purpose of the Bioscan study was to describe botanical change in Shenley Wood between 1980 and 1988 and to assess effects of a recently initiated management programme. They were able to plan their survey methodology to be compatible with that used for the National Vegetation Classification (NVC) and found that the wood was in the W8 community (although the Woodland volume of the NVC was not published until 1991).

From the mid-1980s MK Development Corporation had initiated a management programme “to achieve an attractive public amenity whilst producing some timber and maintaining flora characteristic of ancient semi-natural woodland” though in 1988 public access remained limited. The programme had been applied, in part, to the areas planted 1959-65 (compartments 1-4) but few areas outside this, and only one ride had been reinforced with wood chippings.

Bioscan described the results of their survey in relation to different aspects of the vegetation, under the following types:

- The tree layer (canopy 10m or taller)
- The shrub layer (1.3 to 10m tall)
- The regeneration layer (below 1.3m)
- Herbaceous vegetation.

Bioscan found that Shenley Wood contained no giant old trees or large pollards which are characteristic of other ancient woodlands of this type. The more mature trees were in those areas in the north and west of the wood where there had been little intervention for many decades.

The Wood was found to have a “very-well developed shrub layer” in places very rich, with 9-10 woody plant species per 10 x 10m quadrat. This seemed to be along a gradient from species-poor scrub dominated by blackthorn and Hawthorn in the north and west to species-rich areas in the wetter south and east that were locally-dominated by Aspen with extensive areas of Field Rose and Guelder Rose, though Downy Birch, Red Currant and Holly were rarities.

32 Ancient Woodland Indicator species were present of the list of 100 southern species used by the then Nature Conservancy Council (now Natural England). This included three uncommon species: Broad-leaved Helleborine *Epipactis helleborine*, Thin-spiked Wood-sedge *Carex strigosa* and Narrow-leaved Everlasting-pea *Lathyrus sylvestris*, the last being the rarest.

They made special mention of two features:

1. The abundance of marsh and wet meadow plants such as Marsh Bird’s-foot Trefoil *Lotus uliginosus*, Marsh Bedstraw *Galium palustre* and Flote-grass *Glyceria fluitans*, especially in the wetter rides.
2. The continuous show of flowers in the more open areas right through the summer, allowing flowering of shade-tolerant species such as Primrose *Primula vulgaris* and Wood Anemone *Anemone nemorosa* in the spring, and later species right through August. They regarded the maintenance of these features as a valuable management aim for conservation and amenity reasons.

Bioscan's relatively brief but important conclusions about management and vegetation are worth reading in full. In summary, they found that the effects of management were not easy to disentangle because:

- Recent clearance and small-scale planting in the 1980s had taken place largely in areas previously planted, which were also concentrated in the wetter southern and eastern parts of the wood.
- The scale of management in the 1980s has been sufficient to change vegetation across the whole spectrum of variation within the wood.
- Management may change vegetation in several ways, for example, the recent practice in Shenley of thinning the canopy to approx. three Ash standards of 10-30cm dbh per 100 sq m whilst reopening drainage ditches, would:
 - Open the canopy, allow more light penetration and increase drying out through evaporation
 - Dry out the area through increased drainage
 - Make some areas wetter through receiving drainage.

They considered the Development Corporation's management goals and potential conflicts between these. The goals were:

- 1) Public use as an amenity
- 2) Timber production
- 3) Maintenance of the wildlife interest.

Bioscan concluded that:

- Shenley Wood was at that time in an excellent state, because the 1959-65 planting scheme had failed to establish species alien to this semi-natural woodland, but had opened the canopy in ways comparable to traditional coppicing.
- More recent management (in the 1980s) had opened the canopy again, and retained the old ride system, which had allowed an exceptionally diverse vegetation.
- Substantial areas had been left untouched for many decades, so contribute to the variety of conditions.
- The natural gradient in slope and drainage further increased diversity.
- Unusually for an Ash-Maple-Dog's Mercury woodland, Shenley had few problems of Bramble invasion and spread, although this had increased following clearance.
- Except for a few areas around the north-east edge, there had been little enrichment from nearby farmland.

They examined potential conflicts of interest relating to the variety and intensity of uses envisaged for Shenley Wood and pressed for resolution of these:

- 5) Promotion to high forest for timber production may require too long a rotation to achieve a varied seasonal flora. Application of partial coppice management combined with multi-age high forest stands would circumvent this.
- 6) The risk of damaging the flora communities of rides, particularly the unusual wetland species, by changes to rides to benefit public use and forestry. Diversion of activity to rides away from species-rich wet areas, combined with reduced frequency of verge cutting (to a rotation of several years) should prevent this.
- 7) Over-rapid management of all of the wood within a few years could jeopardise the future of bird and invertebrate species that require overgrown areas. This could be addressed by long-term set aside of some areas to be without management and slowing the pace at which management was reintroduced.
- 8) Excessive public use could damage some of the flora, especially along the rides. This could be addressed using a well-tried technique of concealing some rides behind thickets, providing only narrow and indirect access (as was done in Wytham Woods in Oxfordshire and as used by some game-keepers).

**'Common Bird Census of Howe Park, Linford and Shenley Woods 1993' – Phillips, J (1993)
(Ecological Study No. 121)**

Four Common Bird Censuses have been carried out which cover Shenley Wood. The results are presented in this 1993 report (Ecological Study No. 121), in the earlier 1984 report (Ecological report No. 86) and 1987 report (Ecological Study No. 104), and in a 2007 report (Ecological Study No. 150)

which summarised evidence from the three earlier reports. A summary is provided in relation to Ecological Study No. 150: see below.

