

Bernwood Forest Plan

2019 – 2029

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Our mission for managing the public forest estate:



Forestry Commission woodlands have been certified in accordance with the rules of the Forest Stewardship Council.

The mark of responsible forestry



1. What are Forest Plans?

Forest Plans are produced by us, the Forestry Commission (FC), as a means of communicating our management intentions to a range of stakeholders. They aim to fulfil a number of objectives:

- To provide descriptions of the woodlands we manage.
- To explain the process we go through in deciding what is best for the woodlands' long term future.
- To show what we intend the woodlands to look like in the future.
- To outline our management proposals, in detail, for the first ten years so we can seek approval from the statutory regulators.

Our aim is to produce a plan that meets your needs for the woodland; meets the needs of the plants and animals that live there and meets our needs as managers.

We have produced this draft plan to illustrate our management proposals thereby creating an opportunity for you to comment on the plan, whether you are a user, a neighbour or a member of one of the many stakeholder groups that have an interest in the woodlands. Information on how to get your comments to us is on the webpage.

This plan does not set out the detailed yearly management operations for each small piece of a wood, known as a coupe*. It is not possible to say which year a particular operation will take place, but we can say in which five-year period it should happen.

All tree felling in the UK is regulated and a licence is required before trees can be felled; the scale of tree felling across England's public forest estate is such that the Forest Plan is the best mechanism for applying for this licence.

Responsibility for checking that the plan meets all the relevant standards and statutes lies with another part of the FC (Forest Services). If all the criteria are met, full approval is given for the management operations in the first ten years (2019 - 2029) and outline approval for the medium term vision (2030 - 2040). The plan will be reviewed after the first five years (2024) to assess if the objectives are being achieved. Natural England will approve management proposals for any Sites of Special Scientific Interest (SSSIs) which lie within our woods. Historic England will approve management proposals for Scheduled Monuments (SM).

We use some technical words and phrases in the text because they best describe what we are doing. There is a glossary at the back of the plan with some commonly used technical forestry terms and abbreviations these technical words are identified with an*.



2. Standard Practices and Guidance

Underpinning the management proposals in Forest Plans is a suite of standard practices and guidance described briefly below. Some of these practices are strategic national policy, whilst others are local expressions of national policy to reflect the particular conditions found in East England - the policy level is indicated in brackets.

The UK Forestry Standard* (national)

The UKFS sets out standards for the sustainable management of all forests and woodlands in the UK and describes, in outline, good forest practice.

The UK Woodland Assurance Standard* (national)

The UKWAS certification standard sets out the requirements which woodland owners, managers and forest certification bodies can use to certify their woodland and forests as sustainably managed. It is the document which guides all of our management, and against which the FC is certified by outside consultants to ensure our compliance. The most current edition at this time is the third edition.

European Protected Species (national)

In August 2007 amendments to the European Habitat Directive came into force in England and Wales to protect the habitat of a number of vulnerable species. Those European Protected Species (EPS) most likely to be found in a woodland habitat include all species of bat, hazel dormouse, great crested newt, otter, sand lizard and smooth snake.

Natural Environment and Rural Communities Act 2006 (national)

The NERC Act came into force in October 2006 and was designed to help achieve a rich and diverse natural environment and thriving rural communities. The UK Biodiversity Action Plan was used to help draw up a list of habitats and species which are of principal importance for the conservation of biodiversity in England as required under section 41 of the NERC act.

Ancient and native woodland in England (national)

Ancient and native woodlands are one of the oldest land uses and most diverse ecosystems. They have often taken hundreds, if not thousands of years to develop, and in the case of ancient woodland are irreplaceable. The managing ancient and native woodland practice guide (2010) promotes greater flexibility, encouraging new innovative approaches to woodland management that enhance biodiversity and heritage. It replaces the 1985 broadleaves policy.

Site of Special Scientific Interest (national)

The SSSI series has developed since 1949 as the suite of sites providing statutory protection for the best examples of the UK's flora, fauna, or geological or physiographical features. Sites are selected as being the best regional examples of habitats, such as broadleaf woodland and/or plant and animal communities, and/or important populations of rare species.

These sites are also used to underpin other national and international nature conservation designations.

Information about individual SSSIs can be found on the Natural England website:
<https://designatedsites.naturalengland.org.uk/>

Deadwood (national and local)

Deadwood is important in the forest as a habitat for birds, invertebrates and some primitive plants. Guidance is given on how to provide deadwood in the forest of different sorts and sizes and how this will be distributed.

Natural reserves (national and local)

Natural reserves are areas of the forest where little or no active management takes place thereby creating a very different and special habitat in our otherwise actively managed forests.

Other Designations

The FC landholding in England has a wide range of European and national designations placed upon it in various locations across the country, such as;

- National Park
- Area of Outstanding Natural Beauty (AONB)
- Special Protection Area* (SPA)
- Special Area of Conservation (SAC)
- Scheduled Monuments (SM's)
- County Wildlife Sites*

Along with the standard guidance documents, we have individual plans for our designated sites; these describe work required to maintain and enhance the protected features. We will gradually integrate these into our Forest Plans where appropriate. This document combines both the forest plan and SSSI plan.

In addition, the Forestry Commission has a number of practice guides and specialist bulletins which further inform our management, some of these are available to download from our website <https://www.forestry.gov.uk/england-policypractice>

3. Introduction

This Forest Plan covers 501 hectares of Forestry Commission land. We are guided and directed by the policies and strategies detailed below:

The Governments Priorities

The Government forestry policy is set out in Defra's and Forestry Commission England's Forestry and Woodland policy statement. This policy was published in 2013 during the Conservative and Liberal Democrat coalition government.

More recently, a 25 year Environment Plan was published in January 2018 to set out the governments approach to maintaining and enhancing the natural environment, within a generation. The plan is broad in scope but covers cleaner air and water, public forests and woodland, marine protected areas, species protection, administrative and governance issues.

The Forestry Commissions Priorities

At a national level the Strategic Framework (page 2) shows our mission for management of the Public Forest Estate (PFE). Our strategic goals for what we will deliver from the PFE are set out in the Strategic Plan for the Public Forest Estate in England (2013-2020) and the Corporate plan (2017-2018). At a district level the East England Forest District Strategy 2018-2022 sets our objectives around five goals:

- 1 Staff — A skilled, motivated and professional workforce.
- 2 Finance — Generating a financial surplus.
- 3 Forest resilience — A healthy, resilient and productive forest.
- 4 Community — Improved public involvement and engagement.
- 5 Environment — A recognised global leader in environmental stewardship.

These strategic documents along with local knowledge are used to prepare a design brief for the forest plan (see page 7). The plan is then subject to a consultation where subsequent changes may be applied before being finalised. Forest plan objectives are based around goals 2-5 as the goal relating to staff cannot be addressed within a plan.

General Description of Plan Area

Bernwood Forest lies to the north-east of Oxford. It is made up of three woodland blocks: Shabbington and Chinkwell woods in Buckinghamshire and Waterperry wood in Oxfordshire. Nearby villages include Horton-Cum-Studley, Oakley, Brill and Worminghall and the M40 borders the north of Shabbington woods.

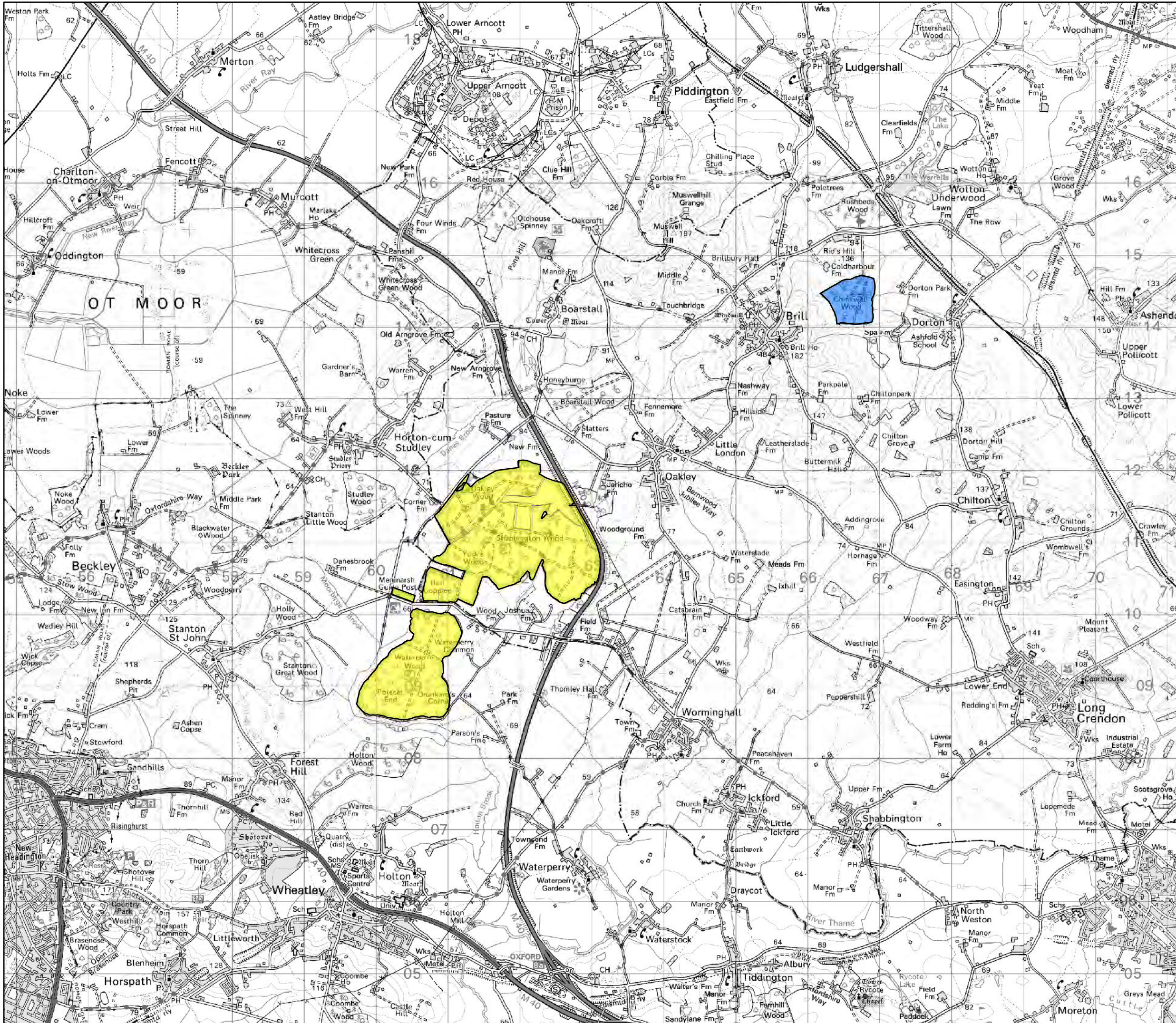
Shabbington and Waterperry woods are Forestry Commission freehold woodlands acquired in 1952, comprising woodland, scrub and open space. These total an area of 465 hectares and are open access. Chinkwell wood is privately owned land leased by the Forestry Commission since 1956 to manage for timber. This area totals 36 hectares comprising woodland and open space. Public access is not permitted (see plan area and landholding status map on page 6) with the exception of the public right of way which runs through the woodland.

The plan area is surrounded by arable land, small towns and villages and non Forestry Commission woodland in the landscape, linked with hedgerow trees.

The plan area lies within the administrative boundaries of Buckinghamshire and Oxfordshire County Councils.

It falls within the five parishes of Waterperry with Thomley, Worminghall, Stanton St John, Oakley and Brill.







Forestry Commission
 England
East England Forest District
Bernwood
 Scale: 1:50,000

Plan area and landholding status:
Shabbington, Waterperry & Chinkwell

Legend

	Freehold woodland Public right of access
	Leasehold woodland No public access

Produced by the planning team
 May 2018
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 [2018] Ordnance Survey [100021242]



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4. Design Brief

Environment

- To protect and enhance areas of ancient semi-natural woodland and restore planted ancient woodland (PAWS) to native species.
- To protect, maintain and enhance designated sites.
- To protect, maintain and enhance priority habitats.
- To protect, maintain and enhance priority species.
- Maintain and improve cultural and heritage value of the land by protecting sensitive heritage features highlighted through the Operational Site Assessment (OSA)* process.

Community

- Create a pleasant natural environment for the public to enjoy outdoor recreation in a rural woodland setting.
- Support responsible public use of open access land by maintaining recreational facilities including the car park and walking trail.
- Increase area managed through lower impact silvicultural systems to protect and enhance the internal and external landscape.

Forest resilience

- Maintain the land within our stewardship under FSC/PEFC certification by meeting standards detailed in UKWAS fourth edition.
- Improve economic resilience of our forests by increasing species diversity through restock programmes and mixed silviculture practices, to protect future timber supplies and biomass.

Finance

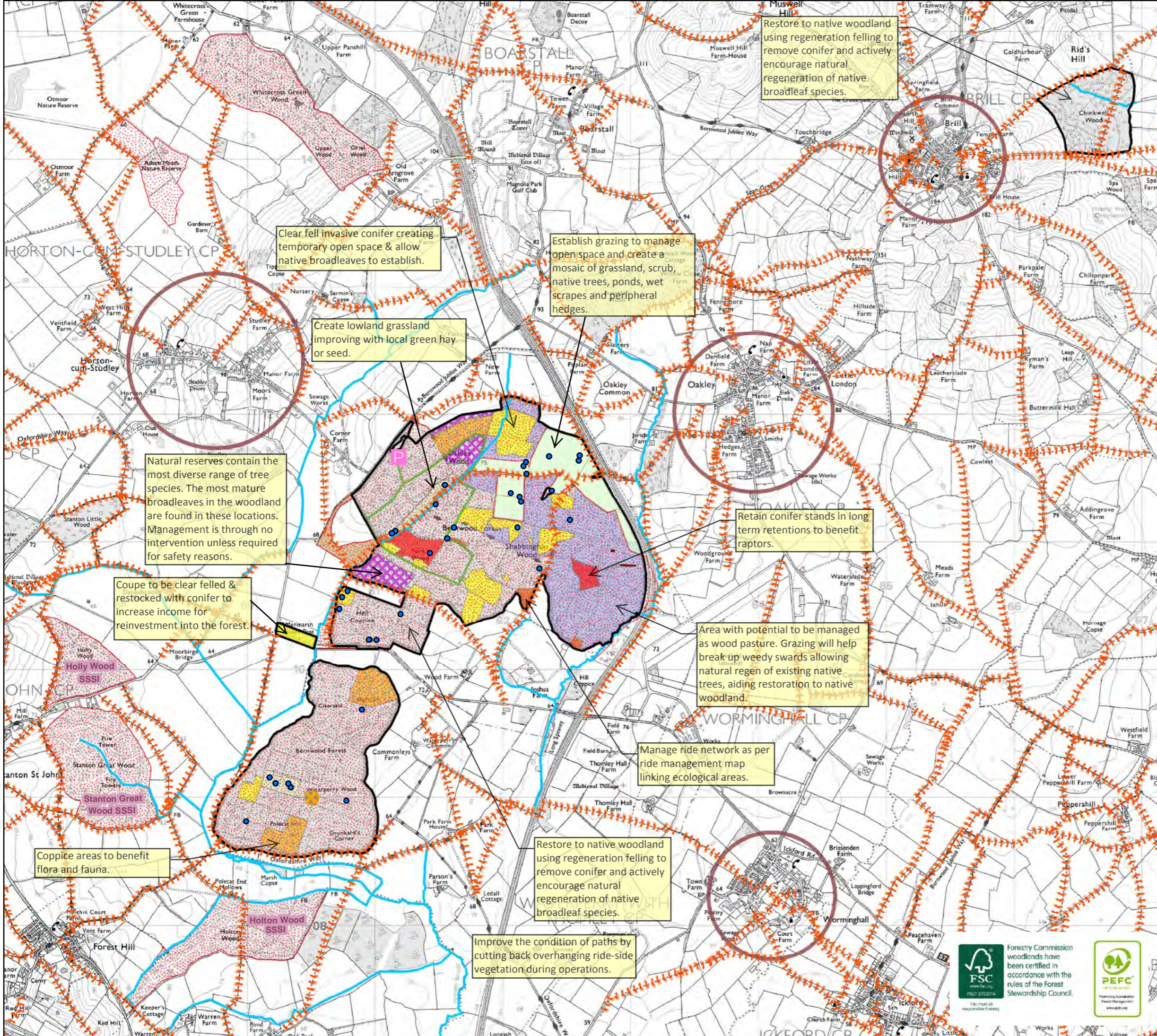
- To generate income from the marketing of timber products whilst ensuring operations take place at a scale and frequency in keeping with the surrounding landscape.



