

## **Yorkshire Forest District**

### **Boltby Forest Plan**

**FDP 36**

**2015**

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**Boltby****632.1 Hectares****Period of Plan: 2015 - 2024****1. Background**

Boltby Forest is part of a network of forests managed by Forest Enterprise (FE), Yorkshire Forest District, located within the Cleveland Beat. It is situated approximately 8 kilometres north-east of Thirsk within the south-west corner of the North York Moors National Park.

The land was initially acquired by the Forestry Commission between 1928 and 1974 and shortly afterwards started establishing the forest over the majority of the land, previously managed as rough pasture and moorland. A proportion of the land at Southwoods was already established with broadleaved woodland.

This is a freehold property.

**2. Describing the Site****2.1 Geology and Soils (FP Map 01)**

Underlying geology is predominantly sedimentary sandstone, siltstone, and mudstone of predominantly but not exclusively the Long Nab Member, formed in the mid-Jurassic period. Outcrops of mudstone, calcareous grit and limestone formed in the late-Jurassic period occur along the upper margins of the main block.

The soils at Boltby are influenced by deltaic and estuarine clays resulting in typical surface water gleys dominating the forest with ironpan and podzolic soils associated with geology along the upper boundary. Brown earth soil types occur in Gurtof Wood and parts of Southwoods. Based on Forest Research Ecological Site Classification, soils range between very moist to slightly dry moisture regime and an overall poor nutrient status which impacts on the range of 'suitable' species that can be considered for planting/restocking.

**2.2 Tree Species (FP Map - 02)**

Sitka spruce is the dominant species accounting for 32% of the planted area closely followed by Scots pine at 16% and birch at 12%. Overall, evergreen conifers make up 54% of the planted area, deciduous larch species 7% and 19% broadleaf species.

Open Ground accounts for 15% of the land at Boltby, comprised of land currently felled awaiting regeneration, permanent open space and a small proportion of tenanted agricultural land.

The forest has benefited from a phased programme of felling and restocking, developing a reasonable range of structural diversity (1850 to present day) across the block as shown on FP Map 03.

### **2.3 Wind Damage (FP Map – 04)**

The windthrow hazard classification suggests a forest of two parts. To be expected the lower more sheltered sites range between hazard class 1 and 2 where thinning regimes are relatively unconstrained, although significantly delayed thinning in the past has led to windblow. Approximately two thirds of the forest is in the intermediate hazard classes 3 and 4 where thinning options can be more limiting and particular care needs to be taken over the timing, pattern and intensity of thinning to avoid precipitating the onset of serious windthrow.

### **2.4 Landscape (Photographic montage)**

The forest is situated in the 'Upland Western Fringe' landscape character area<sup>1</sup> in the south-west of the North York Moors National Park and is planted on a steeply graded escarpment forming an outward looking transition landscape between limestone uplands of the Hambleton Hills and lowlands of the Vale of York/Vale of Pickering to the west and south west. The upper margins extend over on to the moor tops.

The forest is prominent within the local landscape, particularly when viewed from nearby settlements such as Boltby and Thirlby. The Cleveland Way runs along the escarpment top and skirts along parts of the upper margins of the main forest block and Southwoods. Recent felling allows long-distance views south and west across the Vale of Mowbray and towards the Yorkshire Dales.

At the start of the previous plan (2001), the forest was largely coniferous in nature with 74% conifer planting, 15% broadleaf species and 11% temporary and permanent open space. Although still predominantly coniferous, there have been increases in broadleaf cover to 19% and 15% open space. The latter does not include land currently felled awaiting regeneration. The majority of open space in Boltby is temporal and over time will regenerate with predominantly broadleaf species such as birch and ash. The increase in broadleaf cover can be attributed in part to the restoration of conifer Plantations on Ancient Woodland Sites (PAWS) to site-native broadleaf species, and second-rotation conifer stands have a greater proportion of birch regeneration and open space within them. Consequently, the increase in species and structural diversification is having a positive impact on the forests contribution across the landscape.

## 2.5 People and Community (FP Map – 05)

There is no formal provision for recreation across the block although it is dedicated as Open Access land through the Countryside Rights of Way Act (2000). This is a popular forest for residents of nearby settlements for recreational walking and dog walking with visitors seen on most days. The Cleveland Way runs along the eastern fringe of the forest and links with other public rights of way where walkers and horse riders making regular use of the network of forest roads and rides.

The Forest District hosts a number of car and motorbike rallies throughout the calendar year during which a number of stages utilise Boltby Forest.

Although these are freehold woods, there is limited potential to develop recreational use for people and businesses where these do not conflict with the plans aims and objectives.

## 2.6 Natural Heritage (FP Map – 05)

Boltby Forest is important for a wide range of flora, fauna and bio-diverse habitats. Statutory sites within the forest include Lake Gormire Special Scientific Interest (SSSI), the only natural lake in the Park. Adjacent to parts of the forest is the North York Moors SSSI, SAC and SPA. The details for which these sites are designated can be found at; <http://www.sssi.naturalengland.org.uk>

Ancient woodland, particularly conifer PAWS are important at Boltby, accounting for 13% of the woodland area. The previous plan recognised this and the benefit of restoring these and other sites to support site-native broadleaf species with felling and thinning work being carried out across 32 hectares of secondary plantation and PAWS woodland. Particular progress is being made in Boltby Southwoods.

The forest is home to a wide range of international, national and regionally important species: Schedule 1 birds of prey and Nightjar, several species of declining woodland birds including Redstart, Tree pipit and Woodcock (see Appendix 2), and the Agent and Sable, a locally and nationally scarce moth.

A network of streams, water courses and drains pass through the forest, supporting an increasing area of riparian habitat. These sites typically support a more diverse woodland structure where native broadleaf tree species and ground flora can naturally regenerate.

## 2.7 Cultural Heritage (FP Map 05)

The forest boundary lies adjacent to several scheduled monument sites with Boltby Scar promontory fort and barrow system straddling the boundary between woodland and the adjacent arable fields. Features range between prehistoric boundary systems and Bronze Age burial sites.

## 3. Describing the Project

### 3.1 Project Brief

- manage natural and cultural heritage sites in accordance with their requirements as per agreed management plans,
- consider the selection of alternative main tree species that will contribute toward a greater range of species diversity to maintain or increase timber productivity and increase resilience to plant health and biosecurity threats,
- increase the diversity of the age structure by use of appropriate silvicultural systems.

### 3.2 Objectives

#### Environmental

- Maintain and improve the cultural and heritage value of these woods, to be measured by Natural England, Historic England, Non-Government Organisations and FC systems accordingly.
- Improve the resilience and adaptation to climate change, pests and diseases of the natural environment.

#### Social

- Encourage communities to become involved across these woods, its management and direction through consultation in planning and participation in volunteering.

#### Economic

- Maintain the land within our stewardship under UKWAS certification, to be measured by independent surveillance audits.
- Improve the economic resilience of these woods from a more diverse range of site appropriate conifer and broadleaf species, to be measured by the Production Forecast and Sales Recording Package.

### 3.3 Constraints

- Potential forest health issues on pine (*Dothistroma*), larch (*Phytophthora*) and spruce (*Dendroctonus* and *Elatobium*).
- The retention of windfirm conifer stands on extended rotations that will allow the development of continuous cover forestry systems to facilitate species and structural diversity.
- Challenges of managing expectations for public access across the forest.

## 3.4 Implementation

### 3.4.1 Conservation

Protect and, where appropriate, enhance all known sites of archaeological and ecological importance:

#### Archaeological sites

All sites, regardless of their designation, will receive the same level of care during the planning and execution of forest operations. The operational planning system will ensure they are recognised and the proper measures for their protection are in place before work begins. This planning system also ensures that, where possible, opportunities to enhance the condition of archaeological interest are taken during routine forest work. For Boltby this will include:

- Maintain designated sites (Scheduled Ancient Monuments) in favourable condition. Reference will be made to site-specific management plans where these identify particular management issues that need to be addressed.

#### Ecological sites

All work sites are surveyed prior to any operations being carried out, both to audit the accuracy of information already held on record and to identify opportunities to further improve the ecological value of the woodlands. For Boltby this will include:

- Managing Veteran trees and PAWS as set out in – ‘Ancient Woodland on the Forestry Commission Estate in England (March 2002)’ and ‘FEE Operations Instructions No. 3 (rev.2012), Ancient Woodlands’.
- Increase and improve the deadwood resource as set out in – ‘Managing deadwood in forests and woodlands Practice Guide (2012)’. Areas of high ecological value across which deadwood resources could be encouraged include; riparian zones and ancient woodland.
- Increase the diversity of tree species and age structure that will maintain and improve favourable habitats for target species and identified habitats. This is particularly beneficial for the range of habitats and species recorded at Boltby from which a selection has already been mentioned at 2.6 - Natural Heritage.

- A number of watercourses currently identified as moderate or poor status through the Water Framework Directive (WFD) assessment are located downstream of Boltby. Work undertaken through this plan will contribute to their improving condition by replacing existing conifer crops with predominantly broadleaf species where streams and watercourses feed into these. The implementation of continuous cover forestry systems and phasing of felling will avoid significant lengths of watercourse being felled at any one time.

#### Minimum Intervention - Natural Reserves

Natural Reserves are sites that are predominantly woodland which have been set aside where biodiversity is the prime objective. As far as reasonably practicable this is a permanent designation and will be managed on a minimum intervention system.

Through this plan 22.5 hectares are designated Natural Reserve at Garbutt Wood.

#### Long Term Retentions (LTR)

These are stable stands or clumps of trees that are important to retain for landscape or biodiversity reasons and will be retained beyond their economic rotation but still managed under an appropriate silvicultural system i.e. thinning may still be carried out.

Through this plan 66.2 hectares are designated LTR at Boltby Southwoods.

#### Invasive species

There are currently no known invasive species that impact across this plan.

#### 3.4.2 Timber Harvesting

We will continue to sustainably harvest timber from clearfell, group felling and thinnings, and where appropriate develop broadleaf stands to increase their contribution to timber production. These operations will be planned and controlled to ensure due regard for all other objectives of management at Boltby.

#### 3.4.3 Landscape

The woods at Boltby lie within the North York Moors National Park, a designated landscape. Views are varied as the woodland sits in the Upland Western Fringe. The broadly coniferous plantation dominates Boltby Moor and the mixed and developing broadleaf woodland occupy the scarp slope and the incised becks and gills.

