Forestry England

# Ingleby Greenhow Forest Plan
# FP 33
# 2023

## Yorkshire Forest District

Forestry England forests and woodlands have been certified in accordance with the UK Woodland Assurance Standard (UKWAS)

**Forestry England - Property**

| | |
|---|---|
| Forest District: | Yorkshire |
| Woodland or property name: | Ingleby Greenhow |
| Nearest town, village or locality: | Great Broughton |
| OS Grid reference: | NZ 573 035 |
| Local Authority district/unitary Authority: | North York Moors National Park Authority |

**Areas for approval**

| | Conifer | Broadleaf | Open |
|---|---|---|---|
| Felling | 72.81 | | |
| Lower Impact Silvicultural Systems regeneration felling | 18.00 | | |
| Restocking | 70.08 | 19.16 | 1.57 |

1. I apply for Forest Plan approval for the property described above and in the enclosed Forest Design Plan.

2. I confirm that the pre-consultation, carried out and documented in the Consultation Record attached, incorporated those stakeholders which FS 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.

3. I confirm that the proposals contained in this Plan comply with the UK Forestry Standard.

4. I undertake to obtain all permissions necessary for the implementation of the approved Plan.

**CONTENTS**

**Ingleby Greenhow**

**546.8 Hectares (Ha)**

**Period of Plan: 2023 - 2033**

## 1. Background

Ingleby Greenhow is part of a network of forests managed by Forestry England (FE), Yorkshire Forest District, located within the Cleveland Beat. It is located along the northern scarp of the Cleveland Hills, south of Great Broughton and Ingleby Greenhow villages, on the edge of the North York Moors National Park. It lies on a steep curving hillside above a relatively flat plain and has acquired prominence in the local landscape.

## 2. Describing the Site

### 2.1 Geology and Soils (FP Map 01)

The underlying geology is of oolitic sandstone and shale, with mudstone and boulder clay deposits on the lower slopes and thin limestone beds. At Botton Head, jet-mining exposure of Jurassic shale's has revealed plant material in the sediment layers. Remains of conifers and cycads amongst others from the middle Jurassic were reason enough for the site to be designated as a SSSI.

Soils are predominantly brown earth across the mid to upper slopes that become skeletal, stony soils along the scarp slope and gleys on the lower slopes where drainage is impeded. There are also extensive areas of mining spoil at the surface associated with its industrial past. Based on Forest Research Ecological Site Classification (ESC), the majority of this block has a medium nutrient status (SNR) with a fresh moisture regime (SMR). As a consequence the soils currently support a wide range of productive conifer and broadleaf species suitable for timber production.

In common with other woods along this scarp, Ingleby Greenhow has areas that are challenging for forestry operations. Harvesting becomes expensive on the steeper slopes, where there is a machine-limitation compounded by surface rockiness and large boulders.

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

The more notable changes in species composition over the past eleven years has been the significant increase in broadleaf species and subsequent reductions in pine, spruce and larch. Areas that were felled in 2011 have subsequently regenerated with a mix of conifer and broadleaf species as set out in the previously approved plan.

| Species composition | 2011 | | 2022 | |
|---|---|---|---|---|
| | Ha | % | Ha | % |
| Broadleaf | 86.79 | 16 | 166.55 | 30 |
| Pine | 131.23 | 24 | 87.16 | 16 |
| Other evergreen conifers | 5.50 | 1 | 8.35 | 2 |
| Larch | 87.49 | 16 | 64.23 | 12 |
| Spruce | 114.83 | 21 | 79.38 | 15 |
| Open | 80.97 | 15 | 78.40 | 14 |
| Felled | 39.99 | 7 | 62.71 | 11 |

### 2.3 Wind Damage

The majority of stands in Ingleby Greenhow fall within Windthrow Hazard Classes 1 to 4 providing a range of windfirm conditions from very good to poor. Classes 1 - 3 (90%) do not restrict thinning operations. Subsequently, stands might be managed on extended rotations and provide opportunities for Lower Impact Silvicultural Systems (LISS) where other factors such as soil fertility and topography allow. Parts of the upper margins across Broughton and Greenhow Plantations are categorised as WHC 4, which could restrict management options. There is little evidence of recent catastrophic windthrow since the last significant event in 2005.

### 2.4 Landscape (Photographic montage)

Ingleby Greenhow is situated in the Cleveland Hills, Upland Fringe landscape character area on the scarp between the Cleveland Hills plateau and the plain to the south. Over its 12 kilometre length it is never more than 650 m wide and is often much narrower. The aspect varies from northerly to westerly and the wood is often in the shade of the hill slope, providing back-lit conditions.

The process of restructuring has continued as part of the previous plan, with 125 ha of predominantly coniferous stands being felled. The increasing proportion of broadleaf species, mainly birch, continues to move this toward a more diverse forest in terms of species and age structure. Previous geometric boundaries of even-aged, single species stands are responding better to landform and appear more blended in the landscape.

### 2.5 People and Community (FP Map – 03)

The popular car park at Clay Bank provides a starting point for a large network of pathways: forest roads and rides linking with several public rights of way, and more general access throughout the woodlands benefiting from CRoW 2000 Open Access Land designation.

The Cleveland Way long-distance footpath passes along the top of the scarp slope above the woodlands, and there are a number of green lanes passing through the forest.

The incline track, along which the Rosedale Railway down Greenhow Bank once ran, is now one of many popular bridleways passing through the woodland and enjoyed by walkers, horse-riders and cyclists.

### 2.6 Natural Heritage (FP Map – 03)

The woods are predominantly secondary plantation conifer/broadleaf, although 69 hectares of low-lying land associated with alder carr and ash woodland are designated as Plantation on Ancient Woodland Sites (PAWS). A small number of ancient veteran oaks are recorded across the forest block. Through the previous plan 15.34 ha of conifer PAWS was felled and 3.17 ha small-scale group shelterwood felling has been carried out and is currently regenerating with a range of broadleaf species.

There are two designated sites across the forest; Botton Head SSSI and part of the North York Moors SSSI (unit 25)/SAC/SPA, both of which are currently in favourable condition status. Broughton Bank SSSI and parts of North York Moors SSSI/SAC/SPA lie contiguous to the majority of the upper boundary.