The above diagram shows the five areas identified in the East England Forest District Strategy where action is required to meet the objectives of the Forest Enterprise strategic framework (page 2).

The forest plan design brief identifies objectives related to four of these goals, demonstrating how this plan will contribute to the district strategy.

Design Concept Map



Restore to native woodland using regeneration felling to remove conifer and actively encourage natural regeneration of native broadleaf species.

Clear fell invasive conifer creating temporary open space & allow native broadleaves to establish.

Establish grazing to manage open space and create a mosaic of grassland, scrub, native trees, ponds, wet scrapes and peripheral hedges.

Create lowland grassland improving with local green hay or seed.

Natural reserves contain the most diverse range of tree species. The most mature broadleaves in the woodland are found in these locations. Management is through no intervention unless required for safety reasons.

Coupe to be clear felled & restocked with conifer to increase income for reinvestment into the forest.

Retain conifer stands in long term retentions to benefit raptors.

Area with potential to be managed as wood pasture. Grazing will help break up weedy swards allowing natural regen of existing native trees, aiding restoration to native woodland.

Manage ride network as per ride management map linking ecological areas.

Restore to native woodland using regeneration felling to remove conifer and actively encourage natural regeneration of native broadleaf species.

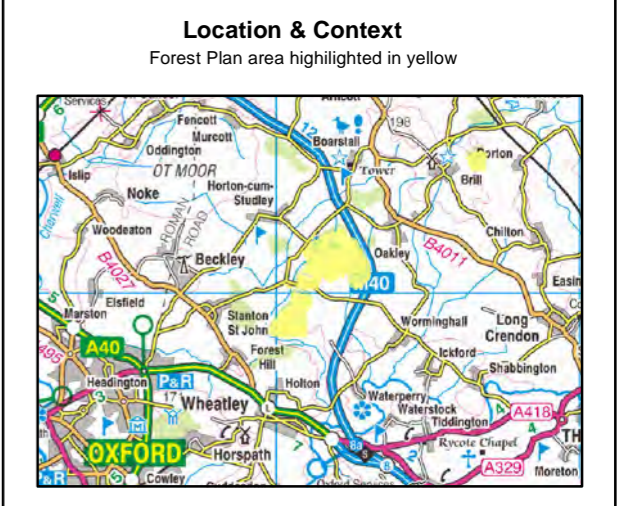
Improve the condition of paths by cutting back overhanging ride-side vegetation during operations.

Access and recreation facilities

- Management Area
- Car park
- Settlements
- Butterfly walking trail
- Public Right of Way

Environment

- SSSI sites
- Permanent open space
- Ecological areas
- Natural Reserve
- Coppice
- Long term retention
- Clear fell
- Potential wood pasture
- BBOWT reserve
- WWII earthworks
- Ponds
- Heritage monument
- Water courses



Design Brief

Environment

- To protect and enhance areas of ancient semi-natural woodland and restore planted ancient woodland (PAWS) to native species.
- To protect, maintain and enhance designated sites.
- To protect, maintain and enhance priority habitats.
- To protect, maintain and enhance priority species.
- Maintain and improve cultural and heritage value of the land by protecting sensitive heritage features highlighted through the OSA* process.

Community

- Create a pleasant natural environment for the public to enjoy outdoor recreation in a rural woodland setting.
- Support responsible public use of open access land by maintaining recreational facilities including the car park and walking trail.
- Increase area managed through lower impact silvicultural systems to protect and enhance the internal and external landscape.

Forest resilience

- Maintain FC land under FSC/PEFC certification by meeting standards detailed in UKWAS fourth edition.
- Improve economic resilience of our forests by increasing species diversity through restock programmes and mixed silviculture practices, to protect future timber supplies and biomass.

Finance

- To generate income from the marketing of timber products whilst ensuring operations take place at a scale and frequency in keeping with the surrounding landscape.



5. Environment

Site Characteristics

Shabbington and Waterperry lie on relatively flat land with a few slight ridges and altitude ranging from 60-90 metres above sea level. They are directly bordered by the M40 and surrounded by agricultural land. Chinkwell rises from 100 to 130 metres above sea level and lies within a predominately agricultural landscape. Rainfall is low at approximately 660mm per annum and severe spring frosts and droughts occur regularly.

Shabbington and Waterperry are mostly situated on Oxford clay that gives rise to soils of the Denchworth series. The extreme western edge of Shabbington wood has loamy-clays of the Shabbington series, while two small pockets of cherty sandstone brash occur within the centre of the wood. The soils across these woodlands are acidic and seasonally waterlogged, due partly to their structure and to the influence of the underlying impervious clay. They are generally very fertile in well-drained parts of the woodland. The central area of Chinkwell sits on Corallia soils over a composite of several solid rock lithologies. Within the north east corner there is Oxford clay and Kellaways Beds, whilst the south western corner consists of Kimmeridge and Amphrill clay.

Designated sites

The majority of Shabbington and the whole of Waterperry are designated SSSI's totalling an area of 443 hectares. The Shabbington woods complex SSSI covers 306 hectares and was designated in 1981. It consists of 5 units although unit 5 on the western edge is not within the Forestry Commission management boundary and is managed by the Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust (BBOWT). The special interest lies in the rich insect fauna associated with compartment edges and the system of open rides. Waterperry wood SSSI covers 137 hectares and was designated in 1955. The special interest lies mainly in its insect fauna, containing nationally rare and uncommon species as well as NVC W10 habitat.

The SSSI management plan forms part of this forest design plan. The main management priorities will be as follows:

1. Management of open space habitat within the woodland.
2. Management of the woodland habitat.
3. Management of water within the woodland.

The maintenance and enhancement of biodiversity is a key consideration in the plan. The existence of various species of rare birds, flora, lepidoptera and mammals associated with designated sites adjoining the plan area, is considered in management of the woodland.

There are no formal conservation designations in Chinkwell forest.

Priority habitats

Management of Open space habitat

The UK Forestry Standard requires a minimum of 10% of the forest plan area to be managed as open space. UKWAS requires a minimum of 10% of the district forest management area to be managed as open space for biodiversity, cultural and recreational purposes. The existing open space within the plan area is made up of recreation areas, ponds, meadows and the network of forest rides.

Open space accounts for 16% of the plan area (see pie chart on page 15) which includes both temporary open space created through felling operations and the permanent open space existing in rides, recreation facilities and meadows.

The sensitive management of open habitats within a woodland introduces greater habitat diversity. This encourages a wider range of species and adds diversity and interest for all types of recreation and sporting activities. Many species make regular use of the edge habitats for feeding due to higher herb layer productivity and larger invertebrate populations. Wider rides are generally drier and therefore maintain a better surface for all year round access.

The rides have been widened over the years by removing up to six rows of conifer crops either side of the rides to reduce shading of ride side blackthorn, goat willow and other flowering species important to Lepidoptera. There is good ride management across Shabbington but further work is required in Waterperry to widen rides in the same way. These ride edges will be left for scrub to develop which can then be managed to create scallops creating a multi age/structured rideside. Appendix 1 on page 29 shows current scrub management in Shabbington and future proposed management in Waterperry. Rideside management within Waterperry will also require restoring the rutted ride network.

Management will aim to create a range of ride widths to a minimum of 15 metres from crown edge to crown edge, incorporating the road/road-side ditch. Scalping beyond this minimum will break up hard edges and create warmer glades. Thinning intensity of the conifer should be increased alongside grassy rides to create a gradual transition from forest crop to scrub to grassy verge, allowing broadleaf species to remain as a softer fringe. The growth of Blackthorn, Goat willow, Hazel, Oak, Wild service, Ash and Cherry should be encouraged along ride margins to benefit Lepidoptera, ensuring they remain safe and do not impinge access.

The Lepidoptera species of Bernwood Forest consists of high forest species, ride/glade species and those species that are dependant on coppice regimes.

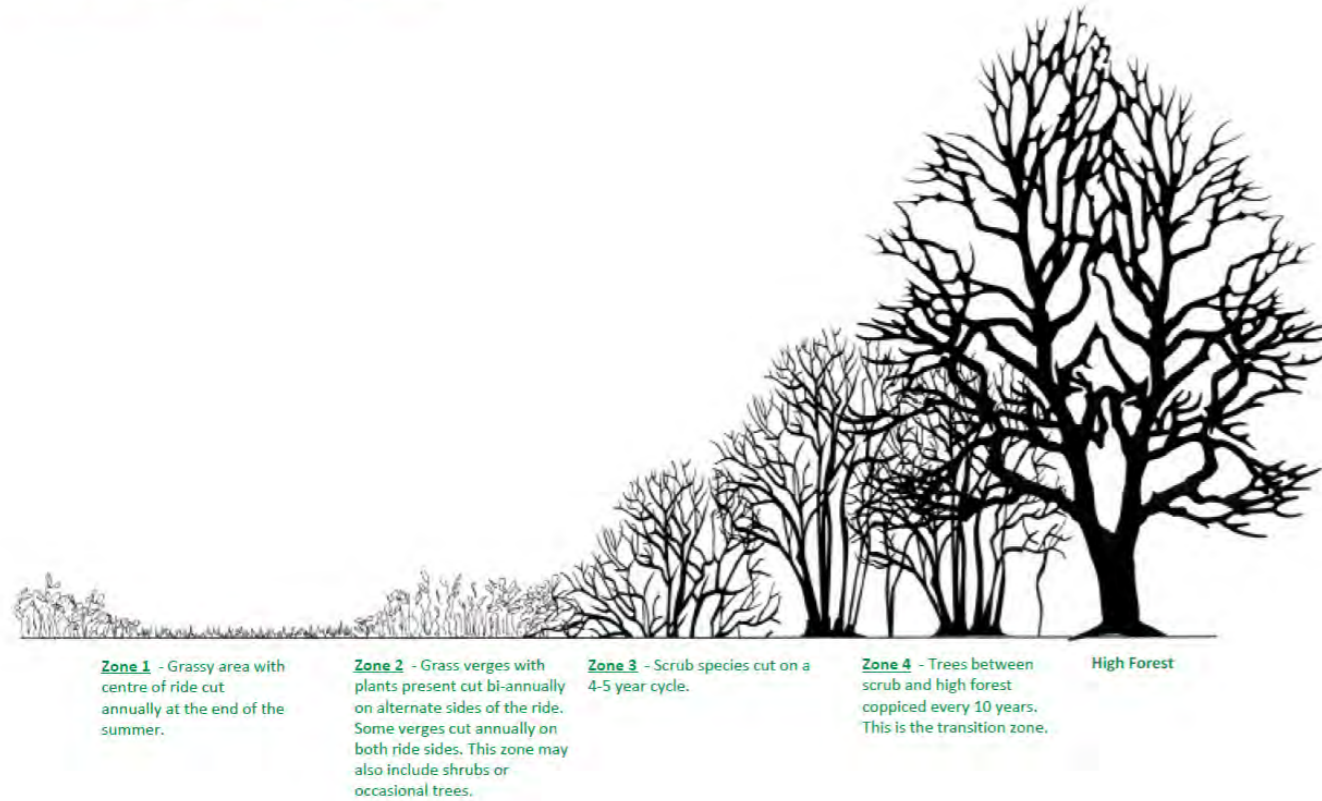
The network of rides managed for conservation have been divided into four zones:

1. Annual grass cuts along the centre of the ride.
2. Bi-annual grass cuts on alternate sides of the ride. Some verges cut annually on both ride sides.
3. Scrub species adjacent to these mown areas cut on a 4-5 year rotation.
4. Trees between the scrub and high forest coppiced every 10 years. The main conservation rides have been sub-divided to reduce the amount of vegetation cut in any one area and in any one age class.

The diagram on page 10 clearly shows these four management zones and the ride mowing and scrub management maps shown in appendix 1 (page 30) detail the planned locations and timings for work. The photo showing good ride management in Shabbington woods on page 10 helps to demonstrate how this can be seen in the woodland.

5. Environment continued

Management of a ride for wildlife benefit



Source: Tree silhouette taken from Forestry Commission England document "So, you own a woodland?." Text adapted to reflect management of ride network in Bernwood Forest.

The reduction of the forest area managed under a coppice system has restricted the survival of most coppice Lepidoptera species, which are also showing national trend of decline. Areas of coppice should continue to be managed, since deer browsing and the lack of heavily shaded phase in coppice rotations has led to swards becoming dominated initially by coarse grasses and herbs, unsuitable for coppice Lepidoptera species. Coppice areas have been identified in the plan and can be seen on the management map on page 17. Clear fell coupes to remove conifer will also help provide temporary open space, effectively mimicking coppice conditions.

The 'ecological areas' shown on the areas of ecological interest map in appendix 2 (page 35) are small areas, primarily of blackthorn, managed for conservation of the black hairstreak butterfly. Work has been undertaken to fence around important scrub species such as blackthorn to reduce browsing damage from deer and to encourage vegetative regeneration of blackthorn. In these areas, blackthorn should continue to be maintained and encouraged through laying and planting. Ultimately, area A and E will link up with the old Christmas tree fields (fields 1-3). Other rotational blackthorn scrub will be managed for a range of important invertebrates.

The design concept map shown on page 8 illustrates proposals to restore and create a mosaic of grassland, scrub, native trees, ponds, wet scrapes and peripheral hedgerows across the large open area to the north and north-east of Shabbington wood, bordered by the M40. This would complement the overall diversity of Bernwood Forest and enhance the existing ecological interest of the SSSI designation.

Areas of permanent open space will be managed to create a mosaic of herb and scrub layers. Grass cutting will be undertaken in Autumn, ideally September, and will focus on areas which require annual cuts to maintain access and a low herbage layer and mature scrub species benefiting from coppicing and layering. There is potential to spread local green hay or seed to add wildflower seeds and improve biodiversity interest. Initially this would be into fields 10 & 11 and at a later stage extend into fields 1-9 (see ecological interest map). This will be investigated and implemented where agreed with Natural England to be beneficial.

Low intensity grazing is used to manage existing sward within the BBOWT reserve. Grazing could also be introduced into Shabbington wood in fields 1-11 to encourage the breaking up of weedy swards in order to help the natural regeneration of native tree species. This would effectively result in the creation of a wood pasture habitat across part of the forest and would require the fencing of these areas (see design & concept map).



Good ride management in Shabbington woods showing different zones.

5. Environment continued

Management of woodland habitat

Ancient woodland

Ancient Woodland makes up 440ha (88%) of the plan area of which 368ha is plantation on ancient woodland sites (PAWS) and 72ha is ancient semi natural woodland (ASNW). This is shown on the Ancient woodland map in appendix 3 (page 38). ASNW sites have been woodland for several centuries with trees forming the canopy having arisen naturally rather than through planting. These are important because the species composition, woodland structure and distribution of trees are more diverse and natural, reflecting the site's history and ecology. These have developed over such long periods of time that they are not present in more recent woodlands and if lost are irreplaceable. PAWS have a long history of woodland cover, existing since 1600 or earlier. The original "natural" woodland was cleared and replaced by a plantation of mostly non native conifer. The plan aims to restore these areas to semi-natural woodlands comprising site native species and retaining remnant features.