On a scale of low/medium/high, landscape sensitivity is considered to range from low to medium depending upon site factors and visibility across the wider landscape.

The forest is dominated by evergreen conifer species, ranging from the late 1920's afforestation to present day restocking. The continuing process of felling and restocking is helping to create a



more varied forest structure and species composition which is evident when viewed externally from public rights of way and internally from forest roads and rides.

Future felling should retain site-appropriate species such as Scots pine, Douglas fir and broadleaf species and diversify overall composition and age structure by felling uniform conifer stands. The adoption of Continuous Cover Forestry (CCF) and smaller-scale felling responding to landform across the forest will contribute toward a more varied and intimate forest landscape.

### 3.5 Plan (FP Map 06)

The design concept map shows the key factors we need to address. These are taken forward and used to form the basis of a practical plan set out in the fell and restock maps.

### 3.6 Areas (FP Maps 08 and 09)

#### 3.6.1 Breakdown of felling areas within the period of the plan.

A map showing the location of felling sites can be found in the Forest Plan folder.

Felling	Area - hectares	% of total area	Projected volume (m <sup>3</sup> )
<b>2016 – 2021 Clearfell</b>	<b>21.0</b>	<b>3.3</b>	<b>6900</b>
<b>2022 – 2025 Clearfell</b>	<b>21.0</b>	<b>3.3</b>	<b>6075</b>
<b>Continuous Cover*</b>	<b>11.5</b>	<b>1.8</b>	<b>3680</b>
<b>Natural Reserve</b>	<b>22.5</b>	<b>3.6</b>	<b>n/a</b>

\* Group/strip felling as part of a CCF shelterwood system.

#### 3.6.2 Breakdown of constituent areas.

A Future Habitat and Species map showing the location and detail of the constituent areas can be found in the Forest Design Plan folder.

Habitat type - (based on principal species established)	Area – hectares		% age of total area	
	2015	2115	2015	2115
<b>Conifer</b>	388.17	265.90	61	42
<b>Broadleaf</b>	119.47	277.30	19	44
<b>Temporal and permanent open ground (inc. felled)</b>	124.40	88.90	20	14

\* The dynamic of temporal open space as described in section 2.4 Landscape will be maintained throughout the lifetime of this plan.

### **3.7 Methods / Forest Operations**

#### 3.7.1 Planning

Before any major forest operations are undertaken an “Operational Site Assessment” is completed. This document details the proposed work and outlines all known environmental, social and operational considerations. The “Operational Site Assessment” then becomes an important reference document during the planning phase, at the pre commencement meeting before scheduled works begin and for supervisory visits during the operation. The “Operational Site Assessment” is kept along with other documents relating to the operation in the main office.

For routine maintenance operations (e.g. fencing, ride mowing, survey work etc.) the Yorkshire District policy on timing of operations to minimise wildlife disturbance will be followed.

#### 3.7.2 Standards

All operations within the forest will be carried out in accordance with the certification standard for the U.K. Woodland Assurance Standard and the U.K Forestry Standard 2011 i.e. Forests and biodiversity, Forests and climate change, Forests and historic environment, Forests and landscape, Forests and people, Forests and soils, Forests and Water.

#### 3.7.3 Harvesting

See 3.4.2. Forestry Commission staff will monitor work through regular site visits to ensure all guidelines and contract conditions are adhered to.

#### Clearfell V's Continuous Cover Forestry

All plans are required to consider lower impact silvicultural systems (LISS) in windfirm conifer plantations as opposed to traditional clearfell systems. This decision is based upon the methodology provided in FC Information Note 40 – ‘Transforming Even-aged Conifer Stands to Continuous Cover Management’. Where existing coupes are not identified for CCF management, we will manage on an extended rotation basis to be thinned and monitored for future consideration for conversion to CCF.

Using the FC Forest Research Agency, Ecological Site Classification system (ESC), a range of conifer species are considered ‘optimum’ to ‘unsuitable’ for CCF where timber production is considered as an objective.

See Appendix 3 – CCF Justification.

#### 3.7.4 Haulage

As in our other woodland blocks we will continue discussions with the relevant Highways Authority to agree haulage routes and discuss annual tonnages.

All timber traffic will be managed in line with the Road Haulage of Round Timber Code of Practice, Fourth Edition (2012), which aims to improve the safety and environmental standards of the timber haulage industry.

#### 3.7.5 Restocking

##### Conifer

The areas of small group felling carried out as part of the CCF silvicultural systems will be replanted to diversify species and age structure and to continue to provide a sustainable timber resource, whilst mindful of the projected impacts of climate change. The FC Forest Research Agency, Ecological Site Classification system (ESC) will aid species choice and selection. A range of timber producing conifer species as set out in Appendix 3 and Appendix 4 'Species by soil type' will help inform restocking options.

Reference to Predominantly Mixed Conifer on the Future Habitat & Species Map will be used to describe those areas where a range of species will be planted.

As indicated at 3.7.1 Planning, the Operational Site Assessment will provide site-specific data on soils and other site factors that will help inform the correct choice of species on a site-by-site basis.

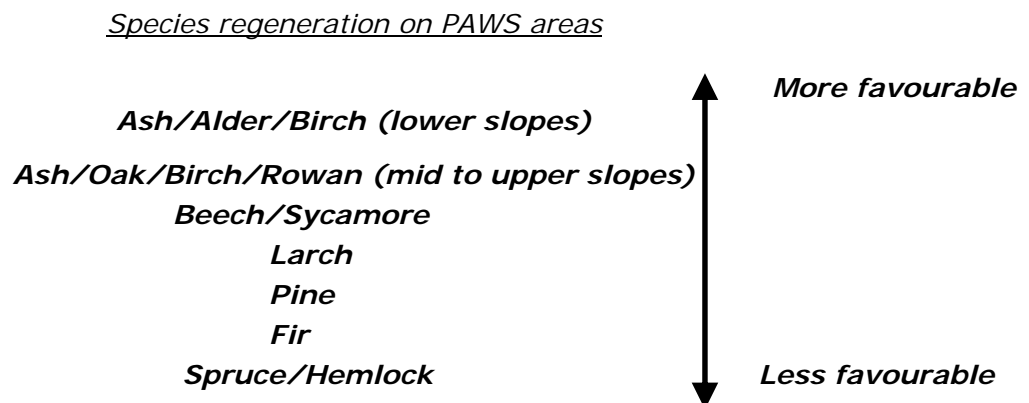
The continuous cover silviculture will be managed to encourage natural regeneration, although it is accepted that replanting will be required to maintain and further diversify the current range of species.

##### Broadleaf

The areas of PAWS at Gurtof Wood and Southwoods will be restored to the appropriate range of native woodland types where this is influenced by underlying soil nutrient and moisture regimes. Delayed thinning or no-thinning across some of these sites reduces the option for gradual restoration through CCF due to the increased risks of windthrow. Consequently, appropriate scale clear felling phased over a range of felling periods, and restocking by natural regeneration will secure the eventual conversion from conifer to native dominant, mixed broadleaf woodland. Other sites that are more stable will be considered to be managed CCF systems. The impact of *Chalara* on ash natural regeneration will be monitored during the life of the plan, although the acceptance

of other site-native species will be considered as an acceptable alternative to achieve PAWS restoration.

On non-PAWS sites planned for conversion to broadleaf woodland, we will accept natural regeneration of both native and non-native species i.e. beech, sycamore.



Natural regeneration in PAWS woodland will be assessed and the risk it poses to the objectives of the plan considered. Where dense shade or invasive species (i.e. Western hemlock, Sitka spruce) threatens the native woodland community, it will be removed as soon as practicable. Where the risk is lower it will be allowed to reach a harvestable size and removed as part of a routine felling or thinning operation.

## Heathland/Wooded heath

It is proposed to develop a mosaic of successional habitat through natural regeneration across conifer sites that lie adjacent to designated heathland habitats. This will create an ecotone of wooded heath, combining elements of heathland flora and conifer and broadleaf tree regeneration. Habitat networks will be maintained and established across parts of the forest that will enhance and maximise the movement of flora and fauna by increasing the permeability both within and outwith the forest area. The development of these sites will be beneficial for a range of species including Nightjar. We do not intend to manage these sites for future timber production.

## 4. Monitoring

### 4.1 Clearfells

All clearfell areas are managed spatially using the Sub Compartment Database to ensure the boundaries and designs are accurately reproduced on the ground. Significant variances in the areas to be felled will require a formal amendment of the plan plus the agreement of and approval by Forest Services staff, as per CSM 6.

#### 4.2 Restock

All restock areas where timber production is an objective will be planted/naturally regenerated and monitored to ensure that the number of established trees per hectare fully meets the requirements of OGB\*4. This document has mandatory requirements on the monitoring of the crop in Year 5 to ensure the establishment of at least 2500 trees / ha.

#### 4.3 Continuous Cover

Continuous cover areas will be monitored using the methods and procedures contained in OGB\*7. Similar in scope to the methods employed for restock areas, where timber production is the aim we need to have at least 2000 saplings per hectare after 10 – 15 years, these should be evenly spread over 90% of the site.

#### 4.4 Forest Plan

All forest plans are formally reviewed as part of a “5-year mid term review” and the plan’s aims and objectives and its success at achieving those aims and objectives. This plan will be formally reviewed in 2019. This time period can be shortened if circumstances change significantly or if parts of the plan prove detrimental to the overall aims and objectives.

\*Operational Guidance Booklet

### **5. Determination of Impact Significance and Mitigation**

#### 5.1 Native Woodland

Threats to our native woodlands can be immediate and absolute (e.g. loss to infrastructure or development) or slower and more subtle (e.g. shading from conifer species or invasive species such as Rhododendron). There are also more widespread environmental changes, such as diffuse pollution and climate change, which may threaten in the long term. ([www.forestry.gov.uk/keepersoftime](http://www.forestry.gov.uk/keepersoftime))

Major threats to native woodland are:

- Climate change and fragmentation
- Excessive browsing and grazing by deer & livestock
- Inadequate or inappropriate management
- Invasive and problem species
- Diffuse pollution
- Loss

Through this plan, we will continue to apply local and national policy and best practice guidance for the management and development of our native woodlands.