Records indicate a wide range of breeding bird species utilise the woodland habitat at Ingleby Greenhow. Several of these are identified as priority woodland bird species including Lesser spotted woodpecker, Woodcock, Willow and Marsh tit, Bullfinch, Garden warbler and Tree pipit.

Recent wetland habitat restoration works carried out in collaboration with Tees Rivers Trust creating areas of wet woodland and sediment control measures has enhanced biodiversity and improved water quality in the Leven River Catchment.

### 2.7 Cultural Heritage (FP Map 03)

Although there are no scheduled monuments recorded at Ingleby Greenhow, there are numerous records and features associated with the sites industrial past linked to medieval stone quarrying and extensive 19th century jet and ironstone mining. Notable features include remaining earthworks associated with the inclined tramway to Ingleby Moor ironstone mine and Rosedale railway.

## 3. Describing the Project

### 3.1 Project Brief

- increase the proportion of native broadleaf cover across areas of PAWS and the upper slopes adjacent the moorland SSSI,

- increase the diversity of age structure by selecting the most appropriate felling pattern and silvicultural system throughout the wood and visually enhance external and internal woodland edges,

- consider the selection of alternative main tree species that will contribute toward timber production where productivity can be improved while recognising the potential impacts from climate change, pests and diseases,

- manage designated sites in accordance with statutory requirements as per agreed management plans.

### 3.2 Objectives

**Nature**

- Improve and maintain the resilience of the natural environment, with particular focus on designated sites and realise the potential of these woods for nature and wildlife, to be measured by Natural England, NYMNP Authority and FC systems accordingly.

- Maintain the cultural and heritage value of these woods, to be measured by NYMNP Authority and FC systems accordingly.

- Ensure SSSI's are maintained in target condition, to be monitored through liaison with Natural England.

**Economy**

- All of our forests and woodlands are certified to the Forest Stewardship Council®(FSC®) licence code FSC-C123214 and the Programme for the Endorsement of Forest Certification (PEFC) licence code PEFC/16-40-1001 standards. We will maintain the land within our stewardship certified against the UK Woodland Assurance Standard, as independently assessed by annual 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 FC systems accordingly.

**People**

- Maintain and improve the woodlands contribution to the landscape character within the North York Moors National Park 'Cleveland Foothills Upland Fringe' character area. To be measured by fixed-point photography.

**3.3 Opportunities & Constraints**

- steep slopes and difficult topography present operational challenges whilst harvesting the upper reaches of the scarp slope,

- projected climate change scenarios and forest pests and diseases are likely to challenge future species choice.

- during the lifetime of this plan we will explore the opportunities which this unique forest presents regarding public access, engagement and recreational use, guided by the Yorkshire Forest District Recreation Strategy which is currently in development.

**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 Site Assessment (OSA) 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 through liaison with Historic England and North York Moors National Park Authority.

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 Ingleby Greenhow this will include:

- Increase and improve the deadwood resource as set out in – 'Deadwood - Policy, Procedures, Guidance (PPG) 51 (2018)'. Areas of high ecological value across which deadwood resources could be encouraged include; Ancient Woodland, riparian zones, Long Term Retention sites and areas of broadleaf woodland.

- Managing Veteran trees and PAWS as set out in – 'Keepers of Time: ancient and native woodland trees policy in England (May 2022), 'Ancient Woodland on the Forestry Commission Estate in England (March 2002)' and 'FEE Operations Instructions No. 3 (rev.2012), Ancient Woodlands'.

  'FC – Managing England's woodlands in a climate emergency' provides guidance to implement adaptation actions including the acceptance of naturalised species and assisted migration.

- Increase the diversity of tree species and age structure that will maintain and improve favourable conditions for target species and identified habitats. This is particularly beneficial for the range of habitats and species recorded at Ingleby Greenhow from which a selection has already been mentioned at 2.6 - Natural Heritage.

- Little Broughton Beck and Ingleby Beck, previously identified as Poor status through the Water Framework Directive (WFD) assessment, flow through this property. Works carried out through the previous plan and future management will continue to improve ecological condition and reduce sediment delivery to these watercourses and associated riparian habitat.

Minimum Intervention – Candidate Natural Reserve

Sites that have the potential to deliver greatest biodiversity benefit but without the formal designation of Natural Reserve as defined by the UKWAS.

There are no Candidate Natural Reserves in Ingleby Greenhow.

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.

There are 7.04 ha Long Term Retentions across the craggy outcrops across Greenhow Plantation.

Invasive species

There are no known invasive species across this property.

3.4.2 Timber Harvesting

We will continue to sustainably harvest timber through clear felling, Lower Impact Silvicultural Systems (LISS) and thinning. Where appropriate we will 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 Ingleby Greenhow.

3.4.3 Landscape

Ingleby Greenhow Forest lies within the North York Moors National Park, a protected and designated landscape, where felling observed from various viewpoints has softened the impacts of hard geometric boundaries and even-aged plantation forest. Particular areas of change include views from Clay Bank car park and travelling south along the B1257 looking across to Battersby Plantation and Broughton Bank respectively. The mosaic of habitats developing across these sites provides opportunities to manage a more diverse forest with a wider range of tree species and age classes.

Appropriate scale felling across the remaining parts of the coniferous forest will continue the process of restructuring, creating a more diverse and resilient woodland.

Over time LISS with associated smaller-scale felling will contribute toward a more varied and intimate internal forest landscape, where simple and complex stand structures create a more diverse visitor experience within the forest.

On a scale of low/medium/high, landscape sensitivity is considered to be medium.

**3.5 Plan (FP Map 08)**

The design analysis and 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 04, 05, 06 and 07)**

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 ($m^3$) |
|---|---|---|---|
| **2023 – 2026 Clearfell** | **16.29** | **3** | **9238** |
| **2027 – 2031 Clearfell** | **31.60** | **6** | **11046** |
| **2032 – 2033 Clearfell** | **24.92** | **5** | **8161** |
| **LISS regeneration felling*** | **18.00** | **3** | **6300** |

* Through this plan 386.39 ha at Ingleby Greenhow will be managed using LISS through the Group and Irregular Shelterwood silvicultural systems. During the plan period, it is proposed areas of LISS where crops are over 25 years old will receive a silvicultural intervention (thinning or regeneration felling). As a result of this intervention, the above area of woodland cover will be group felled and regenerated through a combination of restocking and natural regeneration, removing no more than 25% of the stems within any single compartment over the plan period.