'Shenley Wood Vegetation Survey 1994' by Francis, Dr JL (Ecological Study No. 126)

A comprehensive study of the vegetation of Shenley Wood was carried out in 1994 by Dr Joanna Francis. She used the same methodology for her study of Linford Wood (1993) and Howe Park Wood (1995) which enables useful comparisons to be made of these three Semi-Ancient Woodlands.

The methodology used was standard NVC (National Vegetation Classification) survey techniques. Surveys were carried out of: canopy, understorey and field layer species and other features such as soils and hydrology. Additional surveys were made of rides, ditches and ponds.

The study involved identification of all tree, shrub and field layer plant species within 69 (50m x 50m) grid-squares, which covered almost all of the Wood. The canopy and understorey were surveyed in 10m x 10m plots within each of the grid squares and, for each, a list of the field layer species was compiled. Plants in a 4m x 4m quadrat within each of these 10m x 10m plots were comprehensively surveyed. The methodology required identification of all flowering plants, assessment of the abundance of each species found, total vegetation cover, vegetation height and other factors. Ride, path, ditch and pond flora were recorded separately though an additional 113 quadrats (73 along rides, 43 in ditches). Further species-specific searches were made throughout the Wood to provide additional data on 11 rarer and scattered species, including an 8-figure map reference for each of these plants found.

163 species were found in the field layer, understorey and canopy of Shenley Wood at the time of this 1994 study. A total of 99 species were recorded from the field layer and 130 were found along the rides and ditches, though some of the ride and ditch vegetation was not generally found elsewhere in the Wood. Some comparisons were made with previous vegetation surveys carried out in 1980 and 1988.

Other aspects studied included: soil reaction (pH); cover by bryophytes, bare ground and leaf litter; drainage and wetness; and deadwood.

One conclusion was that the Wood has two very distinct field layer communities, relating to wet and dry areas. Shenley has less continuous transitions between wet and dry communities in comparison to Linford Wood: "The wet, open plots in Shenley are considerably wet and have a distinct and diverse group of species ... In drier plots most of these species are absent, as are some associated with base-richness such as *Paris quadrifolia* Herb Paris and *Sanicula europaea* Sanicle (both found in Linford Wood ...)." (Francis 1994, p.24).

Plants in drier areas included:

- *Hyacinthoides non-scripta* Bluebell
- *Lamium galeobdolon* Yellow Archangel
- *Mercurialis perennis* Dog's Mercury
- *Stellaria holostea* Greater Stitchwort.

Plants in wetter areas included:

- *Deschampsia cespitosa* Tufted Hair-grass
- *Filipendula ulmaria* Meadowsweet
- *Glyceria fluitans* Floating Sweet-grass
- *Juncus effusus* Soft-rush.

Some species in the field layer were indicative of "past disturbance due to planting and reveal the higher nutrient levels found in some areas." (Francis 1994, p.61) such as: *Glechoma hederacea* Ground Ivy and *Urtica dioica* Common Nettle.

Average pH values for the 11 compartments in the Wood were in the range 4.6 to 6.4 with a mean of 5.8 for the entire woodland. This is similar to soils of other wet ash-maple woods mostly on clay or clay loams. Compartments 5b & 5c with lower pH values were in the north-west of the Wood, and this may indicate a gravel cap where leaching has occurred. Higher values may relate to samples over chalky boulder clay or sampling from sites on which burning has raised the alkalinity.

Twelve National Vegetation Community (NVC) stand types were found in Shenley Wood, though they differ from some of those found in Howe Park Wood. The overall classification was W8 Ash-Maple-Mercury woodland, within which the sub-communities W8a, W8b and W8c were well represented. The range of NVC community types in Shenley Wood were:

- W8: Ash-Maple-Mercury woodland
- W8a *Primula vulgaris* and *Glechoma hederacea* sub-community
- W8b *Anemone nemorosa* sub-community
- W8c *Deschampsia cespitosa* sub-community
- W8g *Teucrium scorodonia* sub-community
- W7 Ash-Alder woodland
- W9a Typical sub-community of Ash-Rowan-Mercury woodland
- W21 Atlantic Hawthorn scrub
- W21b *Mercurialis perennis* sub-community
- W22 Blackthorn-Bramble scrub
- W22a *Hedera helix* and *Silene dioica* sub-community
- W22b *Viola riviniana* and *Veronica chamaedrys* sub-community

The most frequent stand types were:

- W8a *Primula vulgaris*-*Glechoma hederacea* sub-community
- W8b *Anemone nemorosa* sub-community
- W8c *Deschampsia cespitosa* sub-community

Characteristic species of the W8 stand type (not all of which were found in Shenley Wood) are:

- Core species: Field Maple *Acer campestre*, Hazel *Corylus avellana*, Ash *Fraxinus excelsior*, Dog's Mercury *Mercurialis perennis* and Bramble *Rubus fruticosus*
- Field layer: Bluebell *Hyacinthoides non-scripta*, Enchanter's Nightshade *Circaea lutetiana*, Wood Avens *Geum urbanum*, Lords-and-Ladies *Arum maculatum*, Dog's Mercury *Mercurialis perennis*, Common Dog-violet *Viola riviniana* and Early Dog-violet *Viola reichenbachiana*.