## 5.2 Flora

*Heathland is a UKBAP Priority Habitat*

*Within woods, concentrate on open space habitat expansion and management, developing heathland, neutral grassland and acid mires.*

(G. Peterken – Native Woodland Development in the North York Moors and Howardian Hills)

This plan will continue the management and development of heathland where this will improve habitat networks within Boltby. Maintaining a mixed resource of temporary and permanent open space will provide suitable habitat for Nightjar, Woodcock and other priority flora and fauna species within the forest area.

## 5.3 Other Objectives

*Concentrate on developing habitat-rich riparian corridors with marshes, meadows, woodlands, trees in farmlands. These would pass through both woodland and farmland.*

(G. Peterken – Native Woodland Development in the North York Moors and Howardian Hills)

We will continue to apply local and national policy and best practice guidance to the management of riparian corridors across Boltby. This will improve and enhance the habitat network within the woodlands and benefit protected species. Continuing development of both species and structural diversity will benefit habitats for priority woodland bird species throughout the woodland.

## Appendix 2 – Priority woodland bird and lepidoptera species

Bird Species <sup>1</sup>	Forest location	Habitat enhancement
Woodcock Nightjar	Clearfell, restock sites.	Restructure closed canopy woodland through thinning and sequential felling, create and maintain open structure woodland/wooded heath, ride enhancement and glade creation.
Tree Pipit Redstart	Established broadleaf and mixed broadleaf/conifer stands.	Group felling/thinning of closed canopy stands to improve, structural diversity, shrub layer structure, enhance rides and woodland edge, create and maintain successional woodland (birch)/scrub habitat and standing deadwood.

Lepidoptera	Forest location	Habitat enhancement
Argent and Sable moth	Restock, succession sites (Boltby Moor, Midlife Hill)	Prefers open woodland with birch regrowth. Develop habitat corridors to extend current range. Maintain birch within restock sites and develop successional sites along road/ride edges and wetter sites.

<sup>1</sup> Source – RSPB bird conservation targeting maps - [www.rspb.org.uk/forprofessionals/targeting/targeting\\_maps.aspx](http://www.rspb.org.uk/forprofessionals/targeting/targeting_maps.aspx)

### Appendix 3 – CCF justification

Site Factor	Suitability Score	Comment
WHC: range 1 to 4	2	Tree stability may be a site-limiting factor across parts of the main block at higher elevations adjacent NYM SSSI.
Soil fertility: Poor (ironpan, peaty SWG), Medium (podzolic B.E, typical SGW), Rich (typical B.E/SWG)	1 – Main block (excl. Cracoe) 2 – Cracoe 3 - Southwoods	Predominantly poor across most of main block but medium across Cracoe and much richer in Southwoods with a greater range of competing ground vegetation.
Current species suitability:  Nil SP, HL, JL, Birch SS, NS	1 – Optimal 2 – Suitable 3 – Marginal	The current range of species offers a limited selection that can be developed for natural regeneration. However, there are currently examples of SS and birch advanced regeneration across the forest.

With a combined score ranging from 5 to 8, initial analysis indicates significant areas of Boltby achieve a Moderate (5) site ranking for transformation to CCF, although Southwoods is expectedly ranked as Low (8) due to the richness of the site. Further analysis of stand structure is considered to help inform whether transformation should be considered.

- Stand form – Form is average and of a reasonable quality.
- Thinning history – Thinning operations are broadly consistent where crops have been managed over a regular cycle, developing crowns that can act as potential seed bearing trees. Only sites that have been regularly thinned will be identified as CCF on the felling map. Delayed thin sites will be managed on an extended rotation basis.
- Currently there is evidence that SS and birch are capable of developing as a natural regeneration resource across restock sites.

On the basis of the above information, we will consider CCF across even-aged conifer stands using a range of conifer species (SS and birch, but also enrichment planting with Serbian and Oriental spruce, Macedonian pine, WRC, Western hemlock and Coast redwood where conditions allow), aiming for a simple stand structure.

We will adopt a Group Shelterwood system through a combination of thinning, group felling (0.25 to 0.50 ha) and replanting with suitable species.

Some areas of high forest/clearfell coupes will be managed on an extended rotation basis and will be monitored for their development of natural regeneration. Where appropriate these will be considered for developing toward CCF management as set out above.

The Forest Research ESC table below supports the range of target species considered for natural regeneration and those where enrichment planting will increase species diversity.



[Boltby, 3621 SE489886] Future Climate Analysis - 5km Area Projection UKCIP02

Species	Baseline			2050 Lo			2050 Hi			2080 Lo			2080 Hi	
	Lim Factor	Suitability	Yield	Lim Factor	Suitability	Yield	Lim Factor	Suitability	Yield	Lim Factor	Suitability	Yield	Lim Factor	Suitability
Corsican pine	SMR		2	SMR		4	SMR		4	SMR		4	SMR	
Lodgepole pine	DAMS		16	DAMS		16	DAMS		16	DAMS		16	DAMS	
Macedonian pine	DAMS		14	DAMS		14	DAMS		14	DAMS		14	DAMS	
Maritime pine	SMR		2	SMR		4	SMR		4	SMR		4	SMR	
Monterey/Radiata pine	AT5		4	SMR		6	SMR		8	SMR		10	SMR	
Scots pine	SMR		10	SMR		10	SMR		10	SMR		10	SMR	
Weymouth pine	SMR		0	SMR		0	SMR		0	SMR		0	SMR	
Norway spruce	DAMS		12	DAMS		12	MD		10	MD		12	MD	
Oriental spruce	SNR		10	SNR		14	SNR		14	SNR		14	SNR	
Serbian spruce	SNR		14	SNR		14	SNR		14	SNR		14	SNR	
Sitka spruce	CT		20	MD		18	MD		14	MD		14	MD	
Douglas fir	SMR		0	SMR		0	SMR		0	SMR		0	SMR	
Hybrid larch	SMR		12	SMR		12	SMR		12	SMR		12	MD	
Japanese larch	SMR		12	SMR		12	MD		8	MD		10	MD	
European larch	SMR		2	SMR		2	SMR		2	SMR		2	MD	
Western red cedar	SNR		14	SNR		16	SNR		16	SNR		16	MD	
Japanese red cedar	DAMS		14	DAMS		14	MD		12	DAMS		14	MD	
European silver fir	SMR		10	SMR		14	SMR		14	SMR		14	MD	
Grand fir	SMR		14	SMR		18	SMR		18	SMR		18	MD	
Noble Fir	SMR		16	MD		12	MD		0	MD		4	MD	

Nordmann fir	SNR	<div></div>	10	SNR	<div></div>	14	SNR	<div></div>	14	SNR	<div></div>	14	SNR	<div></div>
Pacific fir	SMR	<div></div>	14	SMR	<div></div>	14	SMR	<div></div>	14	SMR	<div></div>	14	SMR	<div></div>
Leyland cypress	SMR	<div></div>	14	SMR	<div></div>	14	SMR	<div></div>	14	SMR	<div></div>	14	MD	<div></div>
Western hemlock	SMR	<div></div>	16	SMR	<div></div>	16	SMR	<div></div>	16	SMR	<div></div>	16	SMR	<div></div>
Giant redwood	SMR	<div></div>	0	SMR	<div></div>	0	SMR	<div></div>	0	SMR	<div></div>	0	SMR	<div></div>
Coast redwood	SNR	<div></div>	12	SNR	<div></div>	16	SNR	<div></div>	18	SNR	<div></div>	18	SNR	<div></div>
Lawson's cypress	SNR	<div></div>	12	SNR	<div></div>	16	SNR	<div></div>	16	SNR	<div></div>	16	MD	<div></div>
Downy birch	CT	<div></div>	8	MD	<div></div>	6	MD	<div></div>	6	MD	<div></div>	6	MD	<div></div>
Silver birch	SMR	<div></div>	6	SMR	<div></div>	6	SMR	<div></div>	6	SMR	<div></div>	6	SMR	<div></div>

Site type		Species													
Upland sites	Lowland sites	SP	LP	Mac P	DF	ESF	GF	WH	WRC	Ley/Law C	Coast R	Giant R	SS	NS	Oriental S
Gley						y		y	y	y			Y	Y	y
Iron pan/podzol		Y	y	y	y	y	y				y	y		y	y
BE/intergrade		Y		y	Y	y	y	y	y	y	y	y	y	Y	y
Calcareous				y		y			y	y					y
	Gley					y		y	y	y	y	y	Y	Y	y
	Podzol	Y	y	y	y	y	y	y	y	y		y		y	y
	BE/intergrade	Y		y	Y	y	y		y	y	y	y	y	Y	y

<b>BOLD CAPITAL/INFILL</b>	<b>Cat A Major species</b> - currently widely used with no supply problems and should continue to play an important role
<b>Bold lower case italics</b>	<b>Cat B Minor species</b> - Species that either currently play a minor role but have demonstrated their suitability being part of a species range to diversify our forests. Climate change may increase or reduce their use
Normal lower case	<b>Cat C Secondary species</b> - Species with little information on forest performance but possible choice based on Arboreta. Use on small-scale experimental basis for now but may increase if favourable results

[source data](http://www.forestry.gov.uk/fr/treespecies) <http://www.forestry.gov.uk/fr/treespecies>

[source data](http://www.forestry.gov.uk/forestry/inf-d-8mad67) <http://www.forestry.gov.uk/forestry/inf-d-8mad67>