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 Plan folder (FP Map 07).

| Habitat type | Area – hectares | | | % age of total area | | |
|---|---|---|---|---|---|---|
| | 2023 | 2033 | 2073 | 2023 | 2033 | 2073 |
| **Conifer** | 259.29 | 242.16 | 244.70 | 47 | 44 | 45 |
| **Broadleaf** | 166.55 | 182.11 | 217.32 | 31 | 33 | 39 |
| **Open inc. agriculture, felled, riparian corridors, roadside/ride side verges etc** | 120.96 | 122.53 | 84.78 | 22 | 23 | 16* |

*The reduction in open ground reflects the areas of ‘felled’ from previous periods that have successfully established with broadleaf/conifer mixed woodland.

**3.7 Methods / Forest Operations**

3.7.1 Planning

Before any major forest operations are undertaken an OSA is completed. This document details the proposed work and outlines all known environmental, social and operational considerations. The OSA 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 OSA 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.

Regarding wildfire, we will follow guidance as set out in 'FC Practice Guide – Building wildfire resilience into forest management planning'. This will be applied proportionately dependant on a particular forest or woodland.

3.7.2 Standards

All operations within the forest will be carried out in accordance with the following standards;

- U.K. Woodland Assurance Standard
- U.K Forestry Standard (published 2017).

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 LISS

All plans are required to consider 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 LISS management, we may consider managing these on an extended rotation basis to be thinned and monitored for future consideration for conversion to LISS.

Using the FC Forest Research Agency ESC system, a range of conifer species are considered 'optimum' to 'suitable' for LISS where timber production is considered as an objective. Through this plan the area to be managed under LISS has increased from 76 ha to 386.39 ha.

See Appendix 2 – LISS 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, Fifth Edition (2020), which aims to improve the safety and environmental standards of the timber haulage industry.

3.7.5 Restocking

Conifer

The areas of felling will be established through a combination of natural regeneration and replanting using alternative productive conifer species to diversify species and age structure 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 2 and Appendix 3 '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 and/or regenerated, where conifer species will comprise at least 80% of the component mix.

As indicated at 3.7.1, 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.

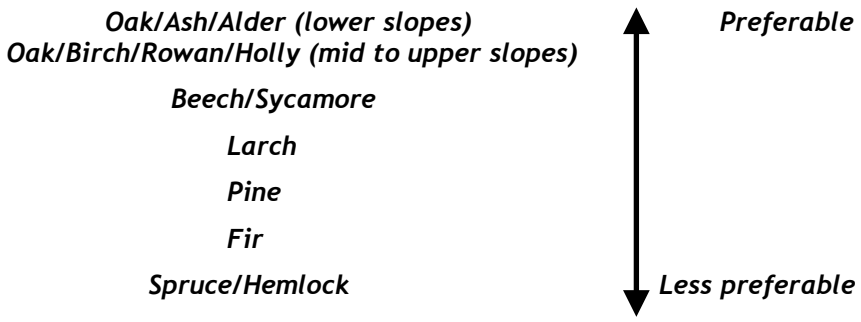
All sites will achieve at least 2500 stems per hectare through planting, natural regeneration or a combination of both.

Broadleaf

There are 69 ha Ancient Woodland Sites across Ingleby Greenhow Forest ranging between semi-natural class 1 or 4 (see section 4.1 Habitat Condition), although predominantly class 1. Where Conifer PAWS are either clear felled or managed through LISS regeneration felling through this plan, regeneration will be carried out through a combination of planting site-native species and natural regeneration. Sites will achieve at least 1100 broadleaf stems per hectare. We will accept 'naturalised' species i.e. beech and sycamore where these can enhance resilience to impacts of climate change.

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 part of routine felling or thinning operations.

*Broadleaf regeneration (indicative)*




Reference to Predominantly Mixed Broadleaf on the Future Habitat & Species Map will be used to describe those areas where a range of species will be planted and/or regenerated, where broadleaf species will comprise at least 70% of the component mix.
Where conversion from conifer to predominantly broadleaf woodland is proposed, sites will achieve at least 1100 broadleaf stems per hectare though natural regeneration, planting or a combination of both.

3.7.6 Wildlife Management

Although Roe deer are present there are low levels of browsing pressure .

## 4. Monitoring

See Appendix 4 – Monitoring Plan

### 4.1 Habitat condition

Over the lifetime of the plan where maintaining semi-naturalness is important, such as Ancient Woodland Sites, we will monitor and record levels of change through the Sub-Compartment Database and the resulting Semi Natural Class scores. Across these sites we will maintain stands at SN Class 1 and gradually manage other sites towards this target composition.

| Class 1 | Semi-Natural Woodland |
|---|---|
| Includes native coppice woodland and high forest or site-native plantation with a relatively high percentage of native self-sown or coppice understorey. | |

| Class 2 | Reasserting Semi-Natural Woodland |
|---|---|
| Plantation or ex-plantation with 50-80% site-native species. Includes coppice regeneration and/or strong natural regeneration amongst planted trees. | |

| Class 3 | Plantation |
|---|---|
| Plantation with 20-50% site-native trees under established plantation stands | |

| Class 4 | Plantation |
|---|---|
| Plantation with less than 20% site-native species. Includes all non-native broadleaves and beech planted outside its natural range in England. | |

### 4.2 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 2028 with opportunity to share information where requested. This time period can be shortened if circumstances change significantly or if parts of the plan prove detrimental to the overall aims and objectives.

Where an amendment to the Forest Plan is required, the Forestry Commission Practice Delivery Note 01 – Tolerance Table will be applied as set out in Appendix 5.