The eleven management compartments of Shenley Wood were of the following NVC types and sub-communities:

- 1A W21b *Mercurialis perennis* sub-community
- 1B W8a *Primula vulgaris* and *Glechoma hederacea* sub-community
- 2B W8c *Deschampsia cespitosa* sub-community
- 3A W8a *Primula vulgaris* and *Glechoma hederacea* sub-community
- 3B-D W8a *Primula vulgaris* and *Glechoma hederacea* sub-community
- 3E W8b *Anemone nemorosa* sub-community
- 4A W8a *Primula vulgaris* and *Glechoma hederacea* sub-community
- 4B W8a *Primula vulgaris* and *Glechoma hederacea* sub-community
- 4C W8 Ash-Maple-Mercury woodland
- 5B W8a *Primula vulgaris* and *Glechoma hederacea* sub-community
- 5C W8 Ash-Maple-Mercury woodland

Canopy

In Shenley Wood 26% of sampled quadrats had canopy cover between 81-100% (in Howe Park Wood it was 15% and in Linford Wood the majority of sample quadrats had over 25% of cover). The main canopy species at Shenley Wood were:

- Ash *Fraxinus excelsior* (in 99% of quadrats, compared with 79% in Howe Park and 93% at Linford Wood)
- Pedunculate Oak *Quercus robur* (in 52% of quadrats, compared with 19% in Howe Park and 49% at Linford Wood)
- Field Maple *Acer campestre* (in 35% of quadrats, compared with 36% in Howe Park and 55% at Linford Wood)
- Beech *Fagus sylvatica* (a more recently introduced canopy species, in 12% of quadrats, mainly in Compartment 1B).

Other species that feature in Linford and Howe Park Woods that are not present in Shenley Wood were:

- Aspen *Populus tremula* (in 39% of quadrats in Howe Park but infrequent at Linford Wood)
- Hornbeam *Carpinus betulus* (in 19% of quadrats Howe Park, but in only one compartment at Linford Wood).

Past management practices were reflected in the low number of very old coppice stools and standard trees, which are usually more common in W8 woodlands.

Understorey

Only 38% of sampled quadrats had more than 60% understorey cover (compared to 53% in Howe Park Wood). *Corylus avellana* Hazel was the most abundant shrub in the underwood, followed by *Crataegus monogyna* Hawthorn and *C. laevigata* Midland Hawthorn. *Sambucus niger* Elder signifies disturbance and enrichment and was found in Compartment 1a where chickens were once housed. *Prunus spinosa* Blackthorn had a patchy distribution throughout the Wood.

Underscrub

Four species were found throughout the Wood as underscrub: *Rubus fruticosus* Bramble, *Rosa canina* Dog-rose, *Rosa caesia* Hairy Dog-rose, and *Lonicera periclymenum* Honeysuckle.

Tree and shrub species included seven that are indicator species for ancient woodlands in southern Britain:

- *Acer campestre* Field Maple
- *Crataegus laevigata* Midland Hawthorn
- *Ilex aquifolium* Holly
- *Malus sylvestris* Crab Apple
- *Populus tremula* Aspen
- *Rosa arvensis* Field-rose
- *Viburnum opulus* Guelder-rose.

Field layer

Of the field layer plant species, 24 were Ancient Woodland Indicator (AWI) species for southern Britain. Four were sedges: *Carex pallescens*, *C. pendula*, *C. remota* and *C. sylvatica*; one a wood-rush *Luzula pilosa* (very few specimens were found); several were grasses: *Bromus (Bromopsis) ramosa*, *Festuca gigantea*, *Holcus mollis*, *Milium effusum*, *Poa nemoralis*; there was a small-reed *Calamagrostis epigejos*. The flowering plants included:

- *Anemone nemorosa* Wood anemone
- *Conopodium majus* Pignut
- *Hyacinthoides non-scripta* Bluebell
- *Lamium galeobdolon* Yellow Archangel
- *Lathyrus sylvestris* Narrow-leaved Everlasting-pea
- *Orchis macula* Early-purple Orchid
- *Platanthera chlorantha* Greater Butterfly-orchid
- *Potentilla sterilis* Barren Strawberry
- *Primula vulgaris* Primrose
- *Stachys officinalis* Betony (only a very few specimens were found)
- *Tamus communis* Black Bryony
- *Veronica montana* Wood Speedwell
- *Vicia sepium* Bush Vetch.

Of these, there were four rarer plants that were locally abundant in Shenley Wood (compared with seven in Howe Park Wood). These were:

- *Carex pallescens* Pale Sedge
- *Lathyrus sylvestris* Narrow-leaved Everlasting Pea
- *Platanthera chlorantha* Greater Butterfly Orchid
- *Orchis mascula* Early-purple Orchid.

Base-rich species absent from Shenley Wood but found in Linford Wood were: *Paris quadrifolia* Herb Paris and *Sanicula europaea* Sanicle.

Rides and ditches

128 vascular plant species were recorded along rides and in ditches.

Ancient Woodland Indicators

32 of the species recorded in Shenley Wood in 1994 were southern Ancient Woodland Indicators (AWI); 7 were trees & shrubs, the other 24 were field-layer species. AWI plants tend to have poor dispersal mechanisms and are only weakly competitive, which is why they are characteristic of old, undisturbed woodland.

The 7 AWI trees and shrubs were exactly the same species as in Howe Park Wood:

- Field Maple *Acer campestre*
- Midland Hawthorn *Crataegus laevigata*
- Holly *Ilex aquifolium*
- Crab Apple *Malus sylvestris*
- Aspen *Populus tremula*
- Field-rose *Rosa arvensis*
- Guelder-rose *Viburnum opulus*.