Refer to cell comments for specific species notes

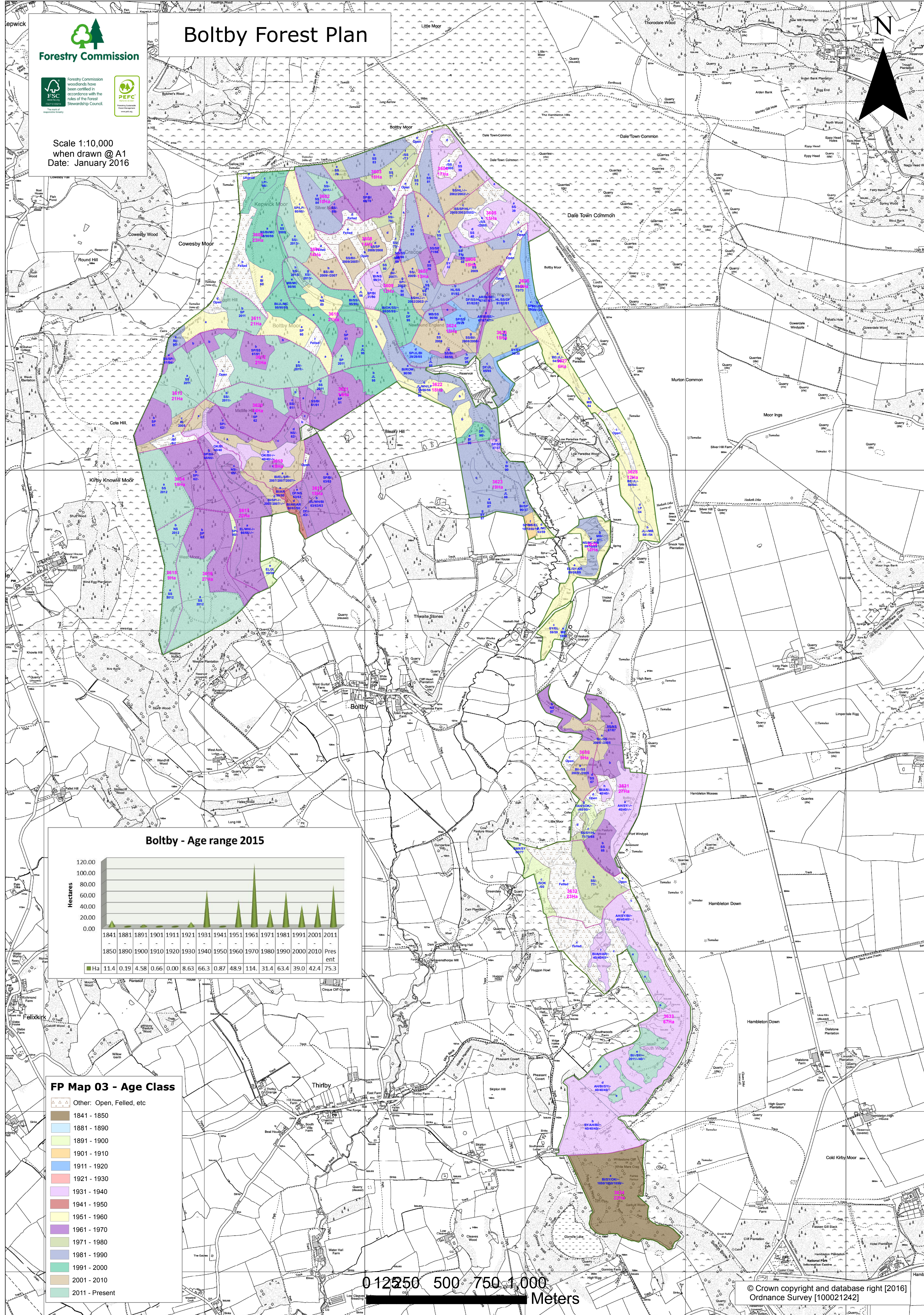
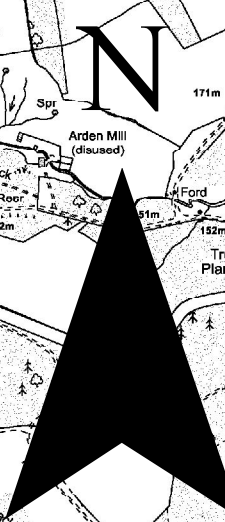
**No planting where >1m peat depth**

Pacific coast associated forest cover - consider in mixtures as part of underplanting for CCF					
DF	GF	WH	Law C	Coast R	ESF

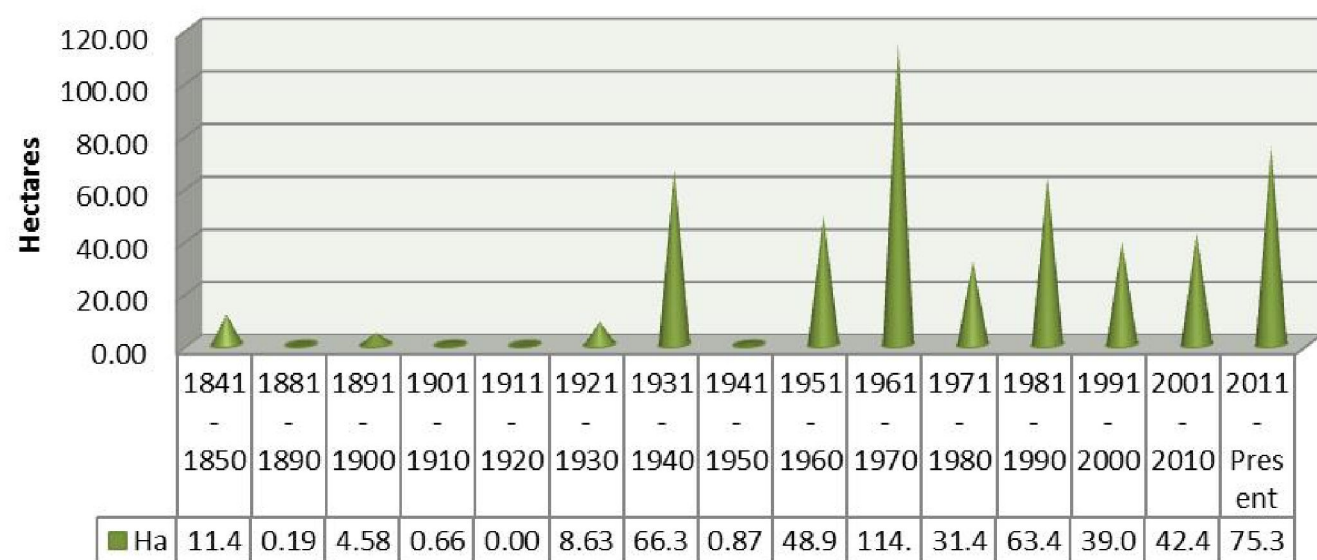


Scale 1:10,000  
when drawn @ A1  
Date: January 2016

# Boltby Forest Plan



**Boltby - Age range 2015**

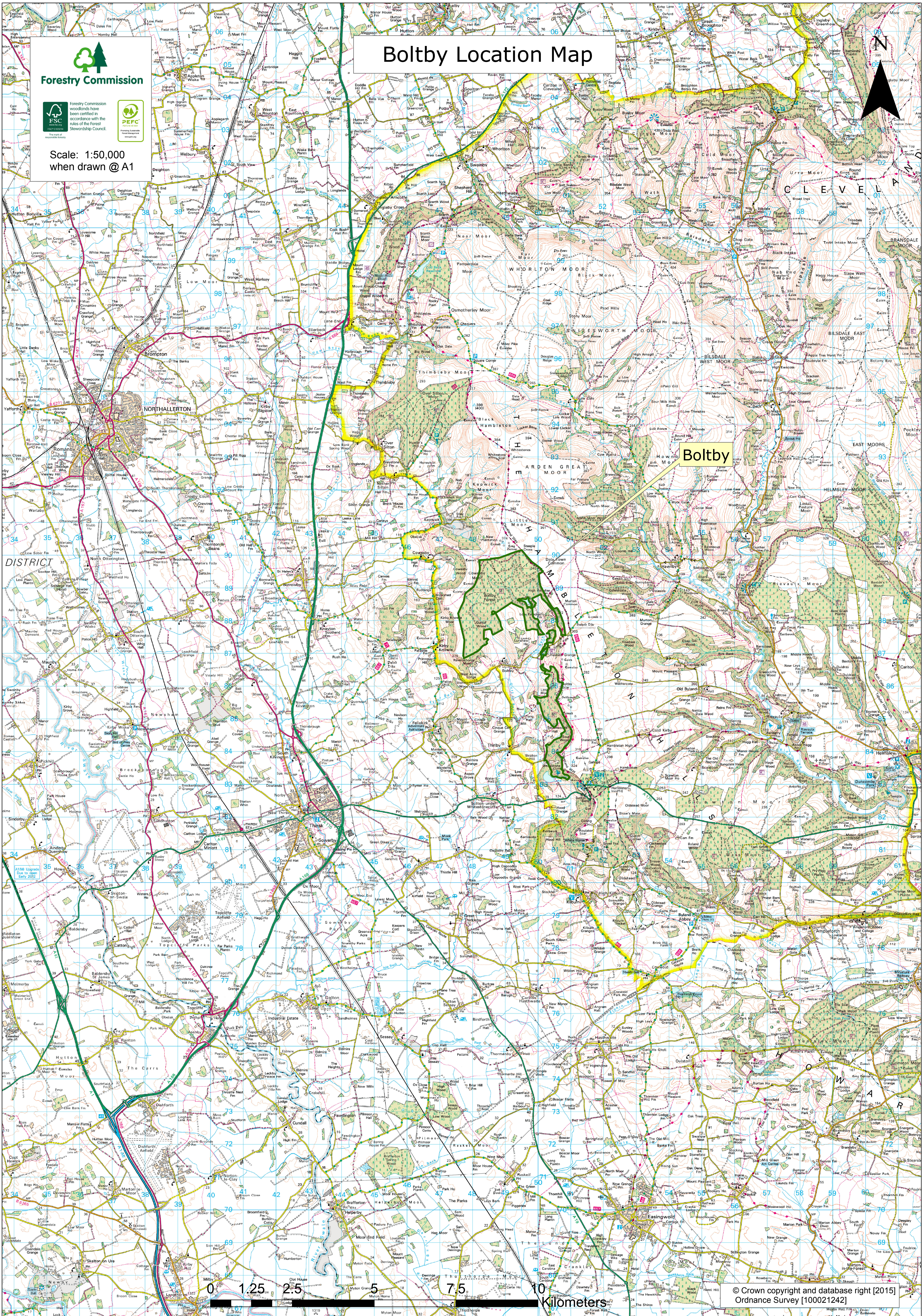


**FP Map 03 - Age Class**

- Other: Open, Felled, etc
- 1841 - 1850
- 1881 - 1890
- 1891 - 1900
- 1901 - 1910
- 1911 - 1920
- 1921 - 1930
- 1931 - 1940
- 1941 - 1950
- 1951 - 1960
- 1961 - 1970
- 1971 - 1980
- 1981 - 1990
- 1991 - 2000
- 2001 - 2010
- 2011 - Present