### 4.3 UKWAS Compliance Table

Maintain the land within our stewardship certified against the UK Woodland Assurance Standard, as independently assessed by annual independent surveillance audits.

| | Forest Plan Area (ha) | Forest Plan Percentage | Forest District Area (ha) | Forest District Percentage |
|---|---|---|---|---|
| Total Area | 546.8 | 100.0 | 20,971 | 100.0 |
| Total Wooded area | 526.5 | 96.6 | 18,595 | 88.7 |
| Natural Reserves – Plantation (1%) | 0 | 0 | 294 | 1.7 |
| Natural Reserves – Semi-natural (5%) | 0 | 0 | 102 | 5.6 |
| Long-term Retentions and Low Impact Silvicultural Systems (>1% Wooded area) | 236.8 | 43.5 | 10,004 | 47.9 |
| Area of conservation value(>15% Total area) including designations; PAWS, ASNW, NR, LTR, LISS | 236.8 | 43.5 | 10,004 | 47.9 |
| Planned Open/Other (Managed Open and Open Successional) | 86.2 | 15.8 | 3,113 | 14.8 |

## 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 subtler (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. Keepers of time: ancient and native woodland and trees policy in England (publishing.service.gov.uk)

Major threats to native woodland are:

- Climate change and fragmentation
- Excessive browsing and grazing by deer, livestock and grey squirrels
- Inadequate or inappropriate management
- Invasive and non-native plant species
- Diffuse pollution
- Pests and diseases
- Inappropriate recreational use
- Development and boundary incursions.

Through this plan, we will continue to apply local and national policy and best practice guidance for the management and development of our existing and new native woodlands. Across Ingleby Greenhow, this will include upland oak-birch woodland and wet woodland.

**5.2 Flora**

Heathland is a UKBAP Priority Habitat for which remnants are present across open areas associated with forest roads, rides and external boundaries.

*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 upland heathland where this will improve habitat networks across Ingleby Greenhow forest. Maintaining a mixed resource of temporary and permanent open space with heathland flora will provide suitable habitat for a range of priority woodland bird species. There are no plans to create new areas of permanent open heathland through this Forest Plan.

Ingleby forest has a small, locally important population of Juniper which will continue to be protected.

**5.3 Other Objectives**

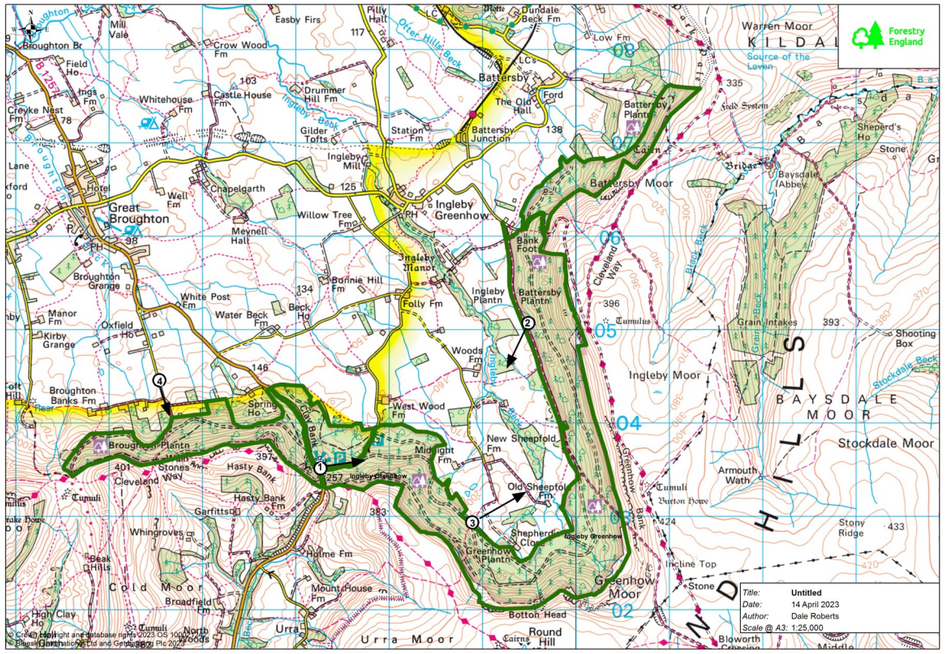
*Concentrate on developing habitat-rich riparian corridors with marshes, meadows, woodlands, trees in farmlands. These would pass through both woodland and farmland.*
(G. Peterken – Native Woodland Development in the North York Moors and Howardian Hills)

We will continue to apply local and national policy and best practice guidance to the management of riparian corridors across Ingleby Greenhow. 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 1 – Priority species).

# Forest Design Plan

# Ingleby Greenhow

# Photographs




**1— NZ 5725 0355**

**View from Clay bank car park to Battersby Plantation**

The changing structure of the forest can be viewed from this location, encompassing both clearfell and LISS approaches that continue to diversify the forest and improve how it sits within the landscape.

**2— NZ 5941 0523**

**Battersby Plantation to Greenhow Plantation**

This view looking across agricultural fields towards Ingleby Plantation, illustrates well the ongoing changing structure and improving diversity of the forest.

**3—NZ 5888 0292**

Felling has broken up historically harsh geometric lines between conifers and the adjacent moorland and the prominent line of the Incline track can be seen. Future operations will continue to improve diversity and improve how the forest sits within the landscape.

**4—NZ 5550 0456**

View towards Broughton Plantation demonstrating how felling and diverse regeneration has reduced the impact of the once harsh boundary between the forest and the moor, the boundary is becoming softer and more suitable to the landscape,

**Appendix 1 – Priority species**

| Bird Species [1] | Forest location | Habitat enhancement |
|---|---|---|
| Dunnock | Developed shrub layer | Continue selective thinning and strip-shelterwood felling as part of LISS management, this will allow the development of shrub layer structure and increased structural and species diversity.<br>Enhance rides, woodland edge habitat and clearings to encourage a habitat mosaic<br>Expand diverse riparian woodland habitat, create, and maintain successional woodland (birch and oak)/scrub habitat and standing deadwood. |
| Willow warbler<br>Redstart<br>Song thrush<br>Marsh tit<br>Willow tit<br>Lesser redpoll<br>Bullfinch<br>Yellow hammer | Woodland edge, ride, glade | Continue selective thinning and strip-shelterwood felling as part of LISS management, this will allow the development of shrub layer structure and increased structural and species diversity.<br>Enhance rides, woodland edge habitat and clearings to encourage a habitat mosaic and standing deadwood. |
| Crossbill | Mature conifer woodland | Continue thinning conifer stands to develop canopy and subsequent seed production across a range of conifer species. |
| **Lepidoptera [2]** | **Forest location** | **Habitat enhancement** |
| White letter Hairstreak | Mixed scrub and on the edges of woodland rides. Food plant Wych elm. | Continue selective thinning and strip-shelterwood felling as part of LISS management, this will allow the development of shrub layer structure and increased structural and species diversity. Enhance rides and woodland edge habitat. |