There is 174ha (35%) of conifer remaining in the woodland, with Norway spruce being the predominant species. Much of the conifer is present in small blocks or growing in mixture with Oak, Ash and Birch. Mature conifer areas can benefit raptors so although reversion to semi-natural woodland (SNW) remains a priority it is important to retain some conifer. This will include mostly Larch and Pine species located in areas of long term retentions and natural reserves and should not exceed 20% of the plan area (see management map page 17).

Bernwood Forest is characteristic of NVC community W10 'Oak, Oak-Ash Woodland' type. Restoration will be to a predominantly Oak woodland (supporting Wild service, Oak and ash, with a Hazel and field maple understorey species and scrub/open space).

There has been good progress made towards reversion to SNW since the last forest plan produced in 2005. This is shown through 'naturalness' scores, where a score of 1 is classed as semi-natural and a score of 4 as predominantly conifer plantation. The semi natural score maps in appendix 3 (page 39) show both scores for 2005 and 2017. The 2005 map shows the 'naturalness' scores to be predominantly 3-4 particularly in Shabbington and Chinkwell, showing a mostly conifer woodland. The 'naturalness' score at 2017 shows progression towards reversion to SNW with a reduction in scores 3-4, increase in scores 1-2 and overall a much wider range of scores across all woodlands. It is expected that throughout this forest plan further progress will be made as clear fell coupes remove more conifer from the woodland.

A policy review in 2015 set to influence the speed at which reversion could take place. This change in PAWS policy meant clear fell systems are no longer permitted in PAWS woodlands with the exception of disease and areas of heavily seeding conifer in order to reduce the need to replant. The majority of previously planned clear fell coupes in Bernwood contain heavily seeding conifer and will therefore require clear felling as planned, to avoid conifer regeneration and maintain the SSSI condition. One small clear fell coupe of Norway spruce which will not heavily re-seed have been removed from clear fell. Reversion to SNW will be implemented through thinning practices that encourage natural regeneration favouring a wide variety of native tree species including those considered honorary or near native. These are shown as high conifer content areas which, overtime, will be reverted to native broadleaf forest.

Several species of birds and invertebrates would benefit from a wider range of crop ages within the woodland. This has been aided in the past by the creation of gaps within the canopy through windblow. It can further be achieved by allowing some trees of different species to remain beyond economic maturity and to maintain a regime of small clear fells and thinning practices.

Coppicing has historically been used in the management of Bernwood Forest and should be continued where it is already practiced to benefit coppice Lepidoptera species, demonstrate past management techniques and provide suitable material if new markets for coppice produce emerge in the long term. There are two fenced areas of coppiced woodland. A third coppice area 5103 is within a 100m block and may require stock fencing, depending on grazing potential of this woodland. Throughout the entire forest area, numerous coppice stools exist (mainly hazel). There will be no active management of the coppice stools outside of areas 5103, 5138 and 5148 shown on the areas of ecological interest map.

The fenced areas of coppice within Bernwood have a high proportion of standards that adversely affect the regrowth of coppice stools and conservation value of the woodland. Coppice area 5103 in Shabbington has a high number of mature oak trees that cast excessive shade. Their removal is required to create a desired 20 to 30% canopy cover, with heavier thinnings taking place along the central ride. The fenced areas require initial coppice restoration felling, cutting all of the stools within coppice areas identified on the areas of ecological interest map during the period October to March. Subsequent cutting will be staggered over a 5-10 year period, depending on available markets. During the initial phase of coppice restoration and thinning, it may be necessary to layer and plant hazel to increase the stocking density.

Non-ancient woodland

Approximately 61ha of the plan area is not Ancient Woodland (see appendix 3, page 38). This is located in Shabbington wood predominantly in the open fields to the north and the grassland area in the central western section of the woodland. Other wooded areas include the broadleaf belt along the north west forest boundary and the small compartment of Scots pine on the south west woodland edge. The Scots pine will be clear felled and replanted with conifer which will help provide a more sustainable income that can be reinvested into the forest.

Deadwood

The OSA process can be used to consider opportunities to provide deadwood habitat. At least 20% of broadleaf trees will be left to grow beyond 150 years and at least 5% left to die in situ. Provided they are safe, all fallen trees are left to rot down where they fall, it is important not to 'tidy up' these fallen trees from a biodiversity point of view as shaded rotting wood is important habitat for invertebrates.

The largest amount of deadwood can be found in areas of long term retentions, natural reserves and those managed through thinning, where ecological processes such as vegetation succession, natural regeneration and windthrow increase the biodiversity and conservational value of the area.

Natural reserves and Long term retentions

Natural reserves and long term retention areas are shown on the areas of ecological interest map and are all located in Shabbington. These are areas of high ecological value. Natural reserves contain some of the most mature broadleaves in the woodland and a diverse range of both conifer and broadleaf species. These are permanently identified areas. Long term retentions contain mostly conifer species to be kept well beyond their economic maturity for the benefit of raptors.

5. Environment continued

Management of water within the woodland

The stream which runs from the north west to the south of Shabbington is a notable feature present in the woodland. Management should aim to remove conifer trees found growing within 20m of the watercourse during ongoing forest operations (see ecological interest map). Broadleaf trees are to be encouraged along streamsides, with the aim of maintaining approximately half of the stream surface in full sunlight and the rest in dappled shade. Blackthorn growing alongside streams should be retained to benefit the black hairstreak butterfly.

There are 33 ponds across Shabbington and Waterperry of which 9 were created through the Million ponds project. The Million ponds project is a national partnership to protect freshwater wildlife by creating new networks of clean water ponds for threatened freshwater plants and animals across the UK. It is a collaboration of partners including major landowners of which the Forestry Commission is one, and is led and coordinated by the Freshwater Habitats Trust. A further 11 ponds were created in 2018 through funding from the Freshwater Habitats Trust. These can be seen on the ecological interest map. It is expected that more ponds will be added in future as extra funding becomes available.

These ponds provide important breeding habitat for Great crested newts, Palmate newts and Smooth newts known to be present in the woodland. Removing trees within 20m of pond margins will help reduce the build up of leaf litter. The ponds also support a variety of dragonflies including Hawkers, Chasers and Darters and Damselflies. Amphibians including the Common frog and Toads have also been observed and birds and other animals will use these ponds as a water source during periods of dry weather.

Unfortunately, these ponds have suffered significant damage due to use by dogs. The Freshwater Habitat Trust have been educating the public on the importance of these ponds through drop in sessions in the car park. However, it will be necessary to fence ponds in the near future to retain them in optimal condition for their intended purpose, as important wildlife habitat.



Priority species

The NERC Act schedule 41 lists 943 species of principle importance for conservation in England. The species relevant to the Bernwood FDP are invertebrate and flora species of woodland, scrub and neutral grassland. Key food sources for the invertebrate species include tree species such as; Oak, Blackthorn, Cherry, Birch, Hawthorn, Hazel Hornbeam, Rowan, Apple, Pear, Aspen, Poplar, Elm, Buckthorn, Plum, and Field maple, plant species such as Meadow sweet, Valerian, Ragwort, Hypericum, and Marsh bedstraw and a range of grasses and rushes. Nectar, pollen, rotting deadwood, leaf litter, moss and fungi are also important food sources.

These food sources and the various micro-climates and habitats required by the priority species found in Bernwood are managed for through ride and open habitat management, stand management such as clear-felling and thinning and allowing natural woodland processes to continue, which produce rotting deadwood, leaf litter and fungi.

European Protected Species

The EPS found in Bernwood include a range of bat species and Great crested newt.

Bats are managed for by retaining 'bat friendly' trees which contain crevices, splits, peeling bark, rot holes etc that provide roosting sites. Open space, ride and stand management provide bats with access through the woodland and also the rich food supply of invertebrates such as moths and beetles which they require.

Great crested newts are provided for by an on-going programme of pond creation, now at 33 and open habitat management, providing feeding and resting sites.



5. Environment continued

Safeguarding our Heritage

Bernwood or 'Barne Woode' as it was originally named, was a Royal hunting forest thought to have been set aside by the Anglo Saxon kings in the 10th century, and further developed by the Norman kings. During the reign of King Henry II (from 1154-1189), this high medieval forest covered approximately fifty parishes in modern day Buckinghamshire/Oxfordshire and can be seen on the plate below:



Plate 1. The Forest of Bernwood, c1590.

Taken from Broad, J. & Hoyle, R. Eds.(1997): Bernwood: The Life and Afterlife of a forest.

In the medieval period a forest was a place where deer roamed for hunting so the forest included a distinctive open landscape, consisting of a rich mosaic of pasture, arable, meadow, heathland, settlement and woodland. Those living within a forest were not allowed to hunt or gather wood without a special licence from the King. From around 1217 through to the 17th century the forest went through a period of deforestation and by the reign of King James I (from 1603-1625), it had lost its royal status and completely disappeared. Today the name refers to the area of Buckinghamshire and Oxfordshire where the forest was at the time of King Henry II.

The smaller modern Bernwood forest is contiguous with Hell's Coppice, York's wood, Oakley wood and Shabbington. The Forestry Commission acquired Bernwood in the 1950's with a commercial approach of removing broadleaf trees before planting conifer crops known to grow fast and produce good quality timber. As a result these woodlands contain a high proportion of non-native conifer but, as described on page 11, the importance of ancient woodlands has since been recognised, and changes in policies have led to restoration to semi natural woodland, a key objective of this plan.

Management aims to maintain those landscape features identified within historical documentation, county archaeological departments and on the heritage layer within GIS*. Examples of these include World War II structures, field banks and open fields such as those found in Shabbington forest and the heritage monument present in Waterperry forest (see design and concept map page 8).

There are no scheduled monuments in the plan area.

Site specific heritage features are considered as part of an OSA process before work commences. A handbook guide to protecting heritage assets has also been produced for forest workers and referred to during operations to increase understanding and protection of heritage features.

6. Community

Access and Recreation

Shabbington and Waterperry forest are held under freehold providing 465ha of public access land. Chinkwell which totals 36ha is privately owned and leased by the Forestry Commission to manage for timber. Public access is not permitted in Chinkwell with the exception of the public right of way from Brill and Dorton. There are a number of public rights of way which link to and border all 3 woodlands, with others running directly through Shabbington and Chinkwell. The land holding status map on page 6 shows access rights across the plan area.

Recreational use tends to be of medium intensity, meaning that there will normally be someone present within the woodland during daylight hours on most days (depending on the time of day and year). The main user groups include regular dog walkers, local walkers, specialist conservation visitors, educational groups and orienteering parties.

Shabbington wood provides the main recreation facilities for the plan area with a car park located in the north west providing around 30 spaces and a waymarked trail. The waymarked butterfly trail starts from the car park and leads walkers through forest, glades and rides. It complements the adjacent Bernwood Meadows Nature Reserve run by BBOWT and is marked on the nature reserve information leaflet.

Shabbington and Waterperry have been mapped for orienteering and permissions are granted for this activity but limited in timing, running between July and March each year to protect the flora and ground-nesting birds outside this period.

Although Shabbington and Waterperry are large enough to accommodate recreation events, the sensitivity of the SSSI and condition of the soils means that events should be carefully considered and limited to a three month period, August to October. Event opportunities are further reduced by limited parking facilities with only one car park in Shabbington and no public vehicular access to Waterperry.

Community

Considering the population of surrounding cities and villages it is not a surprise the woodland is well used. Oxford City which lies to the south west has a population of 155,000 and the population of the surrounding villages including Horton-Cum-Studley, Oakley, Brill and Worminghall total a combined population of 3,000.

Forest plans are revised every 10 years and plans for the East England Forest District are accessible from the Forestry Commission website www.forestryengland.uk.



Landscape

The forest landscape provides a backdrop to the surrounding villages. The immediate landscape surrounding the plan area is flat and mostly agricultural land. However, the internal structure of Bernwood Forest is visible from the high ground between Piddington and Brill. There is also a significant vantage point at nearby Studley. As a generally flat landscape the view from surrounding settlements will be mostly unaffected especially as the majority of the forest will be managed under lower impact silvicultural systems.

Internal views are limited to the main forest roads and rides since the standing trees block many lines of sight. The aesthetic value of the internal landscape could be improved by selectively felling trees along public rights of way and other rides. These operations would encourage the rides to dry out and would improve habitat for Lepidoptera.

Clear fell coupes across both Shabbington and Waterperry will also help to add visual diversity whilst improving conservational value, with sizes generally ranging from 1ha-6ha. The exception to this will be one larger 10ha coupe in the north of Shabbington containing heavily seeding Western hemlock.

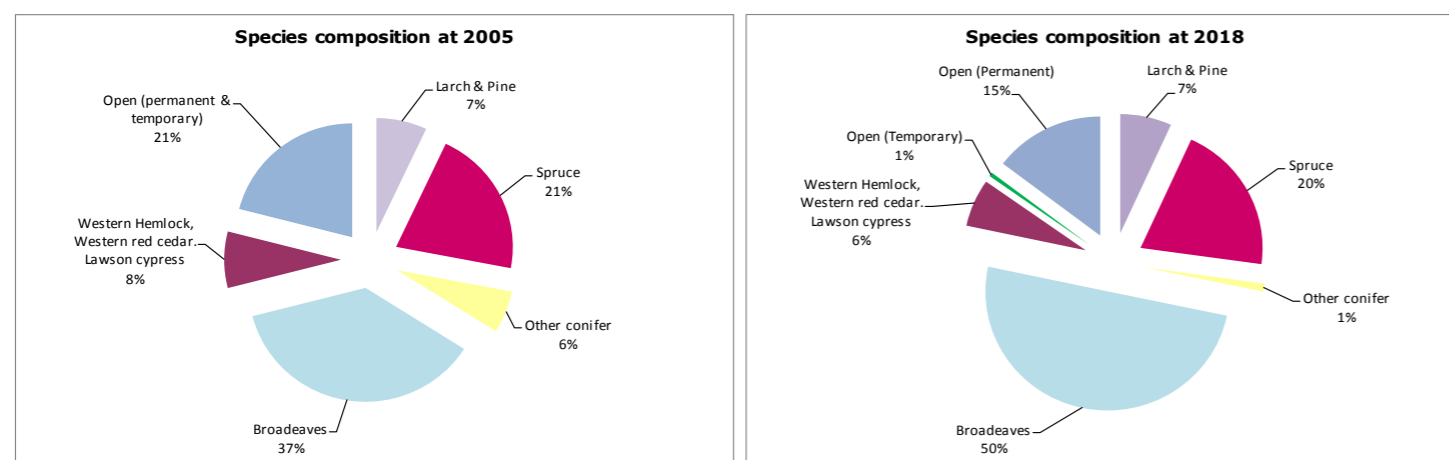
7. Forest resilience

Tree Species

Bernwood forest consists of blocks of conifer, blocks of broadleaf and areas where conifer species can be found growing in mixture with Oak, Wild service, Ash and Birch. Conifer makes up 34% of the plan area shown on the pie chart below (species composition at 2018). The main conifer species is Norway spruce but other conifers present include Scots pine, Lawsons cypress, Western hemlock and Western red cedar.

Broadleaves make up 50% of the plan area of which Oak (138ha), naturally regenerated Birch (58ha) and Hazel (18ha) make up a significant part. These are located in areas shown as high broadleaf content on the management map (page 16) and form a major component of natural reserve and coppice areas. The proportion of broadleaves has significantly increased over time which can be seen from the pie charts below. Broadleaf in the previous plan created in 2005 covered 37% of the area, increasing to 50% by 2018. This is mostly due to an 8% reduction in conifer through thinning and felling operations and a 5% reduction in open space due to natural regeneration of broadleaf on previously windblown sites. This is consistent with the progression detailed on page 11 showing progress towards reversion from PAWS to semi-natural woodland. Further operations will continue to reduce conifer and increase broadleaf proportions.