0 125 250 500 750 1,000  
Meters







Forestry Commission

Scale: 1:50,000  
when drawn @ A1



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



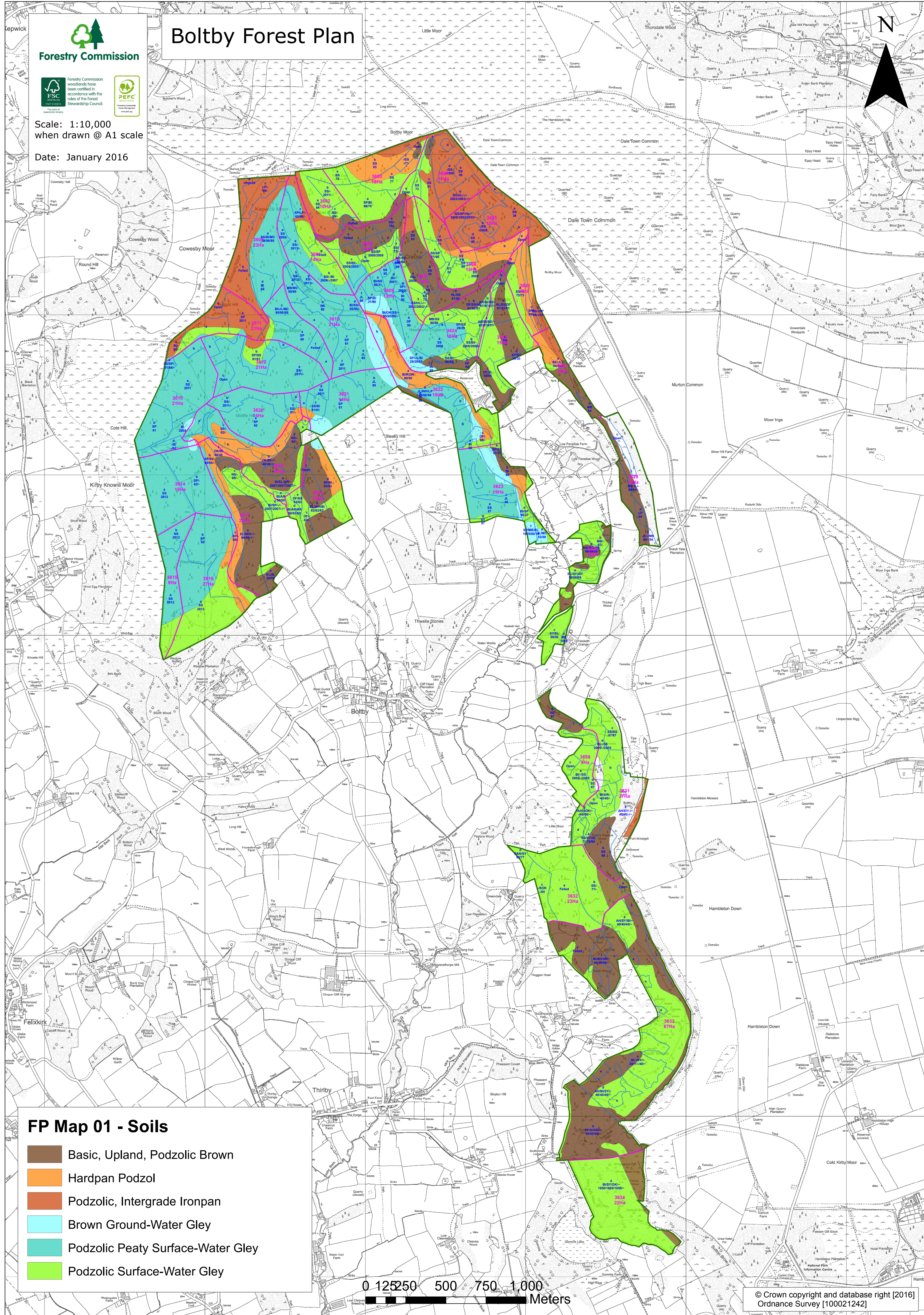
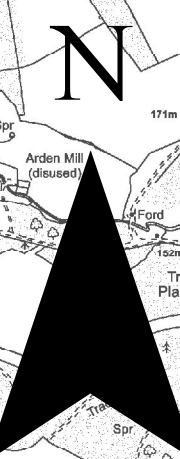
PEFC

# Bolton Location Map

Bolton



# Boltby Forest Plan



## FP Map 01 - Soils

- Basic, Upland, Podzolic Brown
- Hardpan Podzol
- Podzolic, Intergrade Ironpan
- Brown Ground-Water Gley
- Podzolic Peaty Surface-Water Gley
- Podzolic Surface-Water Gley

0 125 250 500 750 1,000  
Meters

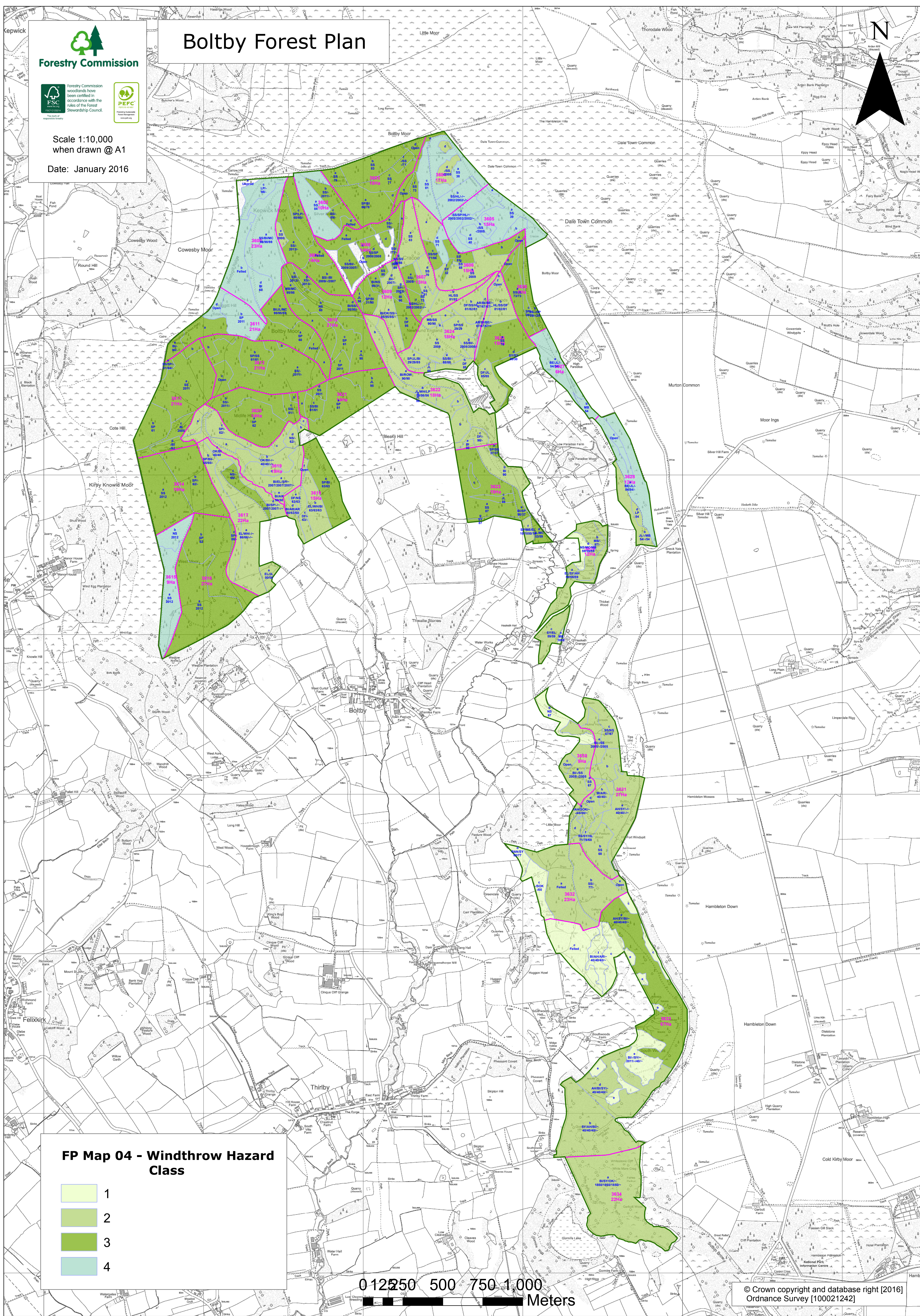




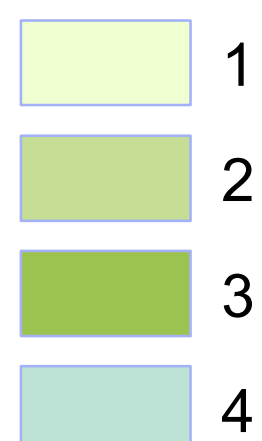
Scale 1:10,000  
when drawn @ A1

Date: January 2016

# Boltby Forest Plan



## FP Map 04 - Windthrow Hazard Class



0 1250 500 750 1,000  
Meters

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# Boltby Forest Plan Yorkshire Forest District Analysis and Concept

Forestry Commission



Forest landscape character is influenced by the adjacent moorland, steeply graded escarpment and adjacent limestone uplands and vale lowlands.

- \* Clearfell coupes will be designed appropriate to landform and local landscape. Allow hard-edged conifer stands adjacent to moorland to develop a mosaic of open and wooded habitats.
- \* The adoption of continuous cover systems will contribute toward the development of a more diverse forest habitat within the landscape.

Sustainable timber production remains a priority objective across the forest whilst mindful of climate change impacts on species choice.

- \* Alternative conifer species i.e. Serbian and Oriental spruce, Macedonian pine and Coast redwood will be considered for restocking where conditions are suitable.
- \* Develop continuous cover systems and extended rotation silviculture to allow natural regeneration and underplanting with alternative species to become established.

Boltby forest offers opportunities to develop significant benefits to improve ecological and archaeological features.