| | | |
|---|---|---|
| Green Hairstreak | Woodland rides and clearings, heathland | Continue selective thinning and strip-shelterwood felling as part of LISS management, this will allow the development of shrub layer structure and increased structural and species diversity. Enhance rides, woodland edge habitat and clearings to encourage a habitat mosaic with more open heathy areas. |
| Section 41 species;<br>Minor Shoulder-knot<br>September thorn<br>White line-dart<br>Small square spot,<br>Heath rustic,<br>Dusky brocade<br>Knot grass<br>White and Buff ermine | | Continue selective thinning and strip-shelterwood felling as part of LISS management, this will allow the development of shrub layer structure and increased structural and species diversity.<br>Enhance rides, woodland edge habitat and clearings to encourage a habitat mosaic with more open heathy areas.<br>Expand diverse riparian woodland habitat, create, and maintain successional woodland (birch and willow)/scrub habitat |
| **Reptile** [3] | **Forest location** | **Habitat enhancement** |
| Adder | Heathland/verges | Maintain the known sites in suitable condition through vegetation management. Plan operations to minimise damage to known hibernacula sites.<br>Increase the connectivity of these habitats through thinning operations and maintain a mosaic of open structure woodland/wooded heath, wide rides and forest road verges. |
| **Invertebrates** | **Forest location** | **Habitat enhancement** |
| Glow worm[3] | Ingleby incline | Maintain the known sites in suitable condition, ensuring longer tussock grass and scrub. Increase suitable habitat through thinning operations and limit disturbance to verges. |
| **Mammals**[3] | **Forest location** | **Habitat enhancement** |
| Bats | Ingleby sheds | Increase habitat connectivity throughout the forest along with the road and ride network and maintain a mosaic of open structure woodland and improve riparian corridors through thinning operations. Ensure veteran trees protected. |

| Trees | Forest location | Habitat enhancement |
|---|---|---|
| Veteran Oaks/ beech | Various | Open up veteran trees through thinning and felling operations as part of this plan and monitor condition. Plan operations to minimise damage |
| Juniper | Various | Planted between 2000 and 2015. Monitor and clear scrub/ surrounding trees as required. Plan operations to minimise damage. |

[1] Source – BTO Bird Atlas and Breeding Bird Survey data

*The Breeding Bird Survey is run by the British Trust for Ornithology (BTO) and is jointly funded by the BTO, the Joint Nature Conservation Committee (JNCC) (on behalf of the statutory nature conservation bodies: Department of Agriculture, Environment and Rural Affairs - Northern Ireland, Natural England, Natural Resources Wales and Scottish Natural Heritage), and the Royal Society for the Protection of Birds (RSPB).*

[2] Source – Butterfly Conservation Group
[3] Source – FE wildlife monitoring volunteers
[4] Source - University of York PhD studies

**Appendix 2 – LISS justification**

**Site Appraisal**

| Site Factor | Suitability Score | Comment |
|---|---|---|
| Wind Hazard Classification:<br><br>Class 1 & 2 across 67% forest area<br><br>Class 3 & 4 across 33% forest area | <br><br>1<br><br>2 | ESC indicates rooting depth up to 100cm across steep valley sides and 20cm across the gently sloping plateaux sites. |
| Soil fertility:<br><br>Scree, typical peaty SWG, ironpan (18%)<br><br>Typical brown earth, typical SWG (82%) | <br><br>1<br><br>3 | Ground vegetation is generally that associated with medium SNR and competing species may have a negative impact if not considered at the establishment phase. |
| Current species suitability:<br><br>**AWS**<br>PBI, CAR, ROW, Willow sp.<br><br>SBI, AH<br><br><br><br>**Non AWS/SSSI**<br>SS, LP, PBI, Willow sp.<br><br>JL, SBI | (fresh SMR/medium SNR)<br><br><br>1 – Very suitable<br>NVC W11<br><br>2 - Suitable<br>NVC W6, W10, W16, W17<br><br><br>1 – Very suitable<br><br>2 - Suitable | <br><br>Careful management toward adaptation strategies should be considered to mitigate negative impacts. A wide range of native and naturalised species are considered suitable species through ESC.<br><br><br>A wide range of current species are considered suitable through ESC. Future suitable species that could be considered to improve diversity and adaptive capacity across this site could include MCP, ESF, WSQ, RSQ, WH, WRC. |

Combined scores across the majority of the forest range between 5 or 6, depending on site factors achieving a 'Moderate' site ranking for transformation to LISS.

**Stand Appraisal**

Stand form – Overall stand form for first rotation Scots pine is good. There is good evidence of advanced regeneration of birch which can act as a site improving species although this species is less suitable under future climate projections. Old Christmas tree sites are of poor form.

Thinning history - Thinning operations have been maintained across the majority of sites unless access or steep conditions impede management. Where access is not an issue stands are well developed. Old Christmas tree sites have not yet been thinned.

Access – steep slopes and difficult topography present operational challenges whilst harvesting the upper reaches of the scarp slope.

On the basis of the above information, we will consider transformation to LISS with the aim of increasing species diversity through enrichment planting using a range of species depending on site objectives.
Group shelterwood system will be applied to a range of stand types across Ingleby Greenhow where the felling of small coupes, up to 0.6 ha in size, will contribute toward the development of mixed native woodland across ancient woodland sites (AWS) and mixed conifer/broadleaf woodland across non-AWS.

The Forest Research ESC table below supports the range of target species considered for natural regeneration and those identified as very suitable/suitable (dark/light green) where enrichment planting will increase species diversity.

Future wildlife management issues may arise where deer browsing could impact across groups as more palatable species are introduced. Site monitoring, the development of deer management infrastructure as set out in Forest Plan, section 3.7.6 and adherence to the District Deer Management strategy will help inform future management.