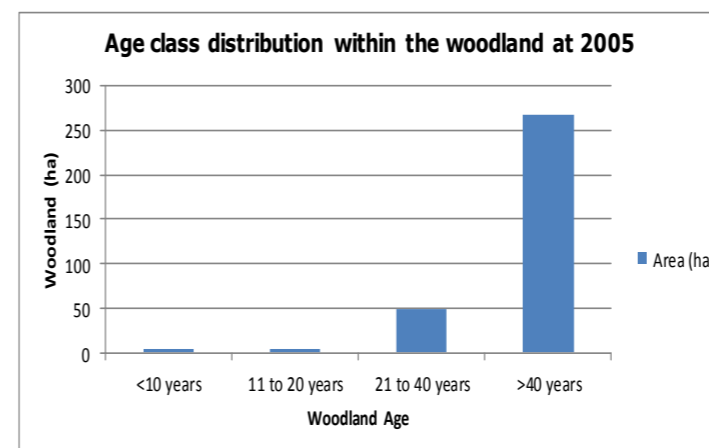
Open space including both permanent and temporary (e.g. recently felled areas) accounts for 16% of the plan area.



Age Class

The bar charts overleaf illustrate how past management of the woods has perpetuated the condensed initial establishment phase with the majority of the forest aged >40 years old. This is due to the majority of the forest being planted in a ten-year period between 1953 and 1963.

A comparison of the bar charts shows the age structure of the woodland is gradually changing with an increase in trees aged between 11-20 years and >40 years, and a decrease in 21-40 years. The decrease in trees aged 21-40 is a result of trees in this age range moving into the >40 years range. The increase in 11-20 years is a positive change showing younger tree ages are coming through helping to improve the age structure of the woodland. The majority of the woodland will be managed under lower impact silvicultural systems where the age structure and species present will be diversified through thinning operations which promote natural regeneration with supplementary planting as required. Clear fell coupes will help to further break up the age structure helping to continually show progress towards a more varied age structure at each plan revision.



Building resilient woodlands through species and age diversity is key to ensuring the long-term sustainability of the woodland within a changing climate. Delivering a forest more resilient to the threats from pests and diseases is key to both economic and ecological sustainability of the forest.

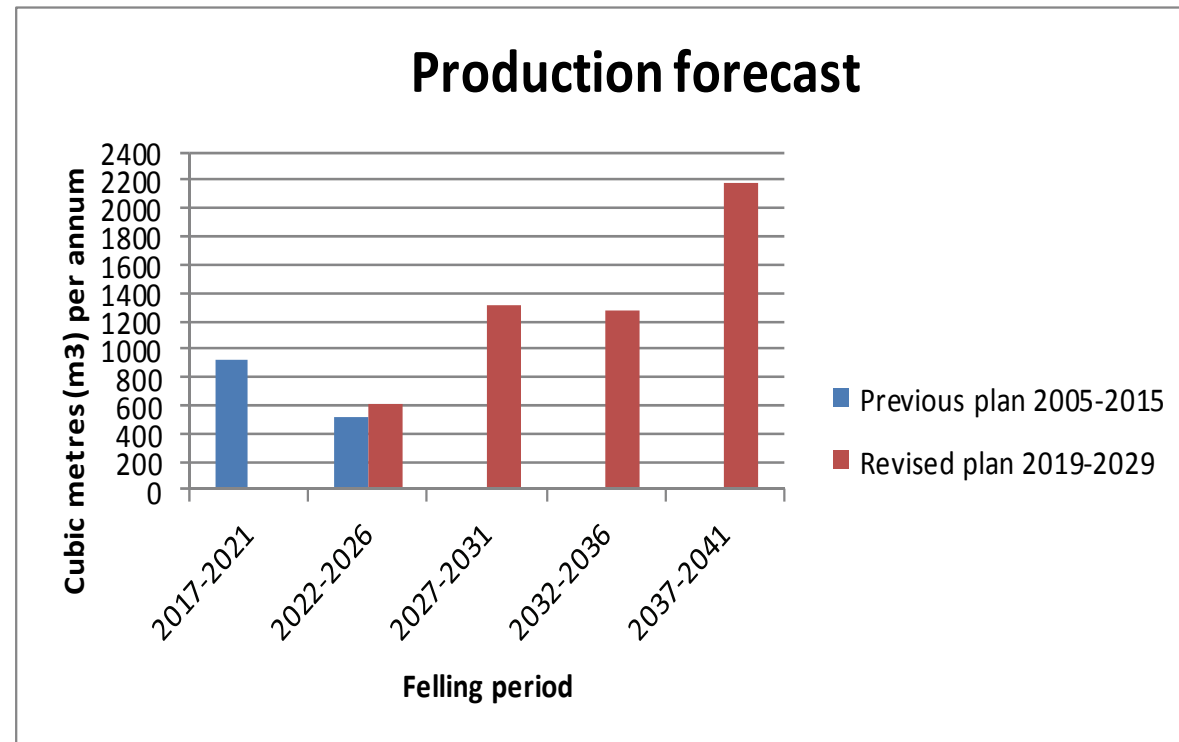
In Bernwood this will be attained by implementing a variety of silvicultural systems including clear felling, selective felling, thinning and coppicing shown on the management maps on page 17. Clear fell coupes identified include areas of conifer known to freely regenerate. Removing these areas in one operation reduces conifer regeneration and shading of ride networks, helping to restore the woodland more efficiently. It also provides temporary open space effectively mimicking coppice conditions, important for coppice Lepidoptera species.

Areas of regeneration felling using a selection system contain a maximum of 40% conifer, with most having much less present. The conifer present is mostly species known to freely regenerate and therefore removal in one operation is required to reduce conifer regeneration. As broadleaf makes up the majority of the remaining area, seed source availability will encourage good natural regeneration. Regeneration felling under a shelterwood system will gradually remove conifer in areas of higher conifer content. This aims to allow broadleaf regeneration at a pace that reduces or avoids the need for supplementary planting and should encourage a more diverse range of native species. In areas of high broadleaf content, regeneration felling under a group shelterwood system will seek to improve the age structure of the woodland and diversify species, as well as creating small clearings of temporary open space across the woodland.

Restocking will be through natural regeneration of site native species to include Oak, Ash, Wild service tree with a Hazel and Field maple understorey. Supplementary planting will be used if regeneration is not successful to ensure good age structure variation. The split between conifer, broadleaf and open space is shown on the habitat and restock species maps on page 18.

Pine and Larch will be retained for raptors. A variety of broadleaf trees retained beyond economic maturity will provide a valuable seed source, increasing the success of natural regeneration and species diversity across the woodland. Monitoring of tree species composition and health through mid term reviews and full plan revisions will help inform future management plans in preparing for an uncertain future and unprecedented rates of change in climate.

8. Finance



The proposed new plan will generate 26,890m³ over the next 21 years from clear fell operations as opposed to the old plan that would have generated 7160m³. For the approved 10 year period of the plan (2019-2029) 9650m³ will be generated which is a 2515m³ increase from the previous plan (2005-2015). The additional volume has come from new coupe shapes, updated yield models and survey data for the current crops.

The 2017-2021 period shows a forecast of 900m³ per annum from the previous plan (2005-2015), and a forecast of nothing in the revised plan (2019-2029). The clear fell coupes shown for the period 2017-2021 on the management map (page 17) were felled in 2018 as per the 2005-2015 plan. These operations were carried out under a separate felling licence due to the expiry date of the plan having come to an end. These areas have been included as felling coupes in the forest plan rather than showing as open space as these operations happened in the current 5 year period. As these areas are now updated to a felled status on the sub compartment database* the volume produced from the clear fell coupes can no longer be forecast, giving a false representation on the graph of volume for this period. This would have also increased the overall volume figures.

As previously stated in the plan, clear fell coupes have been identified where heavily re-seeding conifer is present. These coupes have then been distributed across the most appropriate 5 year periods dependant on location and when they will reach economic maturity. This helps to provide a steady income and create rotational open space which will benefit SSSI species. Further volume and therefore income will be generated through thinning operations on a 5-10 year cycle and also through coppice rotation.



Forestry Commission
England

East England Forest District

Bernwood Forest

Scale: 1:24,000

Management map

Illustrates silvicultural systems to be used

Legend

Clear fell

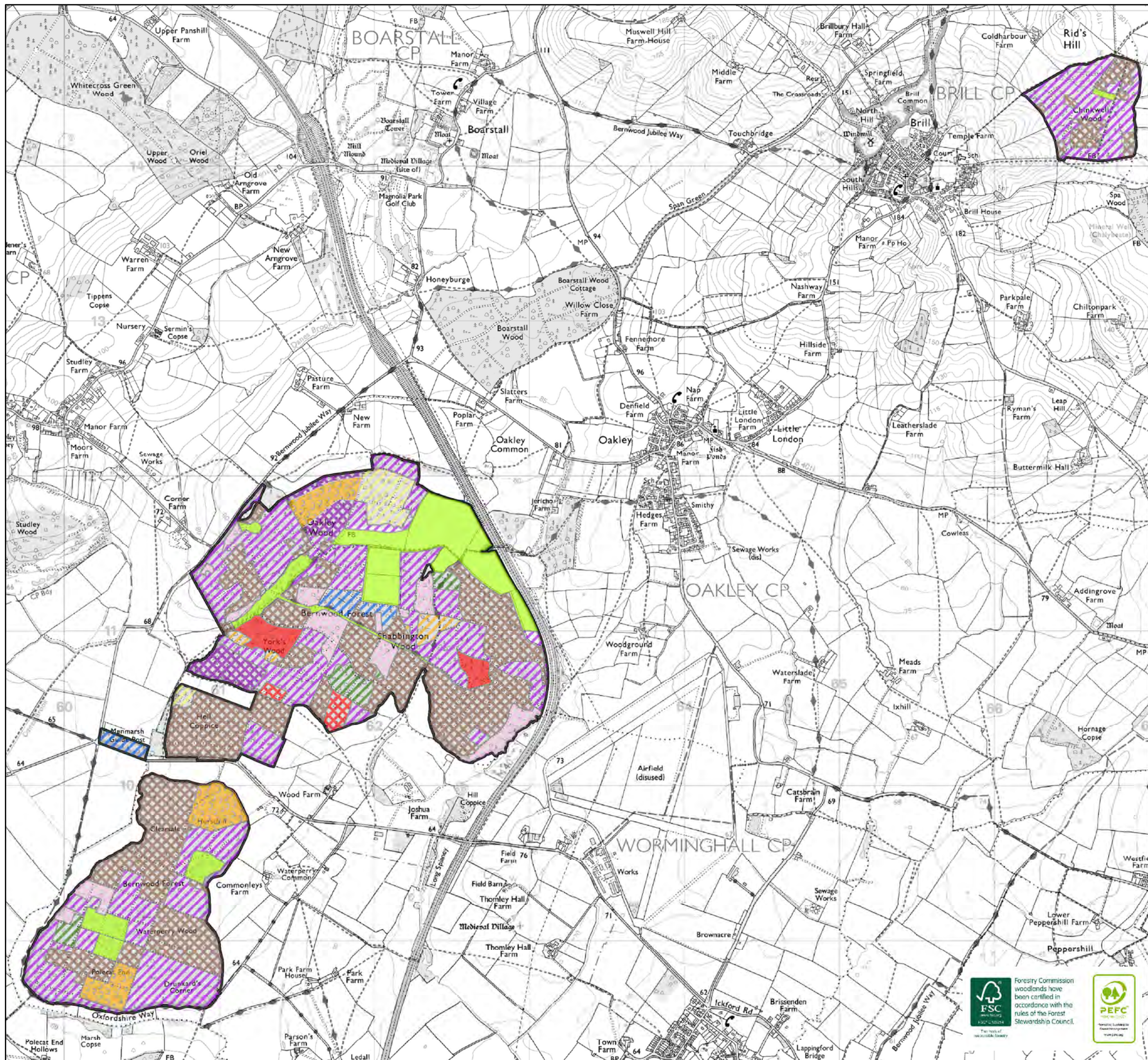
- Clearfell 2017-2021
- Clearfell 2022-2026
- Clearfell 2027-2031
- Clearfell 2032-2036
- Clearfell 2037-2041

Lower impact silvicultural systems

- High conifer content. Regeneration felling under a shelterwood system removing conifer gradually (40% max) in a series of operations to encourage natural regeneration of native broadleaf.
- High broadleaf content. Regeneration felling under a group shelterwood system (40% max) to encourage a diverse age structure and further natural regeneration of native broadleaf.
- Regeneration felling using a selection system removing conifer in one operation. Maximum removal 40% of area.
- Coppice with standards

Open/Other

- Long term retention
- Natural Reserve
- Open/Other
- Management Area



Forestry Commission woodlands have been certified in accordance with the rules of the Forest Stewardship Council.

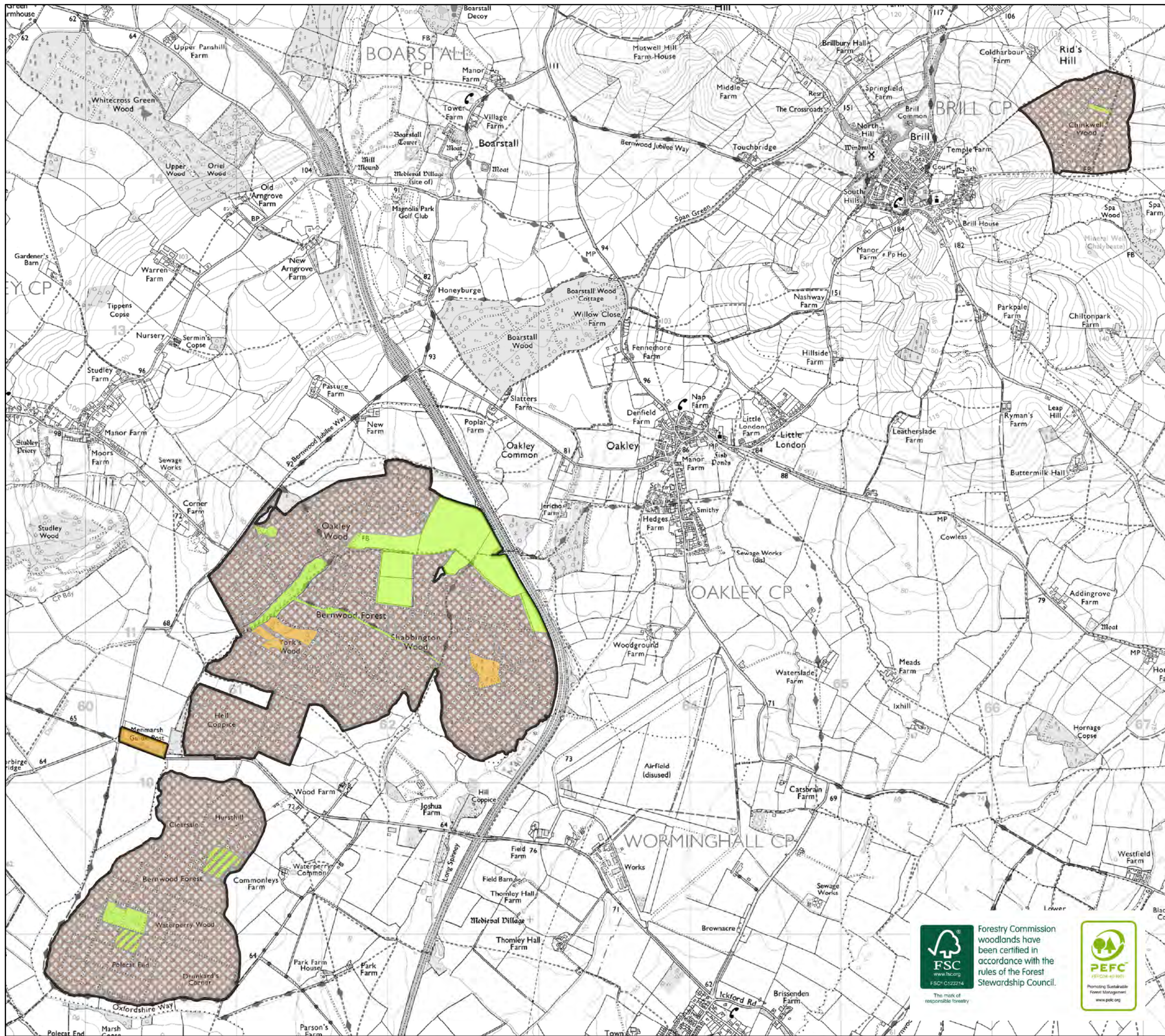


PEFC

Produced by the planning team
January 2019

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[2019] Ordnance Survey [100021242]





Forestry Commission
England






East England Forest District

Bernwood Forest

Scale: 1:24,000

Habitat and future restock species map

Legend

-  Management Area
-  Native broadleaves
-  Conifer
-  Permanent open space
-  Temporary open space



Produced by the planning team
January 2019

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[2019] Ordnance Survey [100021242]



8. Plan Appraisal

The appraisal of the revised plan is measured against the design brief on page 7, this has three separate sections and the appraisal relates to these sections:

Environment

- Design brief objective: To protect and enhance areas of ancient semi-natural woodland and restore planted ancient woodland (PAWS) to native species.