- \* Existing conifer stands adjacent to North York Moors SSSI will be managed toward the development of a mosaic habitat i.e. wooded heath.
- \* Future habitat along riparian corridors will replace conifer crops with broadleaf dominant species.
- \* Archaeological features will be managed in a sensitive way to ensure their continued protection and integration with future habitat improvements.

The network of watercourses passing through Boltby forest that connects with downstream waterbodies are currently classed as 'Poor' under the Water Framework Directive.

- \* Future habitat along riparian corridors will replace conifer crops with broadleaf dominant species, buffering the impacts of future forest management.

Restoring ancient woodland sites to native woodland species remains a priority objective.

- \* Conifer stands will be restored to native species by thinning, felling, natural regeneration and controlling unwanted conifer regeneration.
- \* Maintain existing, and develop additional deadwood resource through management interventions and allowing natural mortality of large dimension trees.
- \* Ancient woodland sites will be buffered by converting adjacent conifer stands to predominantly broadleaf woodland.

## FP Map 06 - Analysis and Concept

- Predominantly productive mixed conifer
- Convert to predominantly mixed broadleaf
- Open habitat, wooded heath
- Restore ancient woodland sites
- Scheduled Monument
- SSSI
- Watercourses

0 125 250 500 750 1000 Meters












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# Boltby Forest Plan



## FP Map 07 - Current Felling

-  2012-2016
-  2017-2021
-  2022-2026
-  2027-2031
-  2032-2036
-  2037-2041
-  2042-2046
-  2047-2051
-  2052-2056
-  2057-2062
-  2063-2071

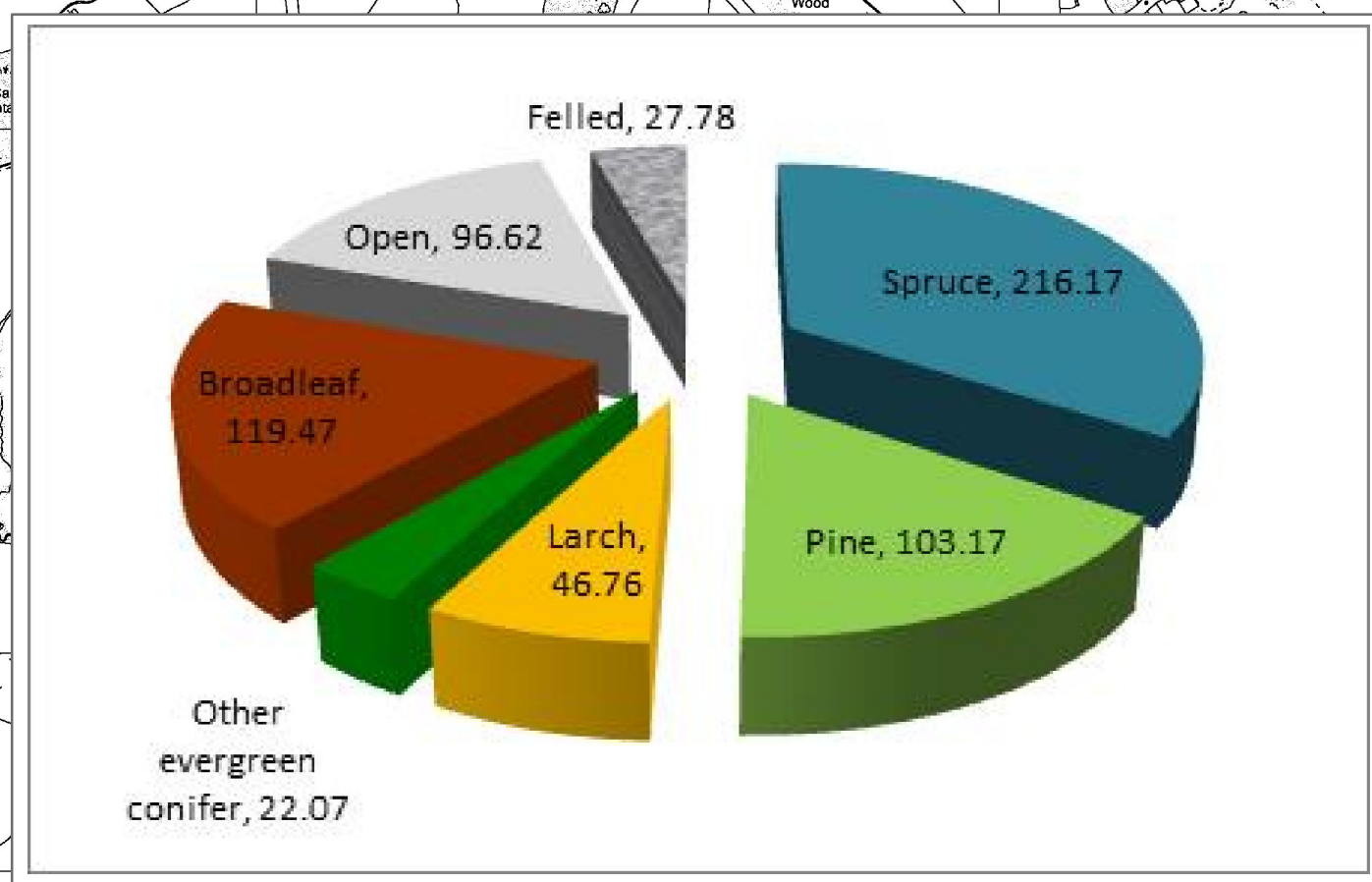
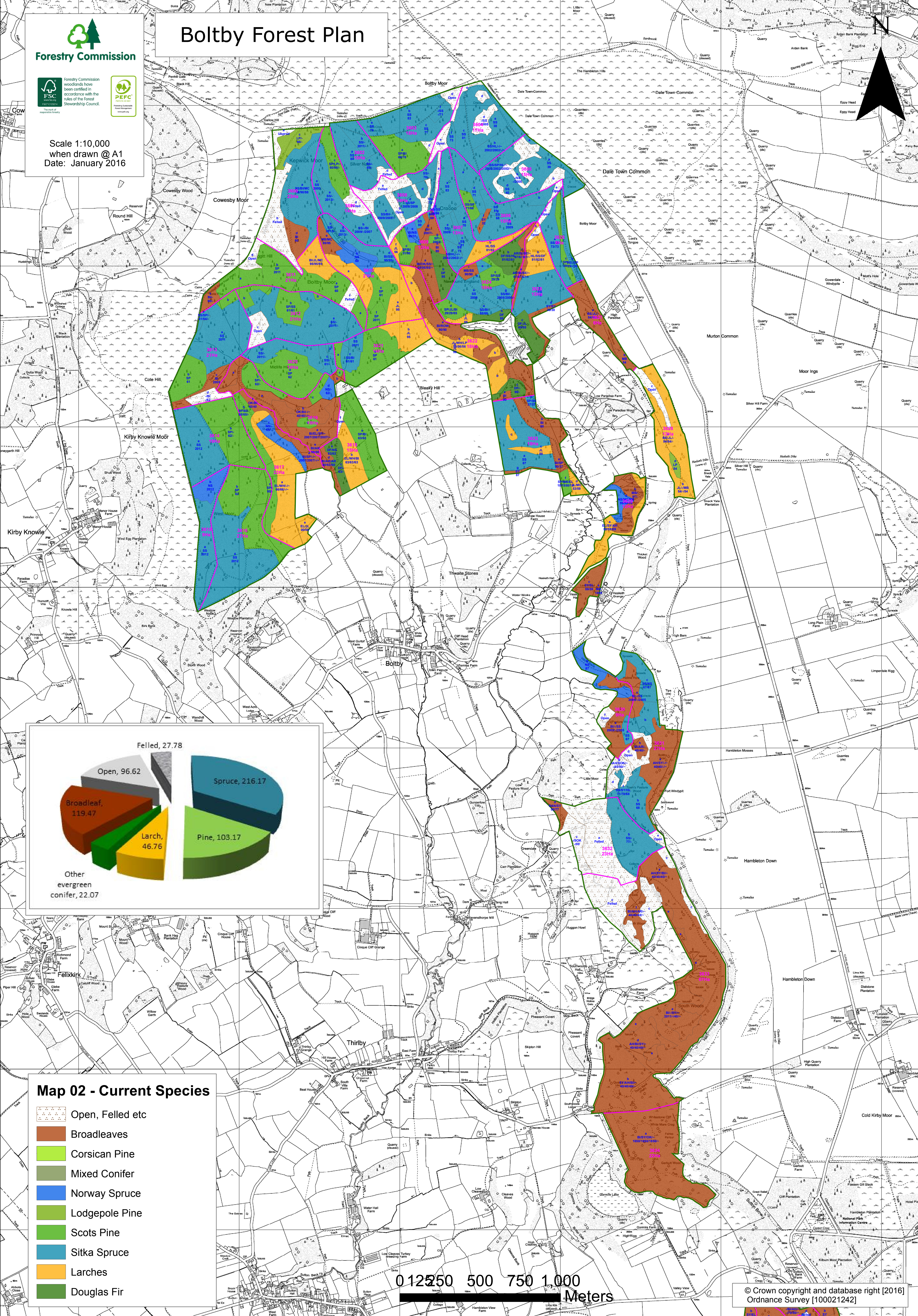
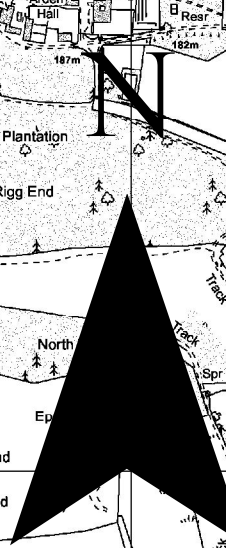
-  Continuous Cover
-  Minimum Intervention

0 125 250 500 750 1,000  
Meters



Scale 1:10,000  
when drawn @ A1  
Date: January 2016

# Boltby Forest Plan



## Map 02 - Current Species

- Open, Felled etc
- Broadleaves
- Corsican Pine
- Mixed Conifer
- Norway Spruce
- Lodgepole Pine
- Scots Pine
- Sitka Spruce
- Larches
- Douglas Fir