ESC report – NZ6000023

**Ecological Site Classification Report**

| *Eastings(m)* | *Northings(m)* | *Grid Reference* | *Climate Scenario* | *Site Class* | *Filter* | *Brash* | *Drainage* | *Fertiliser/Nurse* |
|---|---|---|---|---|---|---|---|---|
| 460000 | 502300 | NZ600023 | Medium-High 2080 (A1b/3q0) AWC method | Warm - Sheltered - Slightly dry | All species | Brash older than 18 months | No drainage installed | Mixture applied |

Site Description and Variables

The site has a warm, sheltered and slightly dry climate. The soils are fresh moisture status and medium nutrient status. The analysis assumes that site management (e.g. CCF), the use of deep rooting species and/or soil properties will help mitigate climatic moisture deficits. Nutrient deficiencies are primarily due to nitrogen availability, and will be ameliorated through planting target species in an intimate mixture with one or more of Scots pine, Alaskan Lodgepole pine, Larch, Birch or Alder. The site DAMS score has been reduced due to either a) an intention to underplant species with the benefit of shelter from established trees or b) local observations of additional shelter/less exposure. Tree species recommendations in ESC do not take account of each countries regulatory approval process, so prior to including species in a forest plan advice should be sought from relevant forestry authorities.

| Modifications | *AT* | *CT* | *DAMS* | *MD* | *SMR* | *SNR* |
|---|---|---|---|---|---|---|
| Default | 2256.0 | 8.0 | 10.0 | 197.0 | 5.0(Fresh) | 3.0(Medium) |
| Nursing mixture | | | | | | 0.0 |
| Dams Modifier | | | -2 | | | |
| Final | 2256.0 | 8.0 | 8.0 | 197.0 | 5.0(Fresh) | 3.0(Medium) |

| Species | *Abbr.* | *Suit(Ecol)* | *Suit(Timber)* | *Yield* | *Limiting* | *AT* | *CT* | *DAMS* | *MD* | *SMR* | *SNR* | *Version* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Corsican pine | CP | ● | ● | 20 | SMR | ● | ● | ● | ● | ● | ● | 3.3(A) |
| Lodgepole pine | LP | ● | ● | 14 | AT5 | ● | ● | ● | ● | ● | ● | 3.1(A) |
| Macedonian pine | MCP | ● | ● | 14 | AT5 | ● | ● | ● | ● | ● | ● | 3.1(C) |
| Maritime pine | MAP | ● | ● | 13 | CT | ● | ● | ● | ● | ● | ● | 3.1(C) |
| Monterey/Radiata pine | RAP | ● | ● | 20 | SMR | ● | ● | ● | ● | ● | ● | 3(C) |
| Scots pine | SP | ● | ● | 14 | AT5 | ● | ● | ● | ● | ● | ● | 3.3(A) |
| Weymouth pine | WEP | ● | ● | 13 | AT5 | ● | ● | ● | ● | ● | ● | 3(C) |
| Norway spruce | NS | ● | ● | 17 | AT5 | ● | ● | ● | ● | ● | ● | 3.3(A) |
| Oriental spruce | ORS | ● | ● | 22 | SNR | ● | ● | ● | ● | ● | ● | 3(C) |
| Serbian spruce | OMS | ● | ● | 17 | SNR | ● | ● | ● | ● | ● | ● | 3(B) |
| Sitka spruce | SS | ● | ● | 26 | MD | ● | ● | ● | ● | ● | ● | 3.4(A) |
| Sitka spruce (Imp.) | Imp.SS | ● | ● | 28 | MD | ● | ● | ● | ● | ● | ● | 3.4(A) |
| Douglas fir | DF | ● | ● | 26 | AT5 | ● | ● | ● | ● | ● | ● | 3.1(A) |
| Hybrid larch | HL | ● | ● | 10 | AT5 | ● | ● | ● | ● | ● | ● | 3(A) |
| Japanese larch | JL | ● | ● | 9 | AT5 | ● | ● | ● | ● | ● | ● | 3(A) |
| European larch | EL | ● | ● | 12 | DAMS | ● | ● | ● | ● | ● | ● | 3(A) |
| Western red cedar | RC | ● | ● | 24 | CT | ● | ● | ● | ● | ● | ● | 3.1(A) |
| Japanese red cedar | JCR | ● | ● | 24 | AT5 | ● | ● | ● | ● | ● | ● | 3(B) |
| European silver fir | ESF | ● | ● | 20 | CT | ● | ● | ● | ● | ● | ● | 3(B) |
| Grand fir | GF | ● | ● | 29 | DAMS | ● | ● | ● | ● | ● | ● | 3(A) |

| Ecological Site Classification Report | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Noble Fir | NF | ● | ● | 7 | AT5 | ● | ● | ● | ● | ● | ● | 3(A) |
| Nordmann fir | NMF | ● | ● | 21 | SNR | ● | ● | ● | ● | ● | ● | 3(C) |
| Pacific fir | PSF | ● | ● | 21 | CT | ● | ● | ● | ● | ● | ● | 3.4(C) |
| Leyland cypress | LEC | ● | ● | 24 | AT5 | ● | ● | ● | ● | ● | ● | 3(B) |
| Western hemlock | WH | ● | ● | 19 | CT | ● | ● | ● | ● | ● | ● | 3(A) |
| Giant redwood | WSQ | ● | ● | 30 | DAMS | ● | ● | ● | ● | ● | ● | 3(B) |
| Coast redwood | RSQ | ● | ● | 27 | SNR | ● | ● | ● | ● | ● | ● | 3(B) |
| Lawson's cypress | LC | ● | ● | 24 | SMR | ● | ● | ● | ● | ● | ● | 3(B) |
| Downy birch | PBI | ● | ● | 4 | AT5 | ● | ● | ● | ● | ● | ● | 3.2(A) |
| Silver birch | SBI | ● | ● | 9 | AT5 | ● | ● | ● | ● | ● | ● | 3.2(A) |
| Big leaf maple | AMA | ● | ● | 9 | CT | ● | ● | ● | ● | ● | ● | 3.1(C) |
| Norway maple | NOM | ● | ● | 11 | AT5 | ● | ● | ● | ● | ● | ● | 3(B) |
| Sycamore | SY | ● | ● | 11 | SNR | ● | ● | ● | ● | ● | ● | 3.3(A) |
| Beech | BE | ● | ● | 9 | AT5 | ● | ● | ● | ● | ● | ● | 3.1(A) |
| Roble beech | RON | ● | ● | 17 | AT5 | ● | ● | ● | ● | ● | ● | 3.1(B) |
| Ash | AH | ● | ● | 8 | SNR | ● | ● | ● | ● | ● | ● | 3(A) |
| Pedunculate oak | POK | ● | ● | 8 | CT | ● | ● | ● | ● | ● | ● | 3.1(A) |
| Red oak | ROK | ● | ● | 8 | SNR | ● | ● | ● | ● | ● | ● | 3(B) |
| Sessile oak | SOK | ● | ● | 8 | SMR | ● | ● | ● | ● | ● | ● | 3.2(A) |
| Aspen | ASP | ● | ● | 10 | AT5 | ● | ● | ● | ● | ● | ● | 3.2(A) |
| Black poplar | BPO | ● | ● | 10 | SNR | ● | ● | ● | ● | ● | ● | 3.1(A) |
| Rauli beech | RAN | ● | ● | 18 | AT5 | ● | ● | ● | ● | ● | ● | 3.1(B) |
| Common alder | CAR | ● | ● | 7 | SMR | ● | ● | ● | ● | ● | ● | 3.2(A) |
| Red alder | RAR | ● | ● | 9 | AT5 | ● | ● | ● | ● | ● | ● | 3(B) |
| Grey alder | GAR | ● | ● | 10 | AT5 | ● | ● | ● | ● | ● | ● | 3.1(B) |
| Italian alder | IAR | ● | ● | 9 | CT | ● | ● | ● | ● | ● | ● | 3.2(B) |
| Shining gum | ENI | ● | ● | 36 | AT5 | ● | ● | ● | ● | ● | ● | 3(C) |
| Cider gum | EGU | ● | ● | 23 | AT5 | ● | ● | ● | ● | ● | ● | 3(C) |
| Rowan | ROW | ● | ● | 4 | SNR | ● | ● | ● | ● | ● | ● | 3.3(A) |
| True service tree | TST | ● | ● | 8 | AT5 | ● | ● | ● | ● | ● | ● | 3(A) |