The 25 AWI field layer species found were:

- Wood Anemone *Anemone nemorosa*
- Hairy-brome *Bromopsis ramosa*
- Wood small-reed *Calamagrostis epigejos*
- Pale Sedge *Carex pallescens*
- Pendulous sedge *Carex pendula*
- Remote Sedge *Carex remota*
- Wood-sedge *Carex sylvatica*
- Thin-spiked Wood-sedge *Carex strigosa*
- Pignut *Conopodium majus*
- Giant Fescue *Festuca gigantea*
- Creeping Soft-grass *Holcus mollis*
- Bluebell *Hyacinthoides non-scripta*
- Yellow Archangel *Lamiastrum galeobdolon*
- Narrow-leaved Everlasting Pea *Lathyrus sylvestris*
- Hairy Wood-rush *Luzula pilosa*
- Wood Millet *Milium effusum*
- Early-purple Orchid *Orchis mascula*
- Butterfly Orchid *Platanthera chlorantha*
- Wood Meadow-grass *Poa nemoralis*
- Barren Strawberry *Potentilla sterilis*
- Primrose *Primula vulgaris*
- Betony *Stachys officinalis*
- Black Bryony *Tamus communis*
- Wood Speedwell *Veronica montana*
- Bush Vetch *Vicia sepium*.

Comparison with previous surveys

There were a very similar number of plant species found from this 1994 survey and that of 1988. The overall increase in species diversity since the 1980 survey was an indicator of the recommencement of management in the mid to late 1980s. This led to raised light levels by creating glades, opening rides and tracks, and scrub clearance, which promoted structural diversity. A side effect was a proliferation of some weedy species, also caused by soil disturbance, but these conditions have also enabled Betony *Stachys officinalis* and Devil's-bit Scabious *Succisa pratensis* to establish at woodland margins.

The report concluded that "The Initial management has been successful in releasing Shenley from years of neglect" (p.78) but also said "Whilst the lack of management in Shenley Wood prior to 1980 necessitated the management within all compartments between 1986 and 1991, this intense regime has now been reconsidered. Clearly the past level of management and its accompanying disturbance

need not continue and it is suggested that a less frequent, but targeted, management plan should be drawn up for the next few decades.”

Management recommendations

Seven specific management recommendations were made. They were:

8. Future management plan

As almost the whole wood had been subject to disturbance over only five years (1996-1991) to regenerate it after many years of neglect, this should be followed by a less-intensive, phased management rotation of compartments about every 7-10 years (the interval chosen to be subject to growth rates), with some compartments on a longer cycle, to achieve a greater range of ages of *Prunus spinosa* Blackthorn, and others left as non-intervention areas. Rides, tracks and clearings, meadows and woodland margins – which require openness and light – would need more frequent maintenance. Compartments should be relatively large blocks.

9. Maintenance of soil moisture levels

Ditch clearance in 1988 may have contributed to drying out of the woodland. Evidence for drying out was the spread of *Mercurialis perennis* Dog's Mercury, which needs to be monitored as its spread is an indicator of likely decrease in species diversity.

10. Maintenance of wet, open areas

One of the features of Shenley Wood is its high species diversity of vegetation in wet, open areas, including some of the rides and the central triangle. The improved management of ride edges since 1991 should be maintained in ways that maintain species diversity.

11. Rare species

“Many of the rarer field layer species exist vegetatively in shady, undisturbed areas, but are able to proliferate in recently cleared areas prior to the build-up of competition”. Some, such as *Lathyrus sylvestris* Narrow-leaved Everlasting-pea, *Stachys officinalis* Betony, and *Carex pallescens* Pale Sedge, will benefit from maintenance of open areas. Other species, including: *Orchis mascula* Early-purple Orchid, *Platanthera chlorantha* Butterfly Orchid will be maintained through cycles of coppicing; this is particularly the case in the south-west of the Wood (Compartments 3B-D and 3E).

12. Control of Bramble *Rubus fruticosus*

The dominance of *Rubus fruticosus* Bramble must be reduced in certain areas, to allow for the proliferation of field layer species. Bramble is shade tolerant and does not die back cyclically, as do other species. It can overarch coppice stools and inhibit the natural regeneration of other species. Its vigour can be accentuated by soil eutrophication. Bramble's dominance is, in part, a consequence of previous neglect of coppicing. A management regime is needed to reduce Bramble's dominance in this Wood. Where there was little existing understorey (especially Compartment 1B) the recommendation was that new shrubs should be planted, such as *Corylus avellana* Hazel to increase shade at ground level and structural diversity. When these are coppiced in future years, their wood should be removed to reduce the overall level of nutrients and decrease eutrophication.

13. Maintenance of ancient woodland characteristics

One recommendation was that the few remaining conifers and specimens of *Fagus purpurea* Copper Beech should be removed. In any future planting, *Quercus robur* Oak should be encouraged and *Acer campestre* Field Maple: *Fraxinus excelsior* Ash will regenerate naturally.

Ancient woodland characteristics will also be maintained by not introducing unsuitable materials into the Wood. Chippings for paths should originate only from native deciduous hardwoods and should certainly not contain conifers; this is to prevent increases in soil acidity and to avoid introducing an uncharacteristic range of fungi.

Burning of brushwood directly on the woodland floor will eventually cause soil eutrophication, altering the base-richness of the soil. This would encourage the germination and proliferation of species more characteristic of places such as wastelands, such as: *Chamerion angustifolium* Rosebay Willowherb, *Juncus conglomeratus* Compact Rush, *Juncus effusus* Soft Rush, and

Urtica dioica Common Nettle. Instead of burning, brushwood could be stacked as wood-piles or chipped for paths.

14. Deadwood

Deadwood was poorly represented in Shenley Wood. It had been removed to provide fuel for a nearby farm until 1985. Deadwood should be retained in the woodland and, wherever possible, as standing deadwood. Hollow trees are an essential habitat for specialist birds and invertebrates and without them species will be lost to the Wood. Deadwood will also assist fungi in their role as recyclers of essential nutrients.