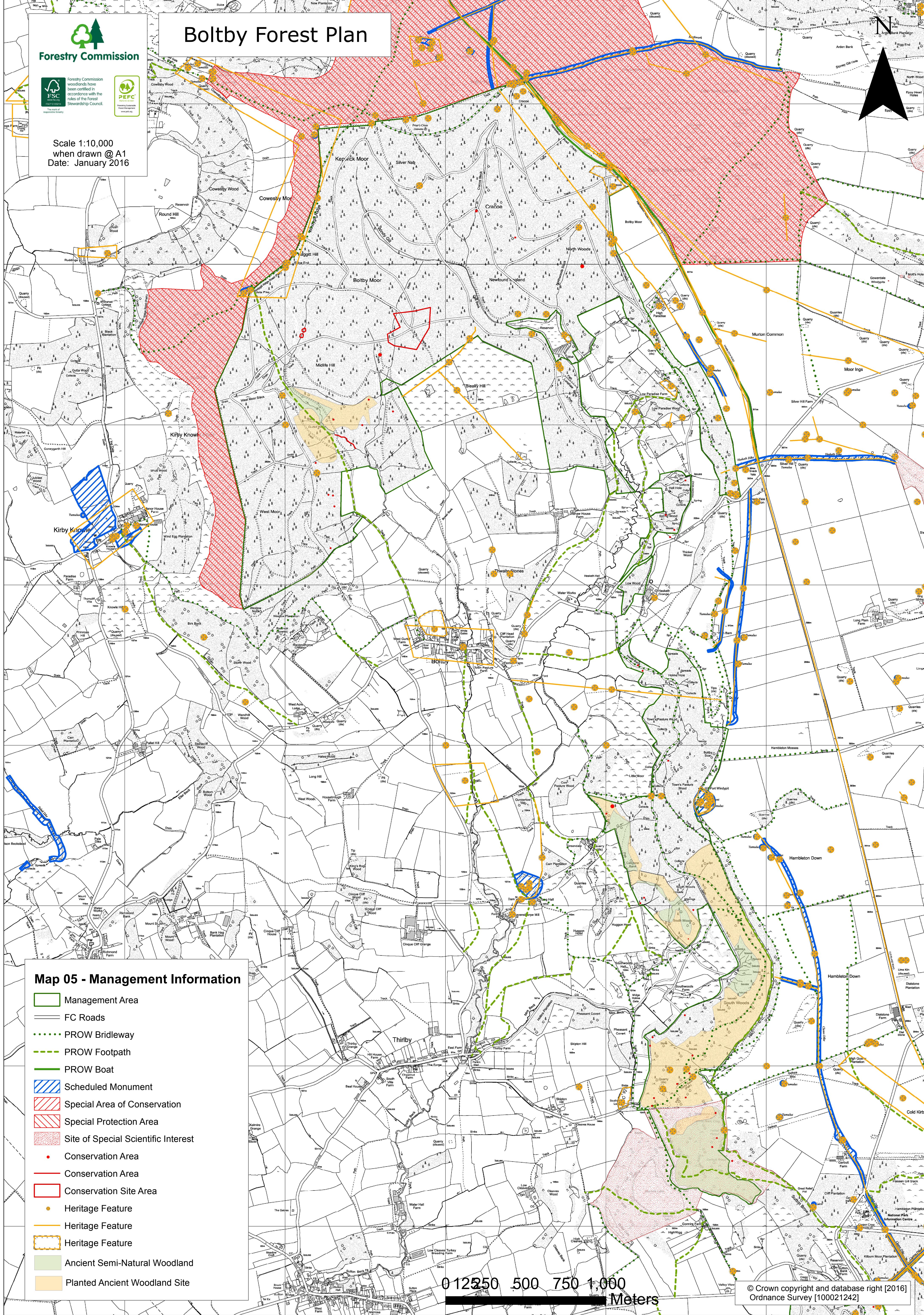
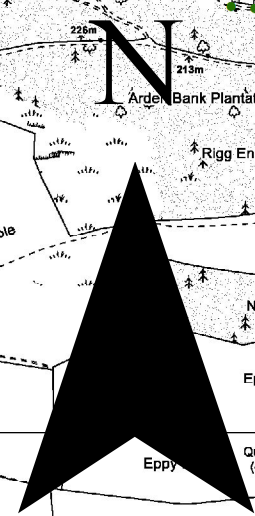
0 125 250 500 750 1,000  
Meters





Scale 1:10,000  
when drawn @ A1  
Date: January 2016

# Boltby Forest Plan



## Map 05 - Management Information

- Management Area
- FC Roads
- PROW Bridleway
- PROW Footpath
- PROW Boat
- Scheduled Monument
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest
- Conservation Area
- Conservation Area
- Conservation Site Area
- Heritage Feature
- Heritage Feature
- Heritage Feature
- Ancient Semi-Natural Woodland
- Planted Ancient Woodland Site

0 1250 500 750 1,000  
Meters

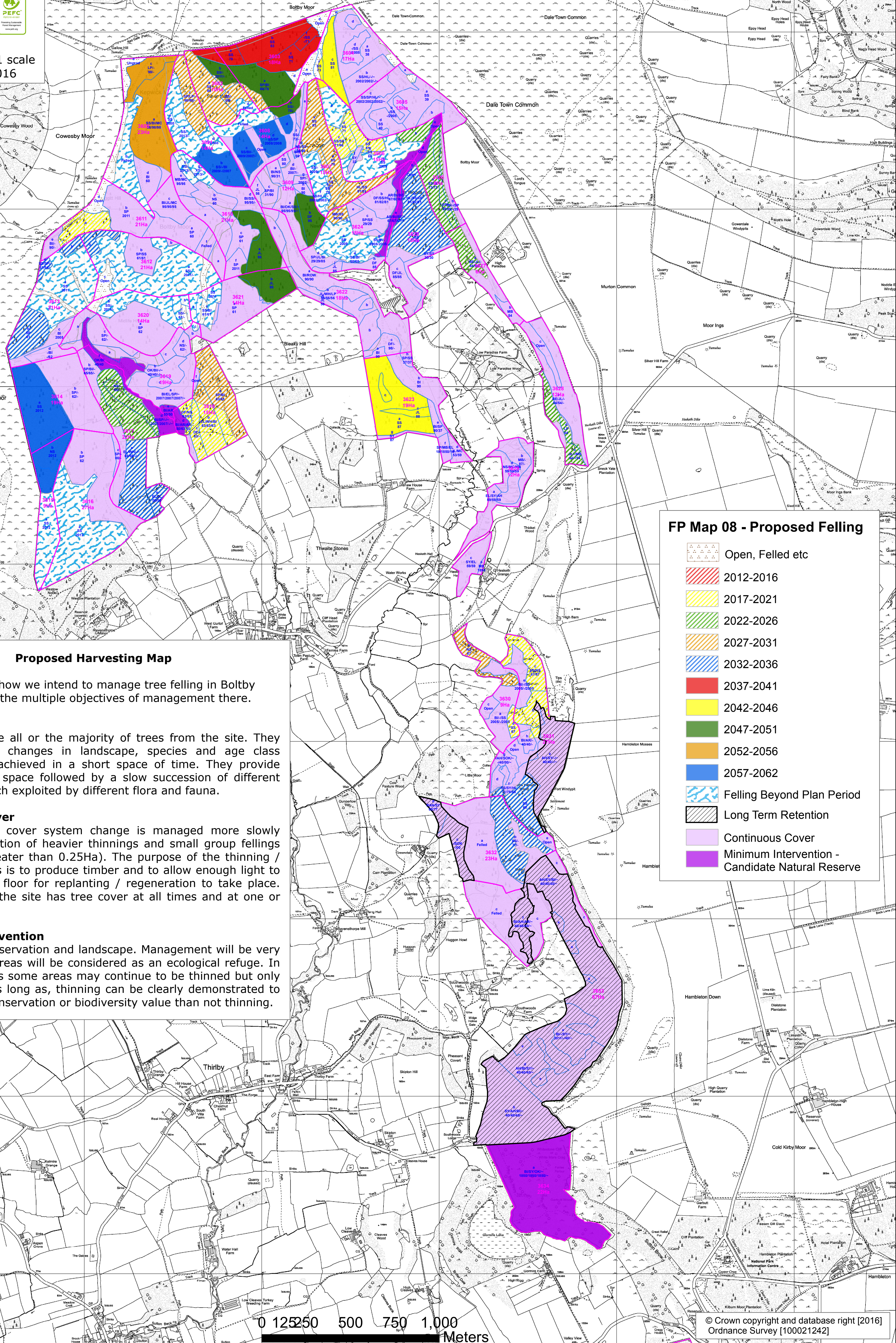
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Scale: 1:10,000  
when drawn @ A1 scale  
Date: January 2016

# Boltby Forest Plan



## Proposed Harvesting Map

This map shows how we intend to manage tree felling in Boltby in order to meet the multiple objectives of management there.

## Clearfells

Clearfells remove all or the majority of trees from the site. They allow significant changes in landscape, species and age class diversity to be achieved in a short space of time. They provide temporary open space followed by a slow succession of different habitat types each exploited by different flora and fauna.

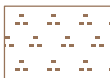














## Continuous Cover

In a continuous cover system change is managed more slowly using a combination of heavier thinnings and small group fellings (normally no greater than 0.25Ha). The purpose of the thinning / felling operations is to produce timber and to allow enough light to reach the forest floor for replanting / regeneration to take place. The majority of the site has tree cover at all times and at one or more levels.

## Minimum Intervention

Managed for conservation and landscape. Management will be very low key where areas will be considered as an ecological refuge. In exceptional cases some areas may continue to be thinned but only when, and for as long as, thinning can be clearly demonstrated to have a higher conservation or biodiversity value than not thinning.

## FP Map 08 - Proposed Felling

- |   |   |
|---|---|
|  | Open, Felled etc                                    |
|  | 2012-2016   |
|  | 2017-2021   |
|  | 2022-2026   |
|  | 2027-2031   |
|  | 2032-2036   |
|  | 2037-2041   |
|  | 2042-2046   |
|  | 2047-2051   |
|  | 2052-2056   |
|  | 2057-2062   |
|  | Felling Beyond Plan Period                          |
|  | Long Term Retention                                 |
|  | Continuous Cover                                    |
|  | Minimum Intervention -<br>Candidate Natural Reserve |

A scale bar with markings at 0, 125, 250, 500, 750, and 1,000 meters. The bar is black with white text.