Forest Development Types non-AWS productive mixed conifer; 1.1.2, 1.1.4, 1.1.5, 2.1.3, 2.1.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4.

Forest Development Types non-AWS productive mixed broadleaf; 6.1.3, 7.1.1, 7.1.2.

| Site type | | Species | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upland sites | Lowland sites | **SP** | **LP** | **MCP** | **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*** |

| | |
|---|---|
| **BOLD CAPITAL (Y)/BOLD INFILL COLOUR** | **Cat A Major species** - currently widely used with no supply problems and should continue to play an important role |
| ***Bold, lower case italics (y), pastel infil colour*** | **Cat B Minor species** - 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 (y), pastel infill colour | **Cat C Secondary species**- 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 |

Refer to cell comments for specific species notes

**No planting where >50cm peat depth**

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

| Appendix 4 - Sand Hutton Forest Monitoring Plan | | | |
|---|---|---|---|
| **Objective** | **Method** | **Frequency/Timings** | **Actions** |
| **People** | | | |
| North York Moors National Park 'Cleveland Foothills Upland Fringe' | Fixed-point photography | Year 0 baseline, 5-year review, 10-year review. | Review visual impact of coupes within the landscape and adjust future coupe shape if necessary. |
| Nature | | | |
| Improve and maintain the resilience of the natural environment, with particular focus on designated sites and realise the potential of these woods for nature and wildlife | Update Forester Web GIS; subcompartment database, Conservation module. | As recordable changes occur within the forest environment. At time of Year 0 plan renewal, 5-year review, 10-year review. | Measure changes in diversity across species, age structure, conservation siting's/records and broad habitat types; conifer, broadleaf, open. Ensure positive change through increasing diversity occurs over the lifetime of the plan. |
| | Review sample of Operational Site Assessments. | Annually | Provide feedback where management is not compliant with recommendations. |
| Maintain the cultural and heritage value of these woods | To be measured by NYMNP Authority and FC systems accordingly | 5 years | Provide feedback where habitat is not in favourable condition and recommend programme of works to achieve favourable status. |
| | Review sample of Operational Site Assessments. | Annually | Provide feedback where management is not compliant with recommendations. |
| Ensure SSSI's are maintained in target condition | Monitored through liaison with Natural England | 5 years | Provide feedback where management is not compliant with recommendations. |
| Economy | | | |
| All of our forests and woodlands are certified to the Forest Stewardship Council®(FSC®) licence code FSC-C123214 and the Programme for the Endorsement of Forest Certification (PEFC) licence code PEFC/16-40-1001 standards. We will maintain the land within our stewardship certified against the UK Woodland Assurance Standard. | Independent surveillance audit across the organisation. | Annually | Implement corrective actions as required. |
| | Independent surveillance audit across the District. | As per audit sample. | Implement corrective actions as required. |
| Improve the economic resilience of these woods from a more diverse range of site appropriate conifer and broadleaf species | Update Forester Web GIS; subcompartment database, Operational Thinning Layer, Management Coupe Layer. | As recordable changes occur within the forest environment and End Of Year updates. Year 0 plan renewal, 5-year review, 10-year review. | Review long-term changes in productive capacity through the Production Forecast at the point of plan renewal and across the wider District. |
| Site-specific | | | |
| Clearfell coupes - ensure boundaries are accurately reproduced and within agreed tolerances as set out in Forestry Commission Practice Delivery Note 01 (FC PDN 01). | GPS unit or equivalent data recorders. | Upon completion of all harvesting activity. | If significant coupe variation, apply for appropriate ammendment to FC as required as per FC PDN 01 prior to felling. Update Forester Web for completed clearfells. |
| Restock & Future Habitat Coupes - Productive mixed conifer sites. Establish at least 2500 conifer stems per ha by planting and natural regeneration by year 5 since date of initial planting (allowing 2 years fallow for *hylobius* ). | On-site stocking density plot surveys. | Beat-up surveys between years 1 to 4. Year 5 stocking assessment, internal guidance OGB4. | Carry out beating up where stocking density falls below prescribed number of trees/ha to achieve full stocking. |
| Restock & Future Habitat Coupes - Mixed broadleaf habitat. Establish at least 1100 broadleaf stems per ha through natural regeneration by year 10 since date of felling. | On-site stocking density plot surveys. | Beat-up surveys between years 1 to 4. Year 5 stocking assessment, internal guidance OGB4. | Carry out enrichment planting where stocking density falls below prescribed number of trees/ha to achieve full stocking. |
| LISS coupes - Productive mixed conifer sites. Establish at least 2500 conifer stems per ha by year 10 after final removal overstorey. | On-site stocking density plot surveys. | Beat-up surveys between years 1 to 4. Year 5 stocking assessment, internal guidance OGB4. | Carry out enrichment planting where stocking density falls below prescribed number of trees/ha to achieve full stocking. |
| Wildlife management - Identify problem sites where mammal damage is affecting crop establishment or degrading woodland flora. | On-site stocking density plot surveys. Damage, Impact and Activity Assessments as set out in YFD Deer Management Strategy. | To be informed from results of beat-up surveys between years 1 to 4 and year 5 stocking assessment, internal guidance OGB4. | Target deer control in line with District strategy. |
| PAWS regeneration. | Monitor change through abbreviated stocking density assessments and repeat condition surveys. | Beat-up surveys between years 1 to 5 year assessment. Ancient Woodland condition survey within plan period. | Monitor change from areas that are currently Semi natural class toward target SN 1 (>80% native). Consider future changes in management that can achieve target score. |
| Plan specific | | | |
| Forest Plan mid-term review. Review the plan's aims and objectives and the progress of their implemetation. | Apply a variety of measures as described in the above table. | 2028 | Modify the plans aims and/or objectives where these are no longer compatible with National or District Policy. Significant plan changes will require consultation and formal amendment from the Forestry Commission. |