‘A Survey of Dragonflies in Milton Keynes’ – Phillips, NJ (1995) (Ecological Study No. 130)

‘A Survey of the distribution of bats in parkland of Milton Keynes’ – North Bucks Bat Group (1993) (Ecological Study No. 132)

‘A Survey of the Saproxylic Coleoptera of Howe Park, Linford and Shenley Woods’ – Plant, CW (1996) (Ecological Study No. 133b)

The aim of the Saproxylic Coleoptera survey was to collect data on the deadwood beetle fauna of three woodlands, to provide an adequate database to enable The Parks Trust to monitor future management works. At least ten survey visits were made to each of the three woodlands over the period April to October 1996. The list of 241 beetles it provided was of all types of beetle and seven of these were associated with ‘saproxylic habitats in ancient pasture woodland’, two of which were found in Shenley Wood. But there are other beetle species which are not strictly associated with ancient pasture woodland and may occur in woodland or at other sites with deadwood.

Of the 241 beetle species recorded for the three woods, Shenley Wood had 182, which was more than Linford Wood (143) and is a considerably larger wood than the other two; Howe Park Wood (the same size as Shenley Wood) had 166.

Saproxylic beetle species recorded at Shenley Wood included:

- *Anobium punctatum* Woodworm
- *Clytus arietus* Wasp beetle
- *Denticolis linearis* a click beetle
- *Dorcus parallelipipedus* Lesser Stag beetle
- *Ernobius mollis* a wood boring beetle
- *Gonodera luperus* a darkling beetle
- *Grammoptera ruficornis* a longhorn beetle
- *Ptilinus pectinicornis* Fan-bearing Wood-borer
- *Rhagium mordax* a longhorn beetle
- *Rhinosimus ruficollis* a false weevil
- *Scolytus scolytus* Elm bark beetle
- *Sinodendron cylindricum* Rhinoceros beetle
- *Strangalia maculata* a longhorn beetle
- *Trixagus carinifrons* a small false click beetle
- *Trixagus dermestoides* a small false click beetle.

Of the beetle species found in Shenley Wood, the following were of national rarity importance status as designated at that time (an asterisk indicates a saproxylic beetle):

- * *Prionychus ater* (Tenebrionidae of the Alleculidae family, close to Darkling beetles): Status Notable B
- *Bruchus atomarius* (a seed beetle) Status Notable B.

Prionychus ater is a large black beetle which develops in decaying wood of a range of species including: Oak, Willow, Elm, Ash and fruit trees. *Bruchus atomarius* larvae develop in seeds of *Vicia* spp Vetches, particularly *Vicia sativa* Common Vetch.

One conclusion was that the past felling of trees and the associated clearance of dead timber had left the three woods with a relatively small deadwood resource, and that deadwood left on the ground was generally too recent to be of particular value to deadwood species of beetle. As the deadwood

resource ages and is increased, by management which leaves standing deadwood and fallen deadwood, *“the saproxylic beetle fauna will not, sadly, suddenly undergo a dramatic increase in diversity. It will increase, but this rise will be slow and gradual over a great many years.”* *“Saproxylic species are extremely sedentary, often restricting themselves to a single tree or log in the case of some species”.*

A further conclusion was that although saproxylic beetles are indicators of the deadwood habitat, *“a great many other invertebrate groups are also dependent upon this ecological niche”* and that improvement of this habitat is likely to be of benefit to most of these other groups. It was therefore suggested that future monitoring should test this by recording other, easily-recorded species such as some of the hoverflies and craneflies which breed in rot-holes, as well as beetles.

Usefully, Colin Plant’s study also listed 155 other invertebrates found during his surveys of the three woods, 152 of which were True Flies (Diptera). Of these Diptera species, 114 were found in Shenley Wood.

Another conclusion was that *“...the present management regime appears to be working, and some suggestions for further management into the future are proposed.”* These were:

1. Though any deadwood can be of value, *“... timber of a large diameter – both standing and fallen – is especially important”.* It was suggested that selected species of a variety of species, including Oak *Quercus robur*, should be felled and left to decay.
2. *“The simplest rule about dead wood is that it should be left where it is to undergo natural decay ... Cutting up and removing, or burning dead and fallen trunks or major branches is a reprehensible act which can never be justified in conservation terms.”*
3. *“If it is necessary to move fallen timber it should be moved into partial shade ... the richest fauna tends to be supported by material in partial shade”.* *“Large trunks should be dragged to their new position without being cut into convenient smaller sections.”*
4. *“Timber which is truly in excess of requirements should be stacked to form loose log-piles whilst finer materials can be used to make litter piles. A few large piles are to be preferred over several smaller ones.”*
5. *“The position of any very old trees and any trees with sap runs or rot holes, splits ... and those regularly producing bracket fungi should be carefully noted and the trees preserved throughout any management programme. It is not good conservation practice to attempt to increase the fallen dead wood resource by selecting for felling trees which are already dead or diseased ... When management calls for a reduction in the number of trees the younger and healthier ones should be selected for felling.”*
6. *“Cut stumps should not be killed or chemically treated but left to regenerate or decay as nature dictates. Dead stumps, and particularly decaying rootstocks, have a distinctive and important saproxylic fauna, which includes some of our rarest hoverflies.”*
7. *“A potential problem ... is that of maintaining the continuity of suitable timber. Modern day small and isolated woodland units tend to be dominated by trees which are all, very broadly, of equal age and this has serious implications for the future maintenance of the stock of dead timber. The thinning programme ... has been carefully designed with this problem in mind and is an excellent start ... a management programme should be regarded as an ongoing programme. ... Provision needs to be made now for assessment of the overall timber resource at regular intervals of, perhaps, in the order of fifteen years and a flexible but long-term management plan for this resource (for the next hundred years or more)7 should be committed to paper.”*

**‘A Survey of Moths at Selected Sites in Milton Keynes in 1999’ – Townsend, M (2000)
(Ecological Study No. 141)**

In 1999, moths were studied at six sites in Milton Keynes including the three ancient woodlands, by light-traps and direct searching between April and November. The overall species total found at each

of these sites was between 350 and 400, not untypical for southern England. Three measures of biodiversity were applied: 'Species Richness' (number of species present), 'Diversity' (Alpha Diversity Index), 'Species Quality Index' (SQI related to the rarity of species). Martin Townsend's report makes the point that: "1999 was generally considered to be a poor year both for weather and insect numbers, which are in any case known to vary considerably from year to year, even for the same species. For this reason, it is likely that a small number of species, particularly the scarcer ones, may have been missed from some or all of the sites during the survey."