There has been good progress made towards reversion of PAWS woodlands to semi natural woodlands since the last forest plan was produced in 2005. This is shown through the use of semi-natural scores detailed on page 11, and through pie charts on page 15 showing a 13% increase in broadleaf species from 2005 to present. This is a direct result of reduction in conifer and open space. Areas of conifer known to freely regenerate have been identified on the management maps for clear fell and thinning operations will be carried out to favour native broadleaf species. Over time these operations will help to further reduce conifer and increase native broadleaf within the woodland.

- Design brief objective: To protect, maintain and enhance designated sites.

The Forestry Commission manages four out of the five units covered within the Shabbington woods SSSI. Unit 1 which covers the north end of the woodland is currently in unfavourable-recovering condition. Clear fell operations shown on the management map to remove Western hemlock which heavily reseeds and shades rides will improve the condition of this unit overtime. All other units are in favourable condition.

The Waterperry woods SSSI is made up of 4 units. Unit 1 is in favourable condition whilst units 2-4 are in unfavourable-recovering condition. Units 2-4 still contain conifer elements which will be thinned out and any conifer regeneration removed over time to improve the condition of these units. A clear fell coupe is still planned in the area to remove heavy seeding conifer and a plan to begin to carry out scrub management is shown in appendix 1. Young broadleaf understorey is coming through, deadwood is present in all units and there is good native ground flora in places.

Meeting the objectives detailed in appendix 4, agreed between Natural England and the Forestry Commission, will ensure designated areas are maintained and enhanced.

- Design brief objective: To protect, maintain and enhance priority habitats.

There has been a change in the provision of permanent open space which has seen a reduction from 15% at the plan revision to 10% following the plan implementation. However, coppice rotation areas which provide temporary open space will offset this and keep the combined total of temporary and permanent open space at 16%. Clear fell coupes, ride and scrub management will also increase the amount of open space provided on a permanent and temporary basis. The number of ponds have increased since the last plan revision to over 30 ponds and more are planned in the near future following funding provided by the Freshwater Habitat Trust. These water bodies will be unshaded through tree removal where required to increase water flora and diversity.

- Design brief objective: To protect, maintain and enhance priority species.

Priority species will be maintained and enhanced through the planned programme of management identified for their supporting habitats. They will be operationally protected through the OSA process.

- Design brief objective: Maintain and improve cultural and heritage value of the land by protecting sensitive heritage features highlighted through the OSA process.

Site specific heritage features are considered as part of an OSA process before work commences. A handbook guide to protecting heritage assets has also been produced for forest workers and referred to during operations to increase understanding and protection of heritage features.

Community

- Design brief objective: Create a pleasant natural environment for the public to enjoy outdoor recreation in a rural woodland setting.

It is difficult to assess how pleasant a woodland environment is as this is subjective but managing the majority of woodland under lower impact silvicultural systems, and retaining patches of mature trees such as those present in long term retentions and natural reserves should create a pleasing environment for forest users and passers by.

- Design brief objective: Support public use of open access land by maintaining recreational facilities including the car park and walking trail.

There is open access across 92% of the plan area in both Shabbington and Waterperry. Due to Chinkwell being leased land public access is not permitted although a public right of way does pass through the woodland. The majority of recreational facilities are located in Shabbington forest including a car park and the Butterfly waymarked walking trail which will continue to be maintained. There are several public rights of way surrounding the plan area with some passing directly through the woodlands.

The permissions system is used to provide permits for orienteering and other events. However, these are restricted to certain times of the year, to protect the flora and ground nesting bird interest.

- Design brief objective: Increase area managed through lower impact silvicultural systems cover to protect and enhance the internal and external landscape.

The majority of the area (77%) will be managed through lower impact silvicultural systems favouring removal of conifer whilst encouraging natural regeneration of native broadleaf species, creating more mixed age woodlands with appropriate species and no dramatic effect on the landscape.

The size and shape of coupes planned for felling can be seen on the management maps along with the planned felling period. The coupe size and coupe shapes are directly connected to conifer locations, which are well dispersed across the plan area. Felling periods for coupes range from 2019 – 2041 and are based on when tree species present reach economic maturity. This helps to maximise and maintain a longer term income whilst increasing internal visual diversity within the woodlands.

8. Plan Appraisal continued

Forest resilience

- *Design brief objective: Maintain the land within our stewardship under FSC/PEFC certification by meeting standards detailed in UKWAS fourth edition.*

UKWAS audits across Forestry Commission England carried out on an annual basis to attain certification.

- *Design brief objective: Improve economic resilience of our forests by increasing species diversity through restock programmes and mixed silviculture practices, to protect future timber supplies and biomass.*

The pie chart below shows projected habitat proportions following plan implementation which will see a significant reduction in conifer and increase in broadleaf compared to the current species proportions (page 15). This is a direct result of restoration of PAWS to native broadleaf woodland.

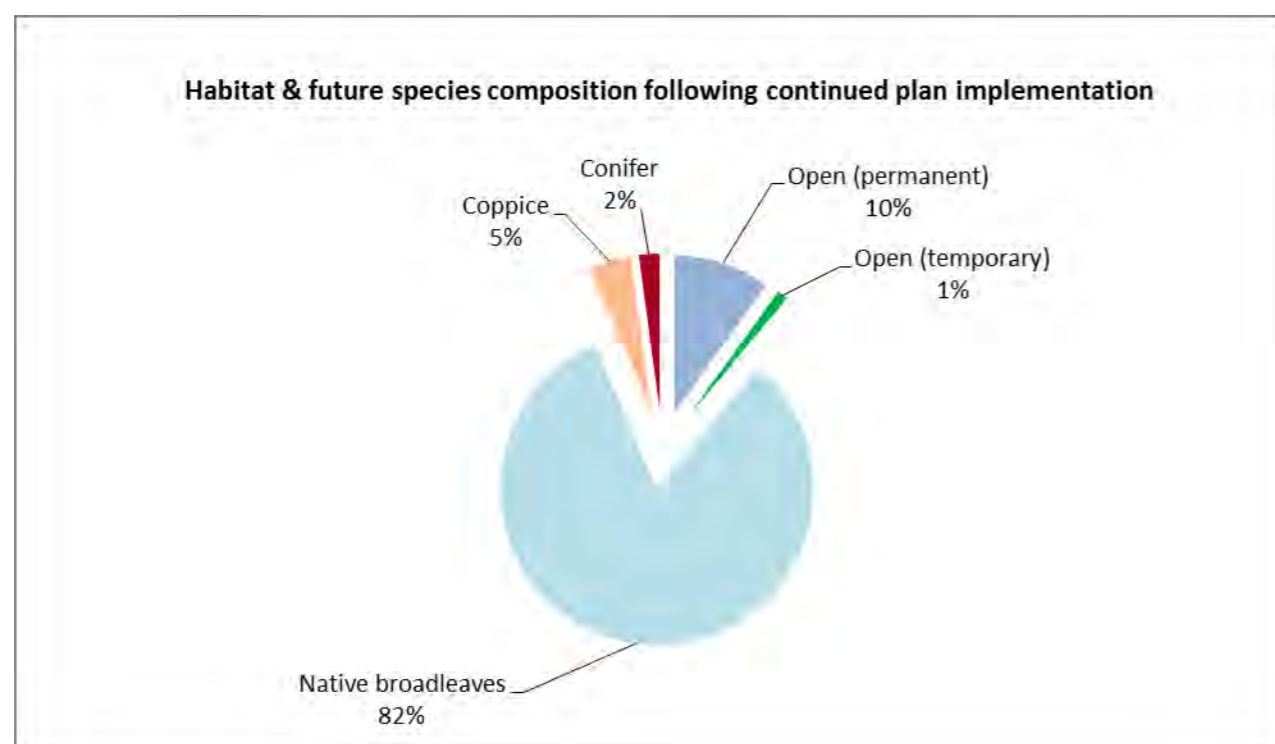
The management map on page 17 shows a wide range of silvicultural practices to be used across the plan area. These include clear fell, selective felling, coppicing, thinning and retaining trees beyond economic maturity in long term retentions and natural reserves. This combination of management will improve the woodland age structure and increase species diversity helping the forest become more resilient to climate change and the threat from pests and diseases. It also maintains habitats for important species identified in the SSSI designation. The habitat and restock map on page 18 indicates the split between conifer, broadleaf and open space. All restock will be through natural regeneration but should this fail to establish then supplementary planting will be required. The stocking density of areas managed through regeneration felling is difficult to define as this is dependant on the silvicultural practice used e.g. group felling or single tree selection to encourage natural regeneration. This is dependant on the species present and therefore natural regeneration will have a variable stocking density with success of stands measured by age structure variation.

Finance

- *Design brief objective: To generate income from the marketing of timber products whilst ensuring operations take place at a scale and frequency in keeping with the surrounding landscape.*

There are ten coupes to be clear felled which will be spread between 2017-2041. Most of the stands in the plan are programmed for felling at their current optimum marketable age — between 50 and 70 years old. In the interim, the productive stands are expected to yield good quality thinning material, and the average coupe size is large enough to allow efficient timber harvesting. The production forecast shows an increase in volume of 515m³ for the revised plan (2019-2029), compared with the previous plan (2005-2015). This is a direct result of new coupe shapes, updated yield models and survey data for the current crops.

One coupe which is not designated as ancient woodland will be felled and restocked with conifer to a minimum of 2,250 s/ha. This coupe is located to the west of Hell's coppice in Shabbington wood. Although close to the woodland, the coupe is not directly connected. It will be clear felled between the period 2032-2036 shown on the management map on page 17. It will help provide extra income to be reinvested back into the woodland. Conifer will not be planted in any other part of the woodland.



9. Monitoring

FEE National vision and overall goal: "To secure and grow the economic, social and natural capital value of the Public Forest Estate for the people of England."

District Strategic Objectives	Forest Plan Objective	Monitoring
<p>Environment:</p> <p>A recognised global leader in environmental stewardship</p>	<ul style="list-style-type: none"> To protect and enhance areas of ancient semi-natural woodland and restore planted ancient woodland (PAWS) to native species. To protect, maintain and enhance designated sites To protect, maintain and enhance priority habitats. To protect, maintain and enhance priority species. Maintain and improve cultural and heritage value of the land by protecting sensitive heritage features highlighted through the OSA process. 	<p>Mid term review (May 2023) will assess the progress of the plan against the SSSI objectives agreed with Natural England detailed in appendix 4 for components 1 & 4. The sub-compartment database and semi natural scores shp file will be used to assess success of reversion to ASNW at each plan revision.</p> <p>Mid term review (May 2023) will assess the progress of the plan against the agreed SSSI objectives taken from the favourable condition table, in appendix 4. Maintaining SSSI units in favourable condition and improving unfavourable condition units, will demonstrate meeting these three objectives.</p> <p>Archaeology will be monitored through the OSA process.</p>
<p>Community:</p> <p>Improved public involvement and engagement.</p>	<ul style="list-style-type: none"> Create a pleasant natural environment for the public to enjoy outdoor recreation in a rural woodland setting. Support public use of open access land by maintaining recreational facilities including the car park and walking trail. Increase area managed through lower impact silvicultural systems to protect and enhance the internal and external landscape. 	<p>As this is subjective it is difficult to monitor. However, feedback made to the beat team and stakeholders will be used to monitor success of this objective.</p> <p>Recreation facilities including the car park and walking trail are maintained through regular inspection processes. The permission system also allows access whilst monitoring to ensure levels are maintained in a way that does not impact significantly on the SSSI.</p> <p>The majority of the plan area is managed under lower impact silvicultural systems, with an emphasis on reverting to native broadleaf woodland. This will reduce the impact on the internal landscape and improve the external landscape as the canopy composition slowly changes to reflect that found in neighbouring woods (i.e. Oak dominated with Ash, Hazel, Aspen, Wild service and Field maple).</p>

District Strategic Goals	Forest Plan Objective	Monitoring
<p>Forest resilience: A healthy, resilient and productive forest.</p>	<ul style="list-style-type: none"> Maintain the land within our stewardship under FSC/PEFC certification by meeting standards detailed in UKWAS fourth edition. Improve economic resilience of our forests by increasing species diversity through restock programmes and mixed silviculture practices, to protect future timber supplies and biomass. 	<p>UKWAS audits and certification.</p> <p>The sub-compartment* database is updated after restocking to show the newly planted species and their proportions. As part of this updating process the restocking information is compared with the habitat and restock plan to confirm compliance. The restocking area can vary slightly from the plan as physical features come to light only after felling. Most of these minor changes are within the tolerances agreed between Forest Enterprise and Forest Services – see Tolerance table on page 28. The majority of the plan area will be restocked through natural regeneration of broadleaf species. To monitor timber sustainability, a stocking assessment is carried out to measure establishment success after five years. If nothing has established after 10 years supplementary planting will be implemented. The sub-compartment* database will be used to monitor species diversity and assessed as part of the full forest plan revision.</p> <p>To monitor compliance with the felling plan, after a coupe is felled the shape is captured on the ground using a GPS* receiver and the data is uploaded into GIS*. The resulting point data is then compared to the original coupe shape to confirm that the felling coupe has been accurately laid out on the ground.</p>
<p>Finance: Generating a financial surplus.</p>	<ul style="list-style-type: none"> To generate income from the marketing of timber products whilst ensuring operations take place at a scale and frequency in keeping with the surrounding landscape. 	<p>The forest is generally thinned on a 5-10 year cycle helping to maintain a timber supply. As the age structure of the woodland increases a more even flow of timber will be produced from thinning cycles.</p> <p>Clear fell coupes will also help to provide a larger income between 2019-2041. One clear fell coupe on the south west side of Shabbington wood that has no conservation designation will remain in cyclic clearfell helping to provide a longer term income that can be reinvested back into the forest.</p> <p>A production forecast has been run for the revised plan and agreed with the programme manager.</p>

UKWAS Compliance table ^[1]

	Forest Plan Area (Ha)	Forest Plan %	Forest District Area (Ha)	Forest District %
Total area	501	100	34,696	100
Total wooded area	425	84	30,642	88
Natural reserve - Plantation (1%) ^[2]	8	2	327	1
Natural reserves - Semi-natural (5%) ^[2]	7	1	256	5
Long-term retentions and low impact silvicultural systems	388	77	13,641	39
Area of conservation value (>15%) including designations: PAWS, ASNW, NR, SSSI, SAC, SPA & Conservation zones	459	92	29,293	84

^[1] Figures calculated 31st January 2019 and correct at time of publication.

^[2] Forest District area totals for natural reserves are calculated using allocated natural reserve area against semi-natural score figures from both ArcGIS and forester web.