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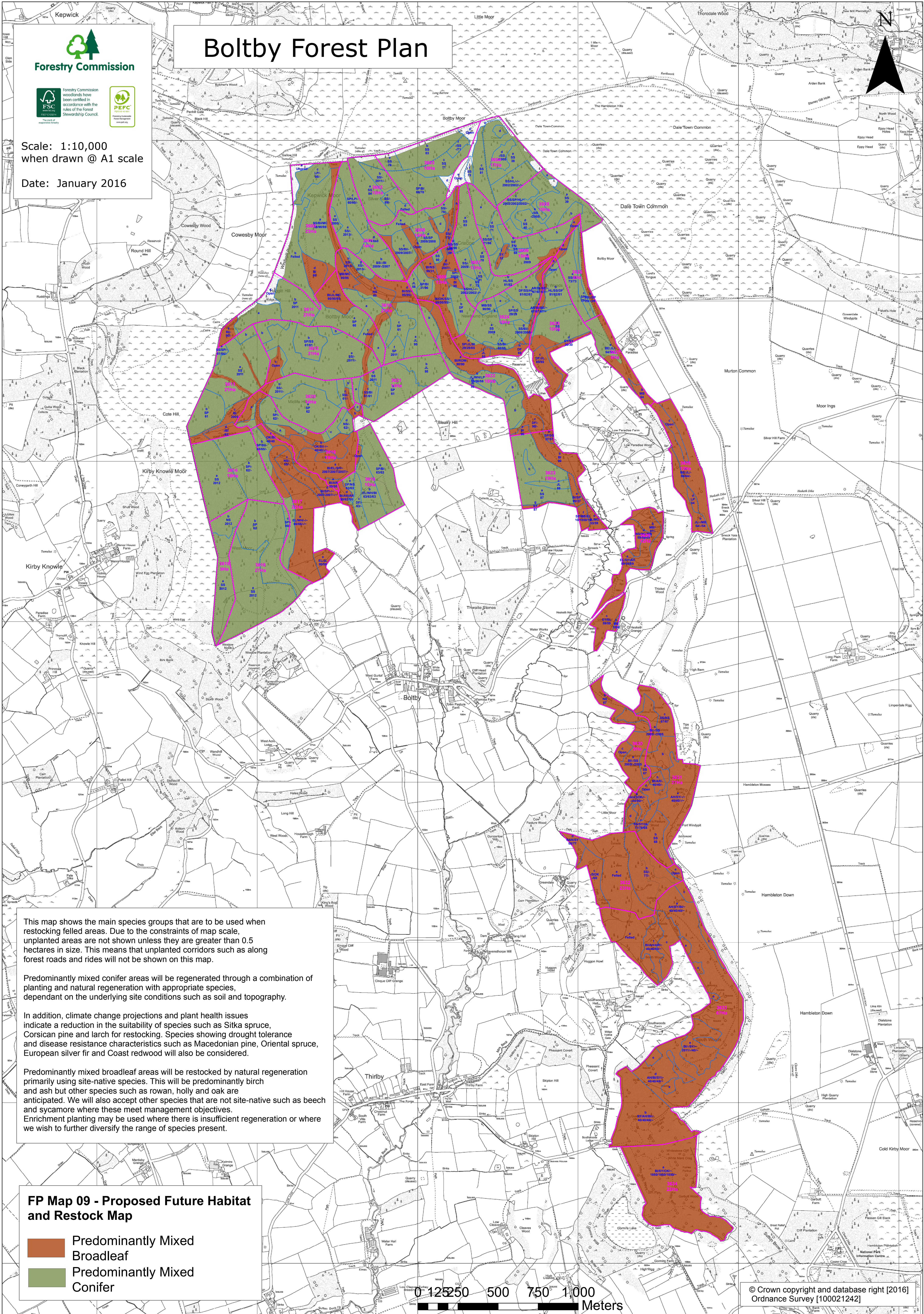
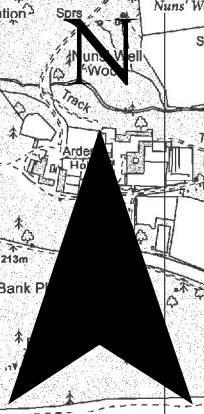




Scale: 1:10,000  
when drawn @ A1 scale

Date: January 2016

# Boltby Forest Plan





This map shows the main species groups that are to be used when restocking felled areas. Due to the constraints of map scale, unplanted areas are not shown unless they are greater than 0.5 hectares in size. This means that unplanted corridors such as along forest roads and rides will not be shown on this map.

Predominantly mixed conifer areas will be regenerated through a combination of planting and natural regeneration with appropriate species, dependant on the underlying site conditions such as soil and topography.

In addition, climate change projections and plant health issues indicate a reduction in the suitability of species such as Sitka spruce, Corsican pine and larch for restocking. Species showing drought tolerance and disease resistance characteristics such as Macedonian pine, Oriental spruce, European silver fir and Coast redwood will also be considered.

Predominantly mixed broadleaf areas will be restocked by natural regeneration primarily using site-native species. This will be predominantly birch and ash but other species such as rowan, holly and oak are anticipated. We will also accept other species that are not site-native such as beech and sycamore where these meet management objectives. Enrichment planting may be used where there is insufficient regeneration or where we wish to further diversify the range of species present.

## FP Map 09 - Proposed Future Habitat and Restock Map

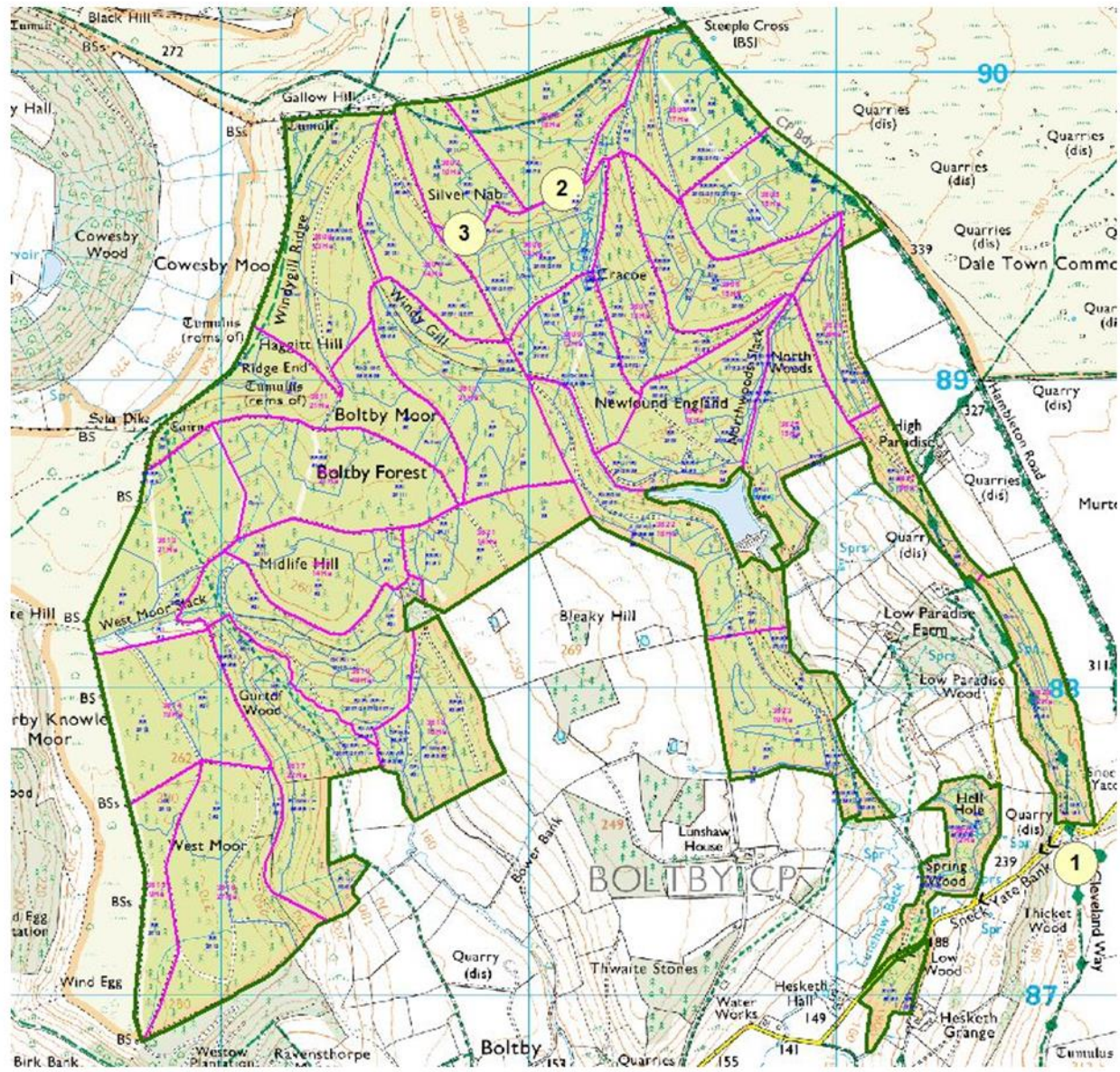
-  Predominantly Mixed Broadleaf
-  Predominantly Mixed Conifer

0 125 250 500 750 1,000  
Meters

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**Boltby**  
**Yorkshire Forest District**  
**Forest Plan 36**



View 1: Boltby main block from the Cleveland Way

From this position the viewer is able to pick out the structural changes within the forest where even-aged stands have been felled and subsequently restocked. This is most visible with the recent felling at Silver Nab and along Windygill Ridge. Geometric shapes still persist within the landscape, such as the conifer stand to the south of Boltby reservoir. These will soften as felling and restocking improve species and structural diversity.

View 2: From Silver Nab, south toward Little Moor

This internal forest view highlights the developing structural diversity, from original stands of conifer, establishing conifer/broadleaf restocking and recently felled sites. The retention of individual mature trees and clumps of both conifer and broadleaf species contribute toward a more complex forest structure, benefiting wildlife and landscape alike



View 3: Recently felled site, SE488895

This view reinforces the improvement in structural diversity, from the original even-aged, single species stands to present day. The continuation of clearfelling and adoption of continuous cover systems will further enhance the wooded landscape character.