Twelve light-trapping sessions were carried out at each of six trapping sites in Shenley Wood (once in April, twice per month from May to September, and once in October). The six sites were all towards the centre of the wood and none were in the northern third of the wood. In addition to the light-trapping some direct night and daytime searching for adults and larvae was carried out using nets and beating, as well as searches for larvae exit holes and pupal exuviae.

Of the three ancient woodlands, Shenley Wood was of the highest value. Linford Wood came next on one score, but Howe Park was ranked higher because of the higher number of rarer or more local species. It was suggested that what distinguished Shenley Wood might be that "earlier and more drastic management" had taken place here than in the other two ancient woodlands. Shenley Wood was highest of the six sites studied in terms of 'Species Quality Index', second in terms of 'Species Richness' and highest in 'Diversity' as an Alpha score.

In Shenley Wood, 4,963 individual moths were light-trapped which were of 216 different species; and a further 9 species were found, giving a total of 225 species. Of these, 3 were Notable B species and 34 were of Nationally Local Status.

The three of Notable B Status were:

- Light Orange Underwing *Archiearis notha*
- White-marked *Cerastis leucographa*
- Mere Wainscot *Photodes fluxa*.

The 34 species of Nationally Local Status, many of which have specialised habitat requirements, were:

Woodland species:

- Poplar Lutestring *Tethia or or*
- Maiden's Blush *Cyclophora punctaria*
- Clay Triple-lines *Cyclophora linearia*
- Large Twin-spot Carpet *Xanthorhoe quadrifasciata*
- Seraphim *Lobophora halterata*
- Scorched Wing *Plagodis dolobraria*
- Lilac Beauty *Apeira syringaria*
- Poplar Kitten *Furcula bifida*
- Lunar Marbled Brown *Drymonia ruficornis*
- Chocolate-tip *Clostera curtula*
- Black Arches *Lymantria monarcha*
- Buff Footman *Eilema depressa*
- Least Black Arches *Nola confusalis*
- Lead-coloured Drab *Orthosia populeti*
- Pale Pinion *Lithophane hepatica*
- Alder Moth *Acrionicta alni*
- Slender Brindle *Apamea lateritia*
- Rufous Minor *Oligia versicolor*
- Scarce Silver-lines *Nena bicolorana*
- Oak Nycteoline (one larva) *Nycteola revayana*
- [Beautiful Hook-tip *Laspeyria flexula* was not found but was thought likely to be present]

Damp woodland scrub and marshland species:

- Brown Scallop *Philereme vetulata*
- Olive *Ipimorpha subtusa*

- Pinion-streaked Snout *Schrankia costaestrigalis*

Grassland species:

- Barred Rivulet *Perizoma bifaciata*

Other species:

- Gold Swift *Hepialus hecta*
- Dwarf Cream Wave *Idaea fuscovenosa*
- White-spotted Pug *Eupithecia tripunctaria*
- Scarce Footman *Eilema complana*
- Gothic *Naenia typica*
- Large Ranunculus *Polymixis flavicincta*
- Sycamore *Acronicta aceris*
- Lunar-spotted Pinion *Cosmia pyralina*.

Other species which are relatively uncommon in Buckinghamshire were also found at Shenley Wood:

- Red-green Carpet *Chloroclysta siterata*
- Small Wainscot *Chortodes pygmina*.

The larger number of species and greater diversity and species richness scores for Shenley Wood in comparison to Howe Park Wood were attributed to different recent management with resumption of coppicing earlier in Shenley Wood than in Howe Park Wood.

The report says: “One aspect of the management of all the woods that could be improved is that of the woodland edges. In many places, the grass is mown right up to the edge of the wood. This is particularly noticeably at Shenley and Linford, but also occurs on at least one side of Howe Park. An uncut margin of up to 5 metres would allow a woodland edge to develop, with uncut grassland and emergent scrub, along with a further zone that is only cut in late summer. This would be highly beneficial, and would also be more aesthetically pleasing. The wide margins along the east side of Shenley Wood in particular offer an excellent opportunity for this”.

Martin Townsend also says: “With regard to the Notable B species, retention of as much dead wood on mature and over-mature Aspen as possible in Shenley and Howe Park is highly desirable for the populations of Light Orange Underwing preferably with no trees removed, even if (in fact especially) if they appear to be dying. This species requires standing decaying wood on mature trees, and will not breed on saplings re-growth. The eggs are laid high in the canopy and the larvae pupate in sift, rotten wood, and therefore remain on the tree until they emerge as adults”.

It also says: “The larvae of the Mere Wainscot [*Chortodes fluxa*], a woodland specialist which is present in all three woods, only feeds in the stems of Wood Small-reed [*Calamagrostis epigejos*], which grows in the rank vegetation of damp rides and clearings. Therefore, the maintenance of this habitat is essential for the survival of this moth. The eggs are laid in a leaf-sheath in July and August and the larvae feed until the following day, when they leave their habitation and pupate on the ground (Heath and Emmet, 1983). Therefore, any removal of large stands of the food-plant e.g. by weeding or ride edge management operations, should be avoided if at all possible. The larvae of the White-marked [*Cerastis leucographa*] have never been found in the wild, although they are not difficult to rear in captivity (Porter, 1997). Therefore, it is difficult to make management recommendations on their behalf, other than those that apply generally”.