10. Application for Forest Design Plan

Forest Enterprise – Property

Forest District:	East England
Woodland or property name:	Bernwood Forest
Nearest town, village or locality:	Oakley
OS Grid reference:	SP 612 103
Local Authority district/unitary Authority:	Buckinghamshire County Council, Oxfordshire County Council

Areas for approval

	Conifer	Broadleaf
Clear fell	27	
Regeneration felling under a selection system (removing all conifer in 1 operation)	10	
Regeneration felling under a shelterwood system	68	66
Coppice		22
New planting (complete appendix 4)	N/A	N/A

1. I apply for Forest Design Plan approval*/~~amendment approval~~* for the property described above and in the enclosed Forest Design Plan.
2. ~~I apply for an opinion under the terms of the Environmental Impact Assessment (Forestry) (England & Wales) Regulations 1999 for afforestation*/deforestation*/roads*/quarries* as detailed in my application.~~
3. I confirm that the pre consultation, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included. Where it has not been possible to resolve specific issues associated with the plan to the satisfaction of consultees, this is highlighted in the Consultation Record.
4. I confirm that the proposals contained in this plan comply with the UK Forestry Standard.
5. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

 Signed
 Forest Management Director

East England FD

Date.....

Date approval ends.....

*delete as appropriate

 Signed
 Area Director

East & East Midlands Area

Date of approval.....

I seek approval to clear fell 27ha of the Public Forest Estate (this is the area in yellow, green and orange stripe fell periods—i.e. 2017-2031). Restock will be through natural regeneration of native broadleaf, with supplementary planting carried out if required.

In addition to the above felling 359ha will be managed using lower impact silvicultural systems (LISS) including regeneration and selective felling. This will be done through the removal of single and small groups of trees, removing no more than 40% of the stems within any single management unit/compartments over the approved plan period. This operation is aimed at:

- Encouraging initial seeding
- Provision of sufficient light to boost growth of understorey and ground flora
- Allowing adequate space for the development of crowns and stem form for quality timber and to accelerate individual tree growth.

Restock will be through natural regeneration of native broadleaf, with supplementary planting carried out if required to improve age structure and species diversity.

A further 22ha will be managed as LISS through coppice areas.

Date of commencement of the plan:

Expiry Date:

Mid-Term Review Date:

11. Glossary of Terms

Biological Diversity

The richness and variety of wildlife and habitats.

Canopy

The mass of foliage and branches formed collectively by the crowns of trees.

Compartments

Permanent management units of land within a forest, further divided into sub-compartments. The compartment boundary usually coincides with a road or ride.

County Wildlife Sites (also SINC and LNR)

A non-statutory designation, recognising a site's local importance for nature conservation. These sites are identified by the Local Authority and should be taken account of in planning.

Coupes

Areas of forest that have been or will be managed together.

Cubic metre

A standard forestry unit of timber volume. A cubic metre is roughly equivalent to a tonne of timber.

England Forestry Strategy (now England's Trees Woodlands and Forests)

Describes how the Government will deliver its forestry policies in England and sets out the Government's priorities for the next five to ten years.

Favourable condition

English Nature's definition for an SSSI in its intended state.

Forestry Commission Guidelines

Outline the principles and standards of good management practices in forests and woodlands to enable landowners, land managers and their advisors to satisfy Forestry Commission policy.

GIS

Geographic Information System - computer program that enables the FC to hold and display all the district's inventory, landholding and crop information. All the maps in this document have been produced using GIS.

GPS

Global Positioning System, which uses information from satellites to accurately locate a position on the Earth.

Historic Environment

These are the physical remains of every period of human development from 1 million years ago and include artefacts, earthworks, buried remains, structures and buildings.

Historic Environment Action Plan (HEAP)

Sets out the requirements for the sustainable management of all historic environment sites.

Historic Environment Record (HER)

The definitive database of all known Historic Environment remains which is managed by the County Archaeology Service.

LiDAR

Light detection and ranging is a method of surveying landscapes. Flights over the landscape send down laser pulses to the ground and the time taken to reflect back builds a picture of the relative height of the land and vegetation. For more information visit www.breakingnewground.org.uk.

National vegetation Classification

The key common standard developed for country nature conservation agencies to produce a comprehensive classification and description of the plant communities of Britain. Each are systematically named and arranged and with standardised descriptions for each.

Native woodland

Woodland containing tree and shrub species which colonised Britain unaided by the influence of man after the last Ice Age.

Natural regeneration

The growth of trees from seed found in the soil or cast from adjacent trees and shrubs.

Non-native species

Trees and shrubs that have been introduced to the UK by the activities of man. Also used to describe species not native to the site and locality.

Operational Site Assessment (OSA)

Detailed site plans that are prepared in advance of all major forest operations and identify site constraints, opportunities and areas requiring special treatment or protection.

Red Data Book species

Species that are included on Red Data lists published by the Joint Nature Conservation Committee (JNCC). The lists are based on a global system developed by the International Union for Conservation of Nature and Natural resources (IUCN) for classifying species according to their extinction risk.

Restocking

The re-establishment of trees where felling has taken place. Restocking may be achieved through natural regeneration but as a term, it is more usually associated with replanting.

Ride

Forestry term for unsurfaced roads, paths and tracks within a woodland.

Rotation

The period, in years, that a 'crop' of trees take to reach economic maturity e.g. Scots Pine may be grown on a 80 year rotation.

Scheduled Monuments

Nationally important archaeological sites which are protected under the Ancient Monuments and Archaeological Areas Act, 1979.

Semi-natural woodland

A woodland predominantly composed of trees and shrubs that are native to the site and are not obviously planted.

SPA

Special Protection Area designated under the European Habitats Directive (Council Directive 92/43/EEC).

SSSI

Site of Special Scientific Interest—this designation is determined by Natural England and placed on areas of very high conservation value.

Strategic Plan

Serves as a guide to the management of woodlands within South East England Forest District. It divides the district into zones for the purpose of management and ensures that forestry activities reflect the local ecological, social and cultural individuality of woodland. Strategic objectives for each zone are presented within the context of the Government's strategic priorities for forestry in England (e.g. forestry for rural development; forestry for economic regeneration; forestry for recreation, access and tourism and forestry for the environment and conservation).

Sub-compartments

Areas of forest comprising a more or less homogeneous crop in terms of age, species composition and condition. Their boundaries may change as the forest develops after felling and restocking.

Succession

Applied to the natural sequence of species change on a site over time, or more simply, the following on of one thing after another. So successional open space is the open space and the plants associated with it, that persist for a short time after felling of trees.

UK Forestry Standard

The Government's criteria and standards for the sustainable management of forests in the UK.

UK Woodland Assurance Scheme (UKWAS)

A voluntary scheme for the independent assessment of forest management in the UK. The Scheme has been developed by a partnership of forestry and environmental organisations in response to the growing consumer demand for timber products from sustainably managed forests. It has been designed to ensure that it reflects the requirements of both the Government's UK Forestry Standard - and through this the guidelines adopted by European Forestry Ministers at Helsinki in 1993 - and the Forest Stewardship Council's (FSC's) GB Standard.

Veteran tree

A tree that is of interest biologically, aesthetically or culturally because of its age, or a tree that is in the ancient stage of its life, or a tree that is old relative to others of the same species.

Windthrow (or sometimes windblow)

Uprooting or breakage of trees caused by strong winds.

Yield Class

Yield class is a measure of the growth rate of a tree crop and is the maximum average rate of volume increment (increase) that a particular crop can achieve. For example, a crop capable of a maximum annual increment of 14 m³ per hectare has a yield class of 14.

12. Management Prescriptions

(Ref: Management Map)

Clearfelling

All the trees are felled across the site or 'coupe' with the timber part of the tree extracted to the forest road where it is taken away by lorry. The smaller branches and tops are left on site where they may be chipped, mulched or raked in to rows so that enough bare ground is available to plant the next rotation of young trees. Any felling over 0.25ha is defined as a clear fell.

Thinning

This is an important part of the management as nearly all the trees planted in the forest will require thinning at some point. Thinning performs three separate functions; removing small, dying or diseased trees; providing space for the dominant trees to continue growing; provide a small economic return in advance of clearfelling. Thinning is a continual process that works around the forest on a 5-7 year cycle.

Lower impact silvicultural systems (LISS)

This is also known as Continuous Cover Forestry and includes a suite of silvicultural systems where species, sites, wind risk, tree health risk and management objectives allow a range of silvicultural approaches. These include group selection, shelterwood or underplanting, small coupe felling, coppice or coppice with standards, minimum intervention and single tree selection systems.

The majority of these systems are based on thinning the crop on a regular cycle and removing a proportion of the trees thereby making space for seeds to germinate and new saplings to grow and fill the resulting space. In the plan this management includes selective felling and regeneration felling.

LISS is often used in areas of high public access to maintain the visual impact of large mature trees for their aesthetic value. It is also a suitable management system on sites where establishment of trees would be difficult if the site were to be clear felled, due to mammal damage or poor soil quality. LISS is also used to manage most of the broadleaf crops and all the mature conifer crops in areas of high conservation value as these trees often provide important nesting habitat.

Coppicing

An area of woodland in which trees or shrubs are periodically cut back to ground level to stimulate growth and provide wood products.

Open space

Temporary open space follows felling when coupes are prepared for planting or to encourage natural regeneration. It is also created through coppicing.

Permanent open space will be centred on conservation and heritage sites—see open space on page 16.

Long Term Retention

In some areas trees are retained beyond their normal clearfell age to provide non-timber benefits such as bat roosts, raptor nests and landscape interest. Generally, these are thinned to encourage large crowned stable trees.

Minimum Intervention

No systematic felling or planting of trees. Operations normally permitted are fencing, control of exotic plant species and vertebrate pests, maintenance of paths and rides and tree safety works.

Natural Reserves

Predominantly wooded, permanently identified and in locations of particularly high wild-life interest or potential. They are managed by minimum intervention unless alternative management has higher conservation or biodiversity value.

13. Tolerance Table

	Adjustment to felling coupe boundaries	Swapping of felling coupes	Adjustment to felling operation	Clearance of standing trees associated with wind-blown areas	Timing of restocking (including natural regen)	Species choice	Tree health
Formal approval by area team required.	> 25% of the coupe area	Where changes to the felling sequence is likely to result in a significant breach ^[1] of the UKFS adjacency rules	Thinning to selective felling or clear felling	Clearance of > 1ha or 10% of the area (whichever is less) in sensitive areas ^[2] , > 5ha or 25% of area (whichever is less) in non-sensitive areas.	Where this is > 4 planting seasons from the date of felling.	From mixed, predominantly broadleaves to evergreen conifer.	Where no SPHN issued and felling required.
Written approval only required from area team.	Between 10-25% of the coupe area	Where changes to the felling sequence is likely to result in a minor breach ^[3] of the UKFS adjacency rules			Where this is at least 2 but no more than 4 planting seasons from the date of felling.	Deciduous conifers to evergreen.	Thinning > 50% but <65%
Formal approval by area team not required.	<10% of the coupe area	Where changes to the felling sequence does not result in a breach of the UKFS adjacency rules.	Clear felling to selective felling or thinning	Clearance of < 1ha or 10% of the area (whichever is greater) in sensitive areas, < 5ha or 25% of the area (whichever is greater) in non-sensitive areas.	Where this is < 2 planting seasons from the date of felling.	Any other changes.	Where SPHN is issued or thinning up to 50%

[1] Greater than 20% or more of the coupe boundary

[2] Definition of sensitive areas is as per the EIA guidance

[3] 20% or less of the coupe boundary

Appendices:




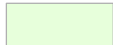

- 1. Ride management maps including grass and scrub cutting regimes.**
- 2. Ecological interest areas map.**
- 3. Ancient woodland area and semi natural score maps.**
- 4. SSSI management objectives.**

Appendix 1: Ride management maps including grass and scrub cutting regimes.

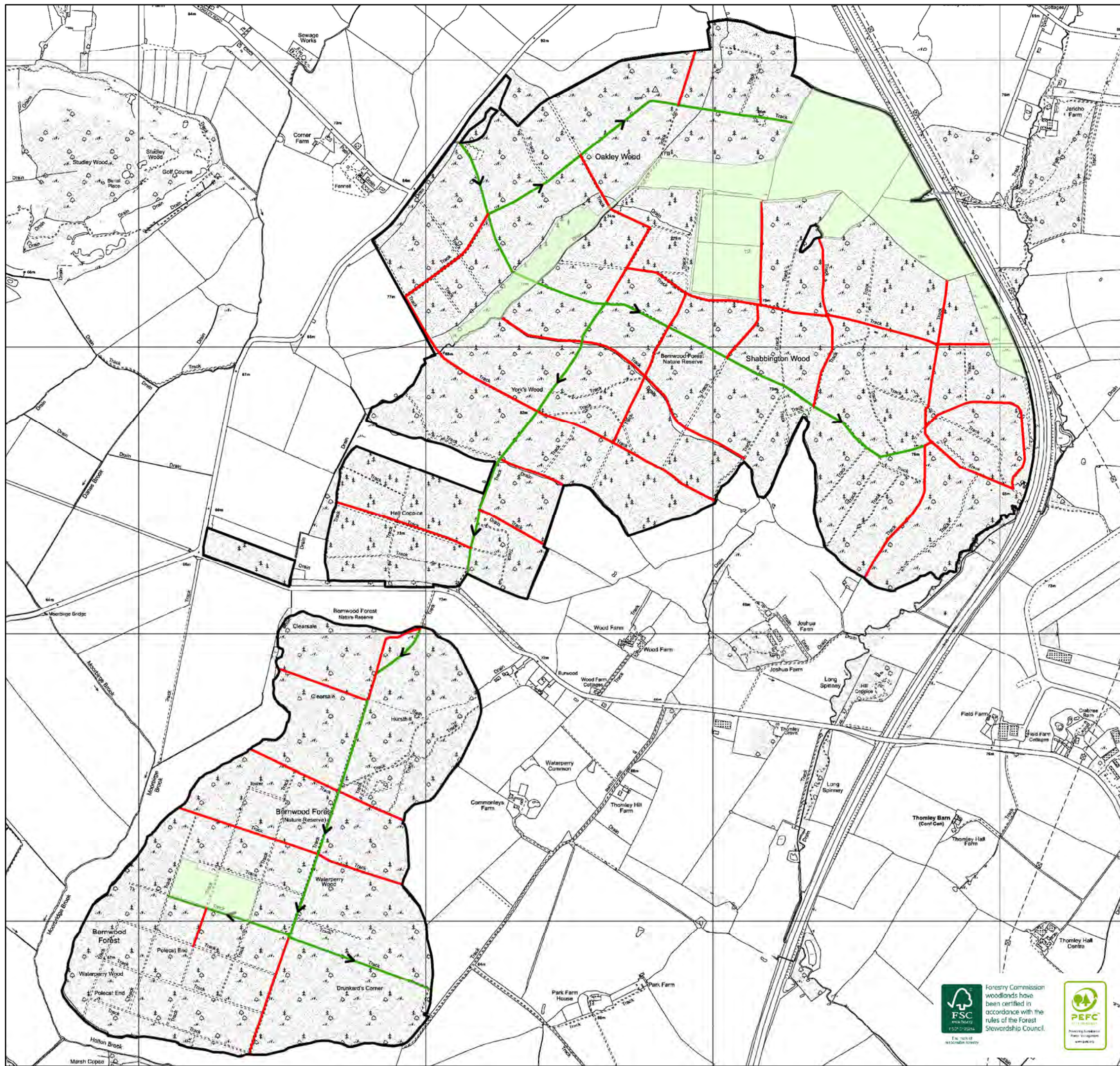
Rideside grass cutting map

Illustrates the timing of grass cutting operations

Legend

-  Annual cut of centre and both sides of ride
-  Annual cut of centre and alternate sides of ride
-  Direction of travel for cutting alternate rides. Left side cut in odd years and right side cut in even years.
-  Permanent open space. Annual cut to extend into these areas.
-  Management Area