More specifically, the report says: “Invertebrates are susceptible to sudden changes in a well-established habitat, and the pressure on the woodland community will have increased, albeit temporarily, by the disturbance caused by the extensive management that was implemented in all the woods ... However, there is no evidence from this survey that management has been detrimental to the moths in the Milton Keynes woods. Indeed ... it is most likely to have been helpful in preventing decline”.

Another point made in the report is: “The detrimental effects of isolation of good quality habitat within an urban setting is an interesting and highly relevant conservation topic. It is well-worth examination in such a survey as this, not least because little hard data has been gathered. Milton Keynes is atypical

in terms of layout, having far more open spaces, wider verges, etc. than older towns. Some of this has been managed sensitively (e.g. the R. Ouzel corridor and the ancient woodlands) and the existence of the six survey sites is testimony to that. However, much consists of a highly landscaped mixture of mown grass, plantations with exotic trees and ornamental shrubberies, which have little entomological interest, so the isolation effect is still in operation for the majority of species”.

In summary, the report’s management recommendations are:

1. Coppice management, widening of rides and retention of some non-intervention areas are each important for overall habitat and invertebrate diversity and will provide an increased range of food-plants and nectar sources.
2. Coppice rotation appears to have resulted in a good balance between open sunny rides and narrower shaded rides, glades and overgrown areas. Continuation of this management is likely to be beneficial.
3. Woodland edges could be improved, particularly where grass is mown right up to the woodland edge. An uncut margin of up to 5 metres would enable a woodland edge to develop, with uncut grassland and emergent scrub, with a further grassland zone that is cut only in late summer.
4. It is highly desirable to retain as much deadwood of mature and over-mature Aspen as possible, preferably with no trees removed even if they are dying. This would benefit the Notable B species which was present, the Light Orange Underwing *Archiearis notha*, as well as other species reliant on Aspen. The eggs of this species are laid high in the canopy on decaying wood on mature trees, and the larvae pupate in soft, rotten wood.
5. Where Wood Small-reed *Calamogrostis epigejos* is present, this should be managed at times and in ways that benefit the Mere Wainscot *Photodes fluxa*, which was the other Notable B species present in Shenley Wood. It feeds on the stems of Wood Small-reed and its eggs are laid in a leaf-sheath in July and August. The larvae continue to feed on the plant until the following May when they leave the reed and pupate on the ground. Any removal of large stands of Wood Small-reed, such as by weeding and ride edge management, should be avoided.

‘A Survey of Butterflies at six selected sites in Milton Keynes 2002-2003’ – Townsend, M (2004) (Ecological Study No. 144)

Butterfly species were surveyed in 2002 and 2003 at six sites in Milton Keynes including the three ancient woodlands, using transects as the main method. The overall total for these six sites was 26 species. The largest numbers were generally at sites with large expanses of open grassland, or a mix of open and damper, more shaded habitats. Seven of the species were those classified as Nationally Local.

In Shenley Wood there were 18 UK resident species and two migrant species. The most common were: Meadow Brown *Maniola jurtina*, followed by Ringlet *Aphantopus hyperantus* and Speckled Wood *Pararge aegeria*. The least abundant species found here were: Grizzled Skipper *Pyrgus malvae*, Red Admiral *Vanessa atalanta* and Painted Lady *Vanessa cardui*. No Small Copper *Lycaeana phlaeas* were found at all.

No Red Data Book or Nationally Notable species were recorded, but five species classified as ‘Local’ were found (i.e. thinly distributed or common only in restricted areas or habitat types). In Shenley Wood these included:

- Grizzled Skipper *Pyrgus malvae*
- Essex Skipper *Thymelicus lineola*
- Purple Hairstreak *Neozephyrus Quercus* (though this often under-recorded)
- Holly Blue *Calestrina argiolus*.

The report discussed the “apparent loss of Wood White *Leptidea sinapis*, Black Hairstreak *Satyrrium pruni* and White-letter Hairstreak *Satyrrium w-album* from the area, and the scarcity of White Admiral *Limenitis camilla* ...” and said “It is concluded that although some habitat is suitable for these species, it is too isolated and may not be large enough for sustainable populations”.

The report went on to say: “White Admiral, a more mobile species, could return to the woodland sites, and measures to improve conditions for it are recommended, including a survey for the foodplant to

target areas for management.”. The foodplant for the White Admiral is Honeysuckle *Lonicera periclymenum* growing in semi-shaded conditions.

The report also said: “It is very unlikely that Wood White is still present, but it is possible that White-letter Hairstreak remains in small numbers, either on sites covered by this survey, or on others in Milton Keynes.”

The report commended current management of the three semi-ancient woodlands with their diversity of structure, compartments with a range of successional stages and non-intervention areas, but said that “*many of the rides are rather narrow and/or semi-shaded or shaded, particularly in Shenley and Linford, and in most cases the herbaceous vegetation is cleared annually. Discontinuity of nectar sources is also a problem, as there are rather few flowers in these woods when the brambles are finished. It is surprising that Hemp Agrimony, an important late summer nectar source in many damp woods, is not present. Introduction of this and also Fleabane, already abundant at Oakhill, would be a useful way to improve the situation*”.