Print in colour



Rideside grass cutting map

Illustrates the timing of grass cutting operations

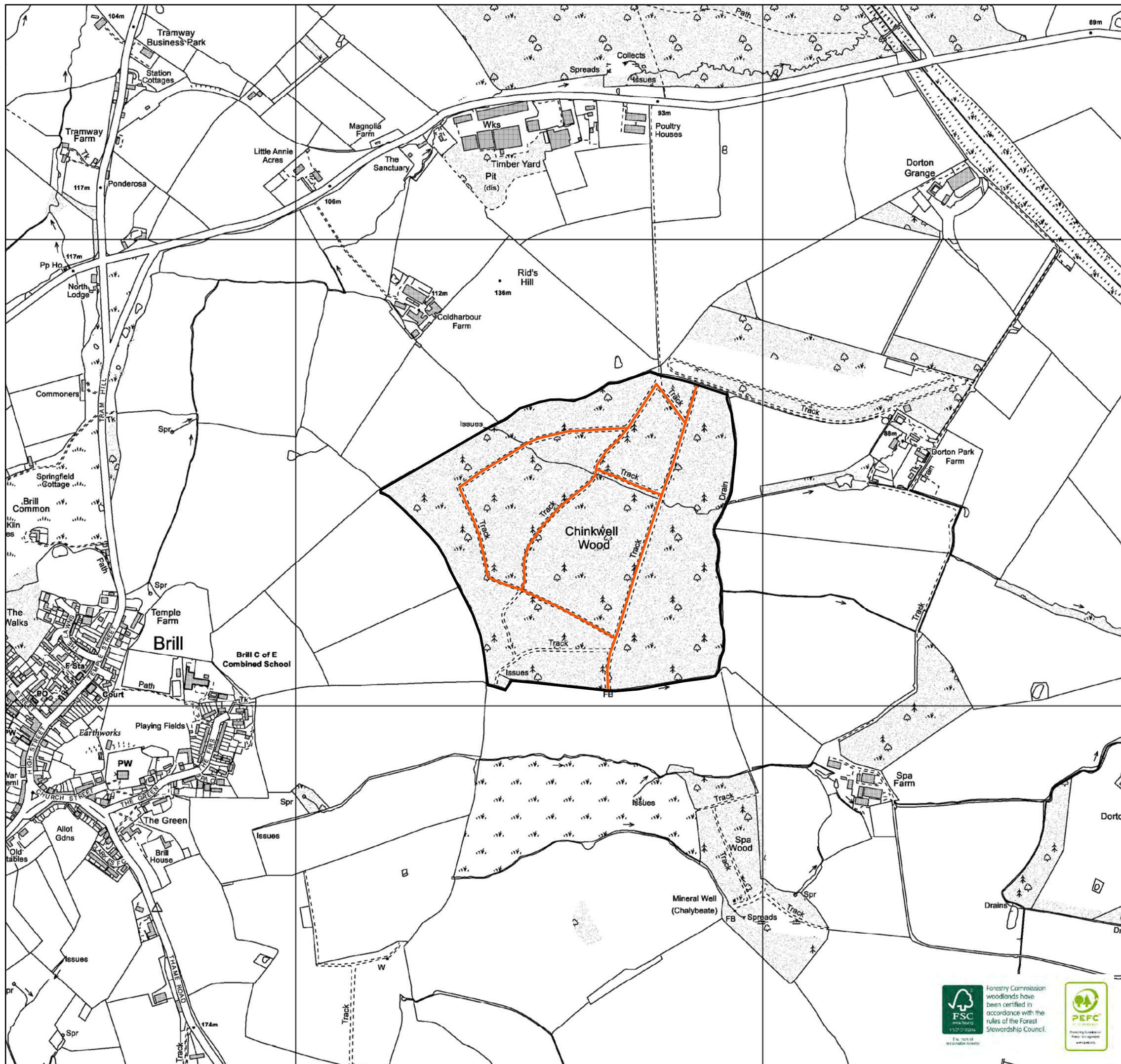
Legend

-  Annual cut of centre and both sides of ride
-  Management Area

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November 2018






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Rideside scrub cutting map

Illustrates the timing of scrub cutting operations

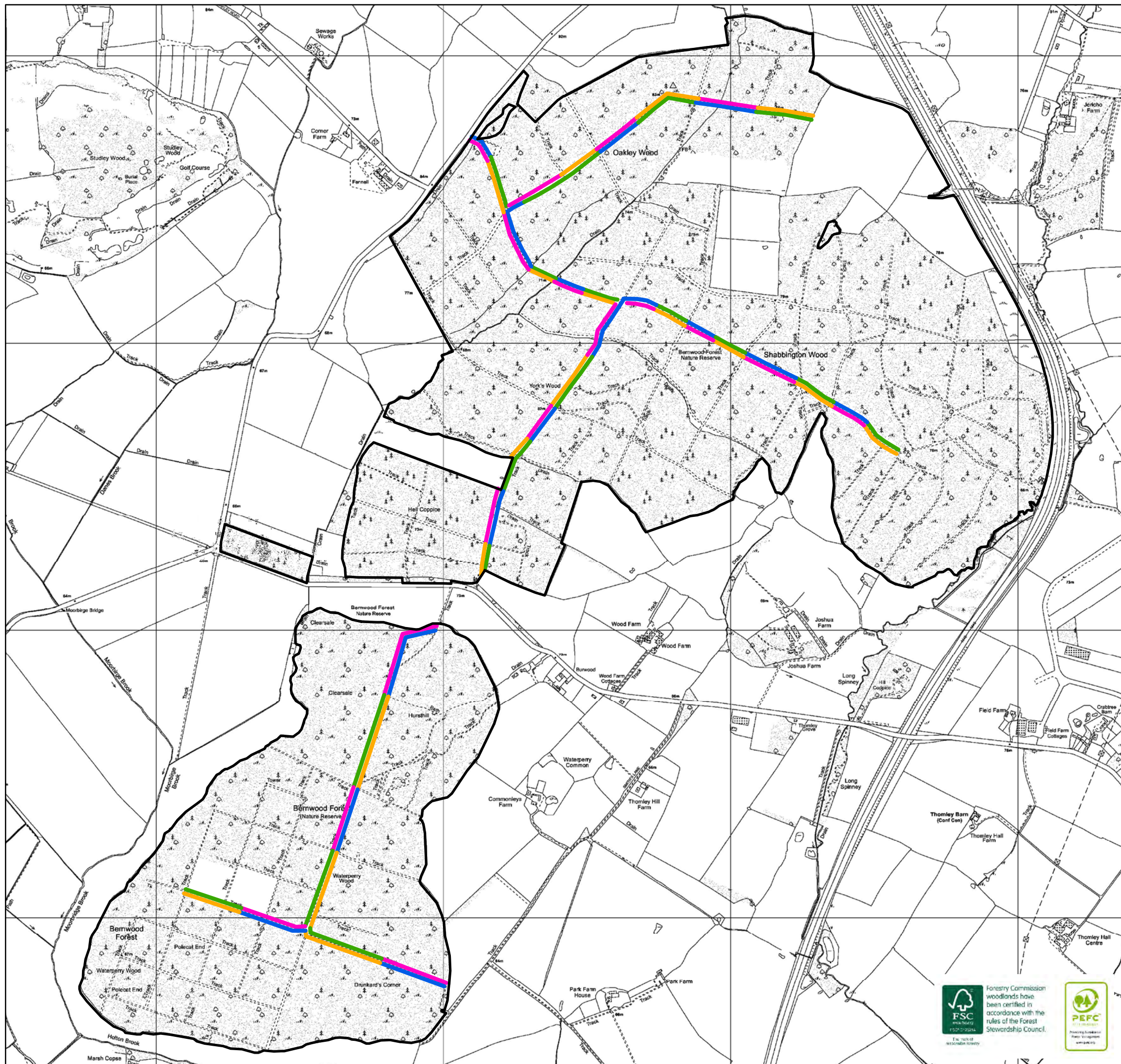
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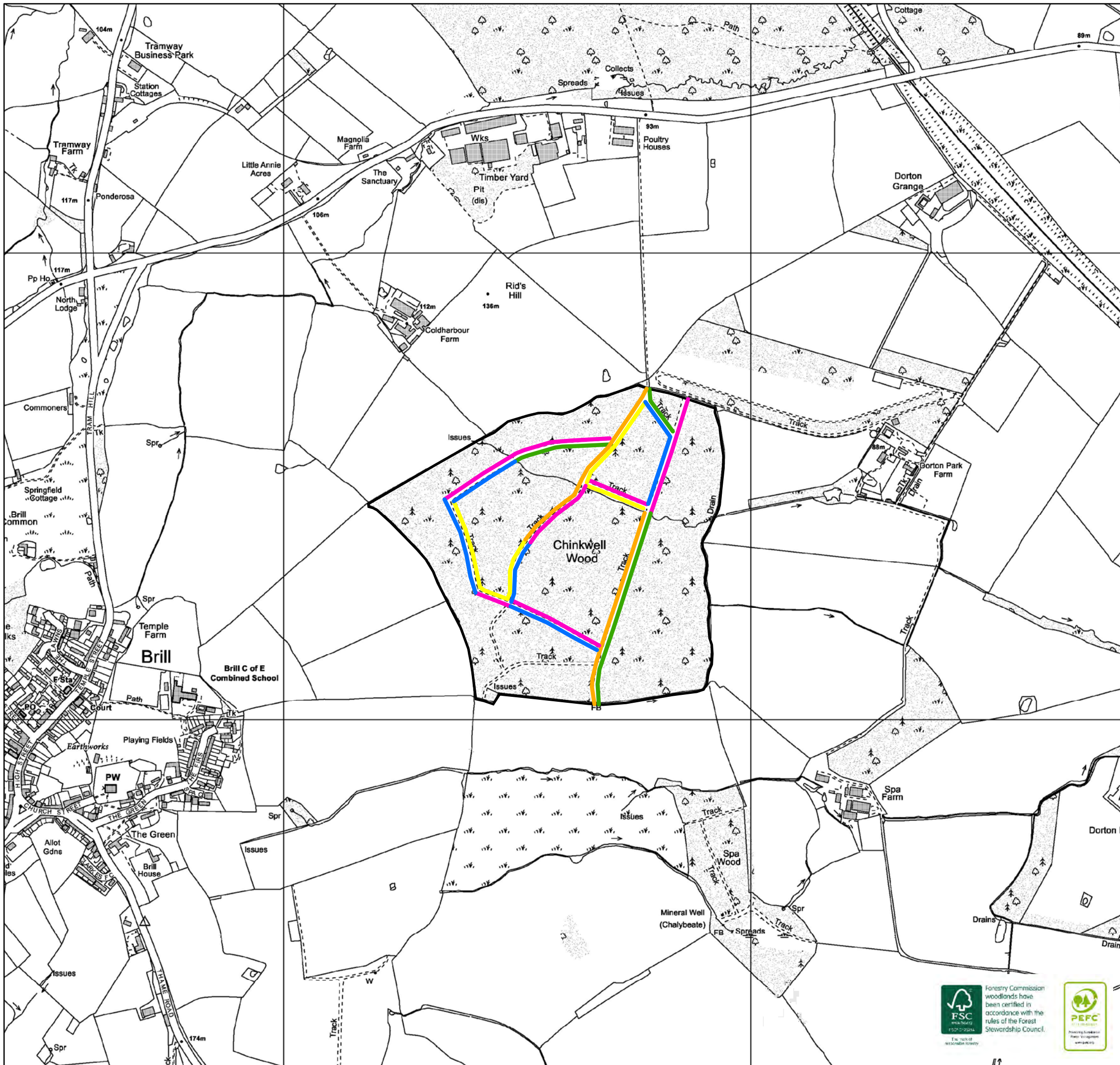
-  Cut rideside scrub in year 1
-  Cut rideside scrub in year 2
-  Cut rideside scrub in year 3
-  Cut rideside scrub in year 4
-  Management Area

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East England Forest District

Chinkwell

Scale: 1:8,000

Rideside scrub cutting map

Illustrates the timing of scrub cutting operations

Legend

- Cut rideside scrub in year 1
- Cut rideside scrub in year 2
- Cut rideside scrub in year 3
- Cut rideside scrub in year 4
- Cut rideside scrub in year 5
- Management Area

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Appendix 2: Areas of ecological interest map.

Areas of ecological interest

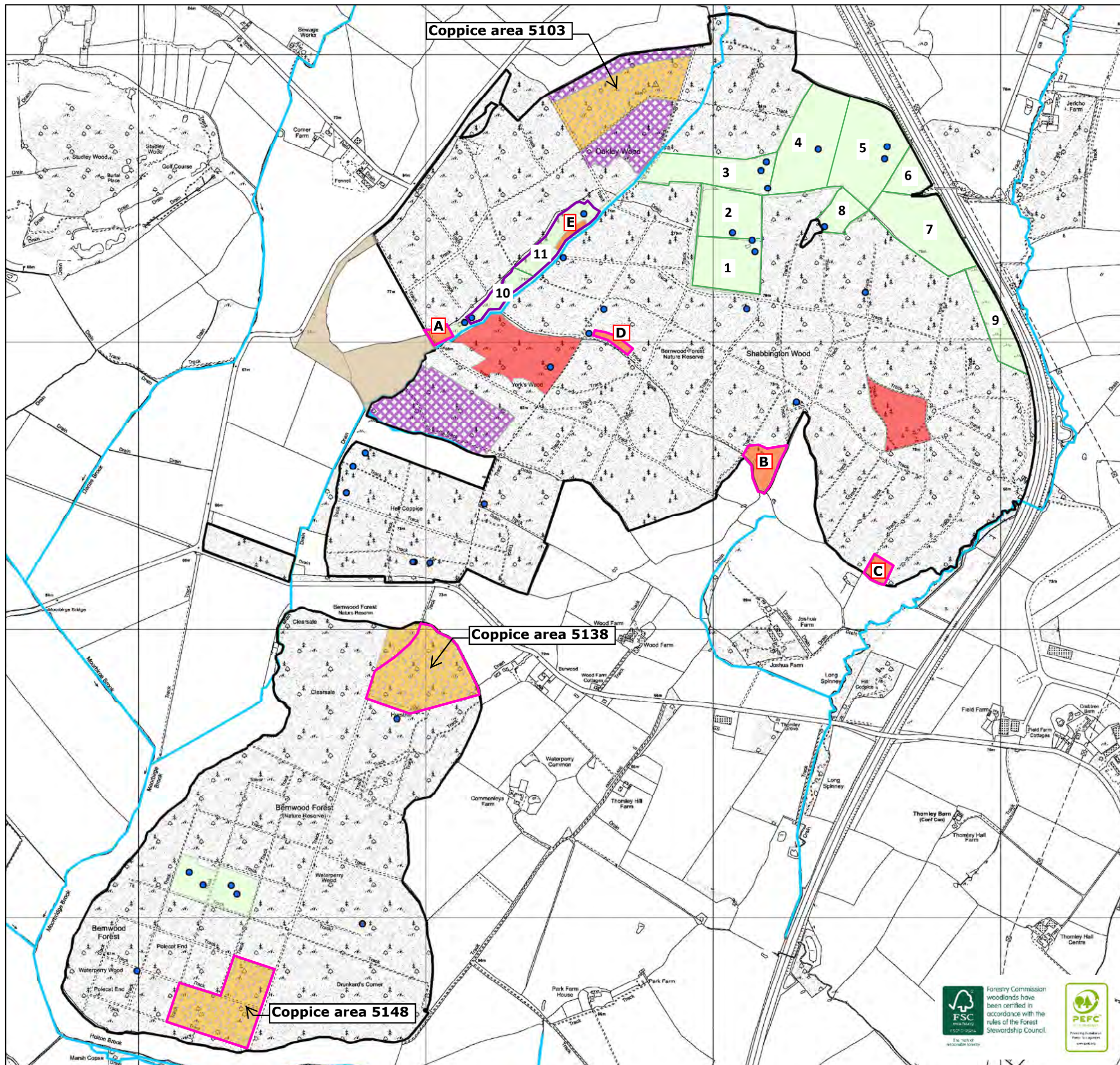
Legend

-  Management Area
-  BBOWT reserve
-  Ecological areas
-  Permanent open space
-  Coppice
-  Natural Reserve
-  Long term retention
-  Water courses
-  Deer fence
-  Stock fence
-  Ponds