In discussing the role of rides, the report mentions that tarmac paths and woodchip rides reduce the area of available herbaceous vegetation. It was suggested that a reduced frequency of cutting the full width of the rides would benefit current butterfly populations and encourage others. One suggestion was to alternate annual cutting of rides from one side to the other (i.e. cut each side only on alternate years). Related to this was an explanation of the benefits of leaving grassy tussocks over winter as these are significant over-wintering sites for many invertebrates.

One conclusion of the study was “*that the sites were being managed favourably for butterflies, but their quality could be further enhanced by less intensive and less extensive management of the woodland rides, woodland edges and open grasslands. Here, mowing could be rotational and reduced in selected areas so that more vegetation is left uncut in any given year, in order to increase the size of suitable breeding areas for certain species ...*”.

‘Common Bird Census of Howe Park, Linford and Shenley Woods’ – Middlemarch Environmental 2007 report (Ecological Study No. 150)

The 2007 Common Bird Census of the three ancient woodlands in Milton Keynes provided an update of the three previous ones in 1984, 1987 and 1993 and enabled comparisons between them. The method is that of the BTO (British Trust for Ornithology) and uses territory mapping to estimate numbers of each species.

The surveys found less of interest than might be expected for these sizes of semi-ancient woodland. In 1987 the number of bird species breeding in Shenley Wood was 35 compared with 36 in Howe Park Wood, which is of a comparable size, and 27 in Linford Wood which is larger but more closely encircled by development. Further comparisons were made between the Common Bird Census (CBC) carried out in 2007 and earlier CBC surveys. In 2007 the number of breeding species in Shenley Wood and Howe Park Wood had declined to 28 in each wood, and in Linford Wood it had risen to 28.

The 28 species in Shenley Wood included:

- two National Biodiversity Action Plan species – Bullfinch *Pyrrhula pyrrhula* and Song Thrush *Turdus philomelos*
- three Red List Species of Conservation Concern – Bullfinch, Song Thrush and Marsh Tit *Poecile palustris*
- three Amber List Species of Conservation Concern – Dunnock *Prunella modularis*, Willow Warbler *Phylloscopus trochilus* and Green Woodpecker *Picus viridis*.

The 36 species of breeding bird in Shenley Wood held 282 territories in 2007. Notable losses and declines over the 14 intervening years since the 1993 study were: Starling *Sturnus vulgaris* (from 5 to no territories); Coal Tit *Periparus ater* (from 5 to no territories); *Poecile palustris* Marsh Tit (down from 6 to 1 territory); Bullfinch *Pyrrhula pyrrhula* (down from 8 to 5 territories); Dunnock *Prunella modularis* (down from 13 to 9); Song Thrush *Turdus philomelos* (down from 7 to 4).

Some bird species had significantly increased territories. Blackbird *Turdus merula* (increased from 14 to 22 territories); Blackcap *Sylvia atricapilla* (up from 15 to 23 territories); Greenfinch *Carduelis chloris* (from no territories to 4); and Green Woodpecker *Picus viridis* (from 1 to 4 territories).

Over the 20th century, in line with national trends, other breeding species have been lost from the three main woodlands in Milton Keynes. The 2007 report noted that “there has been a noticeable decline in the number of breeding species within each of the surveyed woodlands with a loss of the following breeding species” Cuckoo *Cuculus canorus*, Mistle Thrush *Turdus viscivorus*, Spotted Flycatcher *Muscicapa striata*, and Willow Tit *Poecile montanus* (a species that has declined nationally and has increasingly shrunk its distribution northwards, though at least one was hanging in the Hanson Centre woodlands at Stanton Long in 2014) “The loss of all of these species, with the exception of Mistle Thrush, reflects the national picture ...”

They also noted the loss of both species of Sparrow from the three woodlands, though remarked that this was in line with changes nationally. But they expressed “... *the possibility of house sparrow returning to breed in adjacent residential development and feeding along the woodland margins ...*”. There is some objective evidence that this has happened in some localities.

They remarked that “*Marsh tit would appear to be just ‘hanging on’ as a breeding species. This species has shown significant declines in all three woods since the last census in 1993 This species, like willow tit, is very sedentary and once lost from a wood is perhaps unlikely to re-colonise.*”

Their overall summary was that “*All three woodlands are, however, considered to be of moderate value for their breeding birds with a typical range of woodland species recorded*”.

The 2007 Common Bird Census (CBC) report concluded with eight recommendations:

1. Conduct annual CBC breeding bird surveys to provide information on population trends and relative value of habitats for birds.
2. Continue with the woodland management practices then in place: coppicing, ride enhancement and grassland mowing regimes used at that time.
3. Create more structural diversity by undertaking thinning and coppicing in some of the woodland.
4. Create a ‘graded edge’ around each woodland area, where possible.
5. Consider planting one or two areas with a wild-bird seed mix to provide winter food for finches, and potentially for buntings which were species with the potential to be attracted to stay and breed. This was recommended for Shenley Wood where there appeared to be the potential on grassland areas outside the Wood and should be possible at Howe Park Wood.
6. Maintain standing and lying deadwood to provide nesting sites and invertebrate prey for birds.
7. Install a selection of bird boxes (including new owl boxes) if these can be monitored and maintained.
8. Update information boards for the public to say which bird species are present.

REFERENCES

1. Forestry Commission. 1968. 'Plan of Operations for the Shenley Wood Estate, Buckinghamshire 1959 to 1968. [Conservancy File No. 36/5BU/113]
2. Towns M, Cousins J, Towns S. 1975. 'Shenley Wood': The Milton Keynes Natural History Society Journal No. 1 1975.
3. Cousins J. 1975. 'Management of Shenley Wood Past and Present': The Milton Keynes Natural History Society Journal No. 2 1976.
4. The Parks Trust's Biodiversity Action Plan (BAP). Reviewed 2017: The Parks Trust.

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