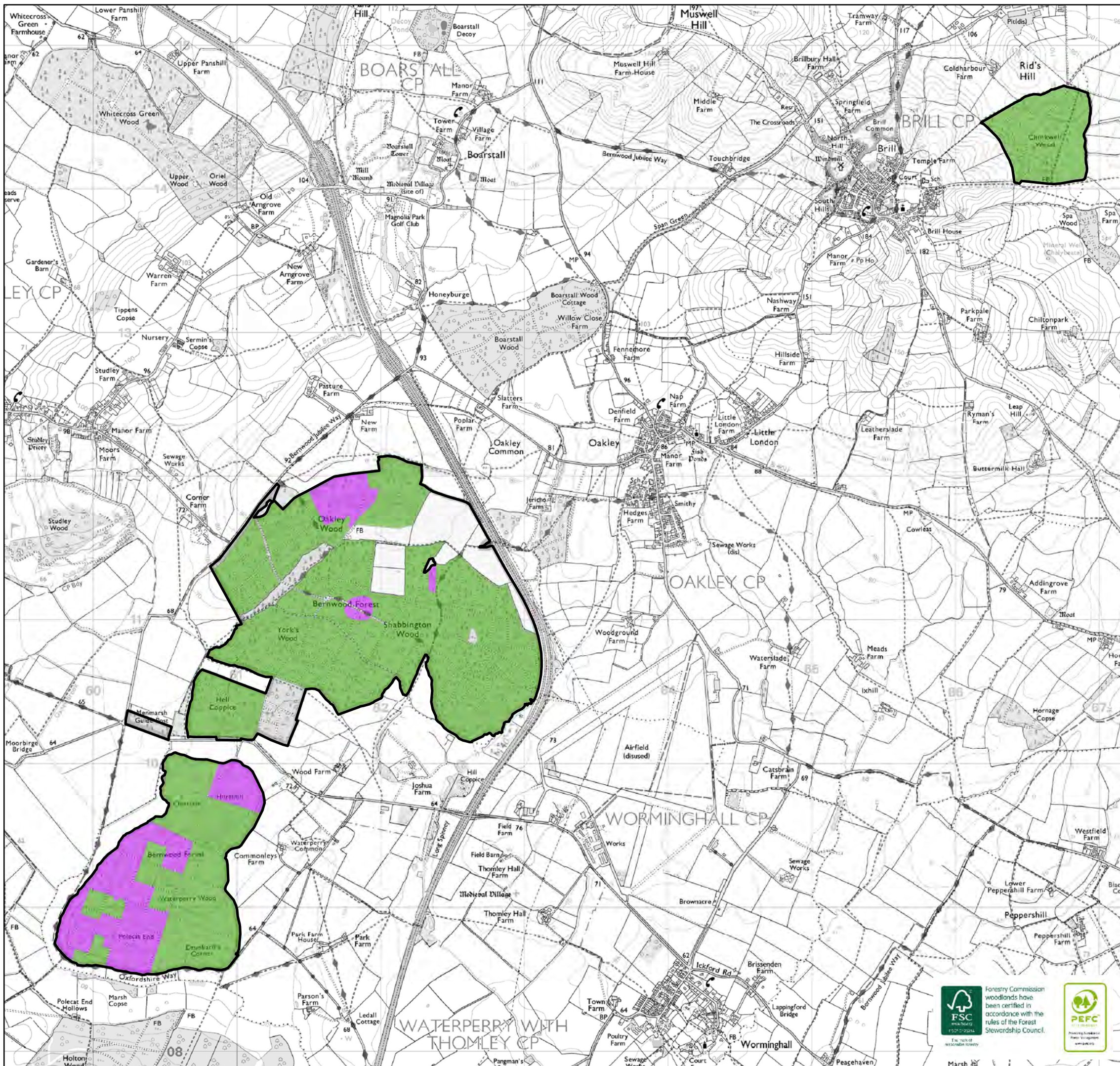
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Appendix 3: Ancient woodland area and semi natural score maps.



Forestry Commission
England

East England Forest District



Bernwood Forest

Scale: 1:26,000

Ancient Woodland Map

Illustrates areas of ASNW and PAWS in
Shabbington, Waterperry and Chinkwell

Legend

-  Ancient Semi Natural Woodland
-  Plantation on Ancient Woodland Site



Forestry Commission
woodlands have
been certified in
accordance with the
rules of the Forest
Stewardship Council.




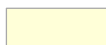
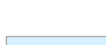
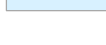


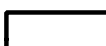
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Shabbington, Waterperry and Chinkwell ancient woodland area and semi-natural scores at 2005.

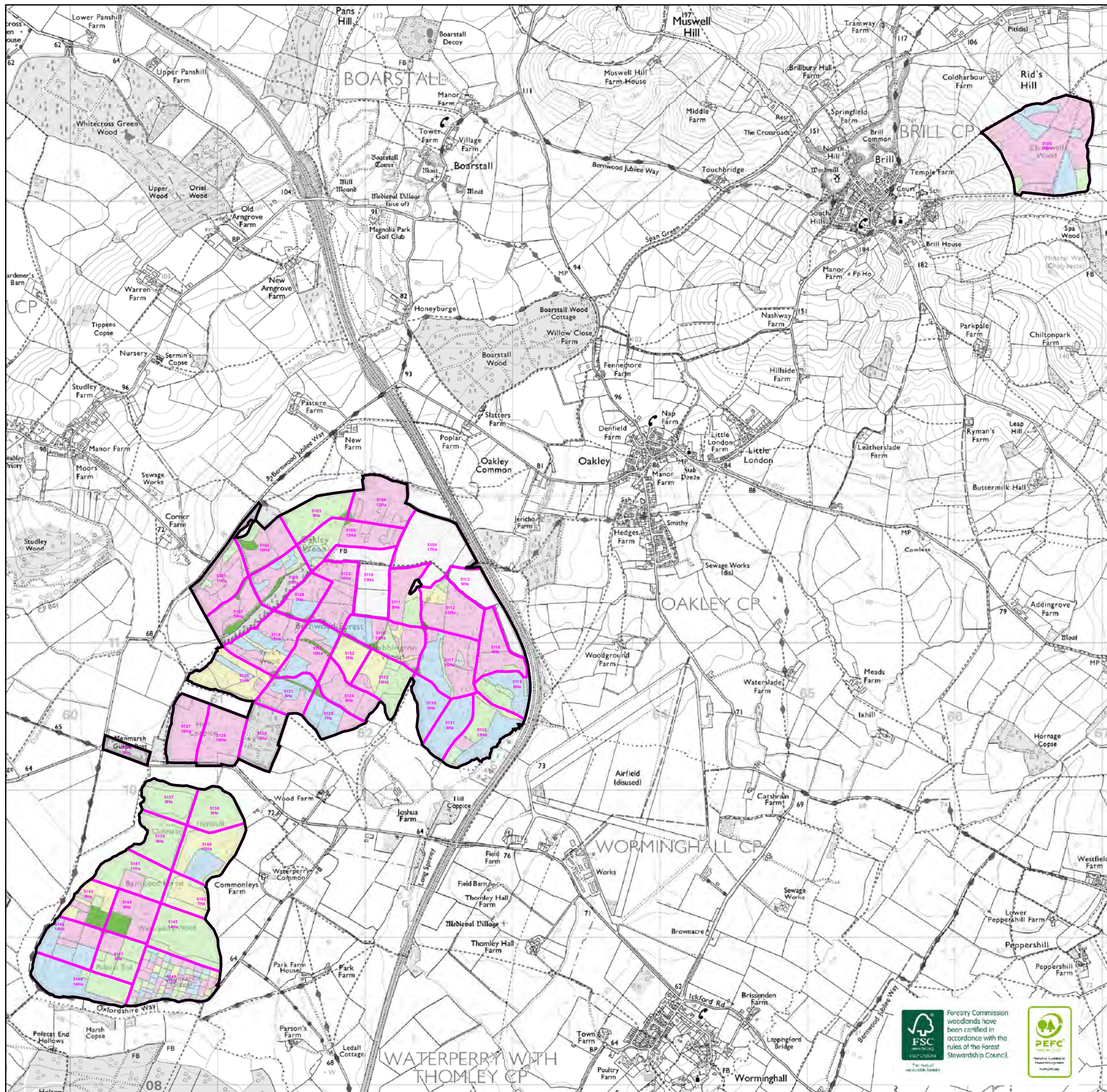
Legend

-  1 - Semi-natural woodland
-  2 - Semi-natural woodland (reasserting more than 50% site native tree species)
-  3 - Plantation - 20-50% native tree species
-  4 - Plantation - less than 20% intruding native tree species
-  Open space
-  Management Area
-  Compartments

Print in colour



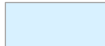




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November 2018

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Shabbington, Waterperry and Chinkwell ancient woodland area and semi-natural scores at 2017.

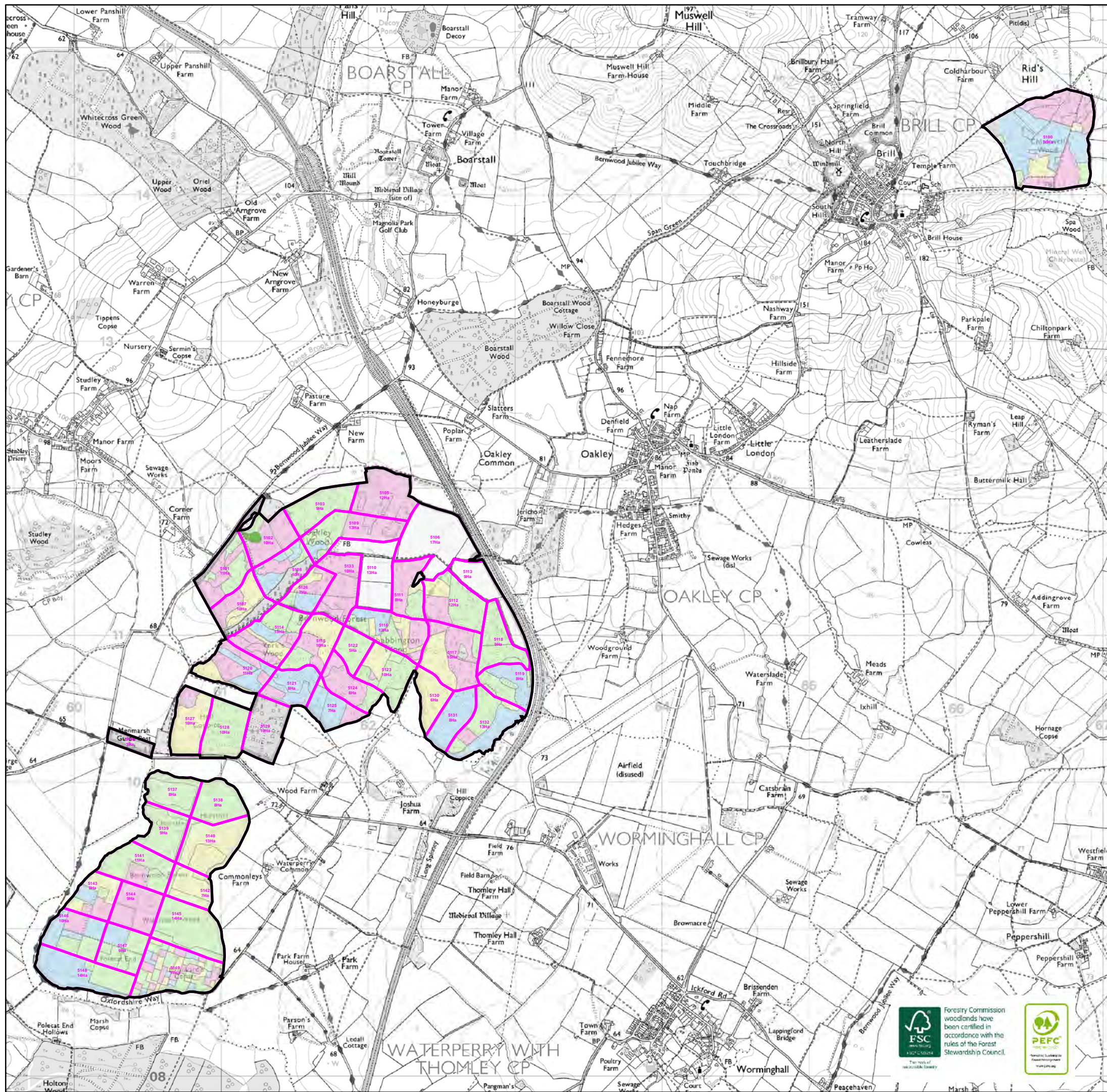
Legend

-  1 - Semi-natural woodland
-  2 - Semi-natural woodland (reasserting) more than 50% site native tree species
-  3 - Plantation - 20-50% native tree species
-  4 - Plantation - less than 20% intruding native tree species
-  Open space
-  Management Area
-  Compartments

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Forestry Commission woodlands have been certified in accordance with the rules of the Forest Stewardship Council.

Appendix 4: SSSI management objectives.

The table below identifies the objectives agreed between Natural England and the Forestry Commission to maintain and improve Shabbington and Waterperry SSSI's. It should be noted that some objectives are long term and will run beyond the lifetime of the approved forest plan.

Shabbington wood SSSI

Designated Features	Targets	FP Management Actions
Broadleaved mixed and yew woodland 140.2ha estimated A key feature of this site is that a high proportion of the woodland should be at early growth stage, ride margin, open space or coppice. There should be no reduction in the extent of remaining areas of W10 woodland.	No reduction in the extent of the area of ASNW	PAWs restoration
	No decline in area considered semi-natural	PAWs restoration
	At least 65% of the woodland canopy composition should contain at least 95% broadleaved species	PAWs restoration
	Canopy composition referable to W10	PAWs restoration
	Understory (2-5m) present over >30% of stand area	Thinning and Felling operations. Deer management. Promoting natural regeneration
Black hairstreak (<i>Strymondiia pruni</i>)	No more than 25% reduction in extent of core habitat, i.e. blackthorn scrub and ride edge in suitable condition.	Ride management. Project proposal - Blackthorn hedge network restoration and management.
Brown hairstreak (<i>Thecula betulae</i>)	No more than 25% reduction in extent of core habitat, i.e. blackthorn scrub and ride edge in suitable condition.	Ride management. Project proposal - Blackthorn hedge network restoration and management.
Invertebrate Assemblage	Specialist survey of relevant habitats - soil surfaces, herb layer, scrub layer, understory and canopy	Ride Management. Open space habitat management Thinning and Felling operations. Deer management . Promoting natural regeneration

Waterperry wood SSSI

Designated Features	Targets	FP Management Actions
Broadleaved mixed and yew woodland 140.2ha estimated A key feature of this site is that a high proportion of the woodland should be at early growth stage, ride margin, open space or coppice. There should be no reduction in the extent of remaining areas of W10 woodland.	No reduction in the extent of the area of ASNW	PAWs restoration
	No decline in area considered semi-natural	PAWs restoration
	At least 65% of woodland canopy composition should contain at least 95% broadleaf species	PAWs restoration
	Canopy composition referable to W10	PAWs restoration
	Understory (2-5m) present over >30% of stand area	Thinning and Felling operations. Deer management. Promoting natural regeneration
Black hairstreak (<i>Strymondiia pruni</i>)	No more than 25% reduction in extent of core habitat, i.e. blackthorn scrub and ride edge in suitable condition	Ride management. Project proposal - Blackthorn hedge network restoration and management
Purple Emperor <i>Apatura iris</i>	No more than 25% reduction in extent of core habitat, i.e. blackthorn scrub and ride edge in suitable condition	Ride Management. Thinning and Felling operations. Deer management. Promoting natural regeneration
Invertebrate Assemblage	Specialist survey of relevant habitats - soil surfaces, herb layer, scrub layer, understory and canopy	Ride Management. Open space habitat management Thinning and Felling operations. Deer management . Promoting natural regeneration