**Appendix 5 Agreed Tolerance Table for Yorkshire Forest District, England**

| | 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 regeneration | 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 >1 Ha or 10% of the area (whichever is less) in sensitive[2] areas, >5 ha or 25% of the 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,[3]** | Between 10-25% of the coupe area | Where changes to the felling sequence is likely to result in a minor breach[4] 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 <u>not required</u>[5]** | < 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 <1 Ha or 10% of the area (whichever is greater) in sensitive areas, <5 ha 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% |

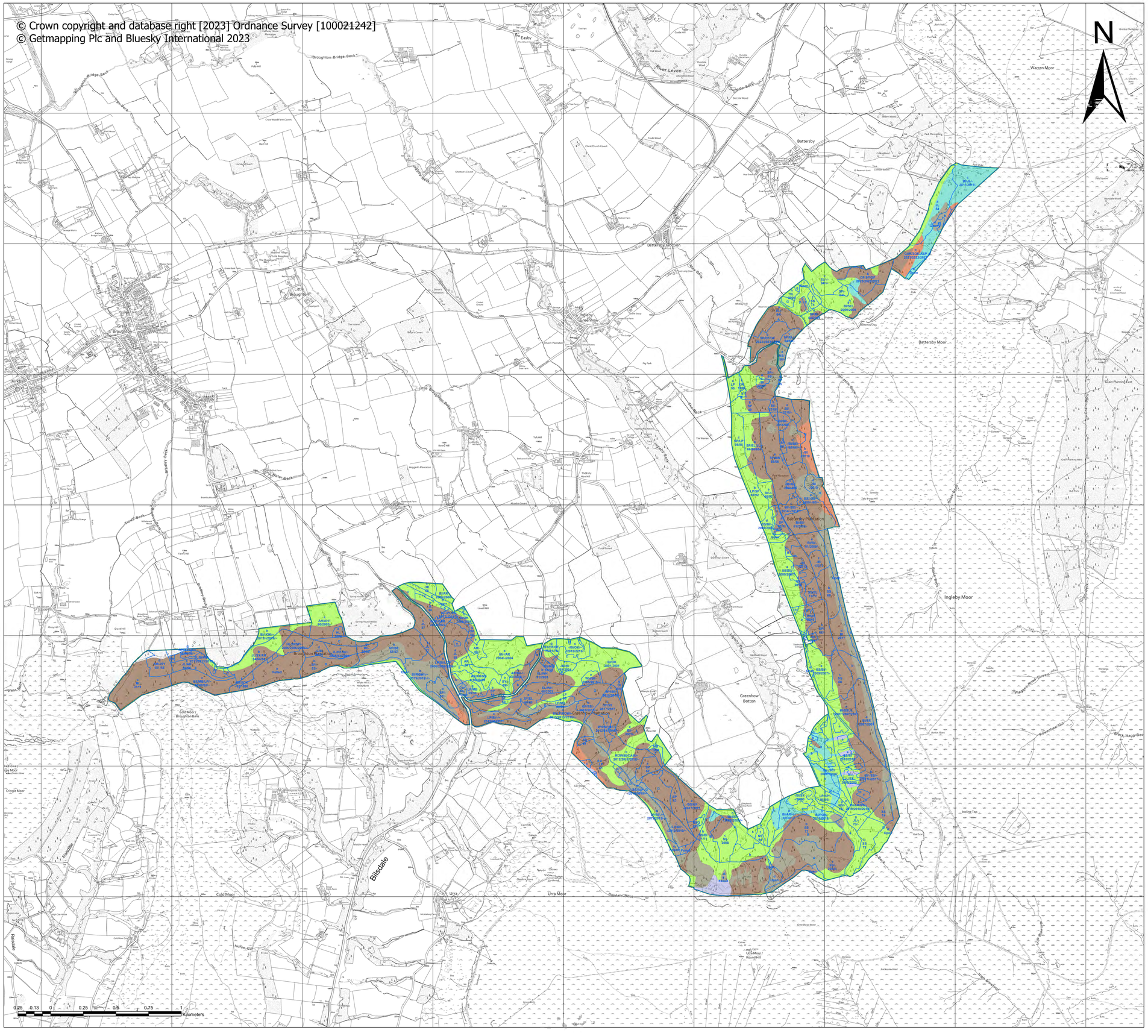
[1] Greater than 20% of the coupe boundary

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

[3] Approval letter retained for compliance inspection purposes

[4] 20% or less of the coupe boundary

[5] District team must retain all relevant documentation for compliance inspections




Forestry England

Ingleby Greenhow Forest Plan

FP Map 01 – Soils

Scale: 1:10,000

When Printed @ AO

Created: August 2023

- Blocks
- Typical Brown Earth
- Ironpan Soil
- Typical Peaty Surface-Water Gley
- Typical Surface-Water Gley
- Blanket Bog
- Scree

FSC www.fsc.org FSC® C123214
The mark of responsible forestry

Forestry England forests and woodlands have been certified in accordance with the UK Woodland Assurance Standard (UKWAS)

PEFC PEFC/16-40-1001
Promoting Sustainable Forest Management
www.pefc.org

Forestry England

Ingleby Greenhow Forest Plan

FP Map 02 – Current Species

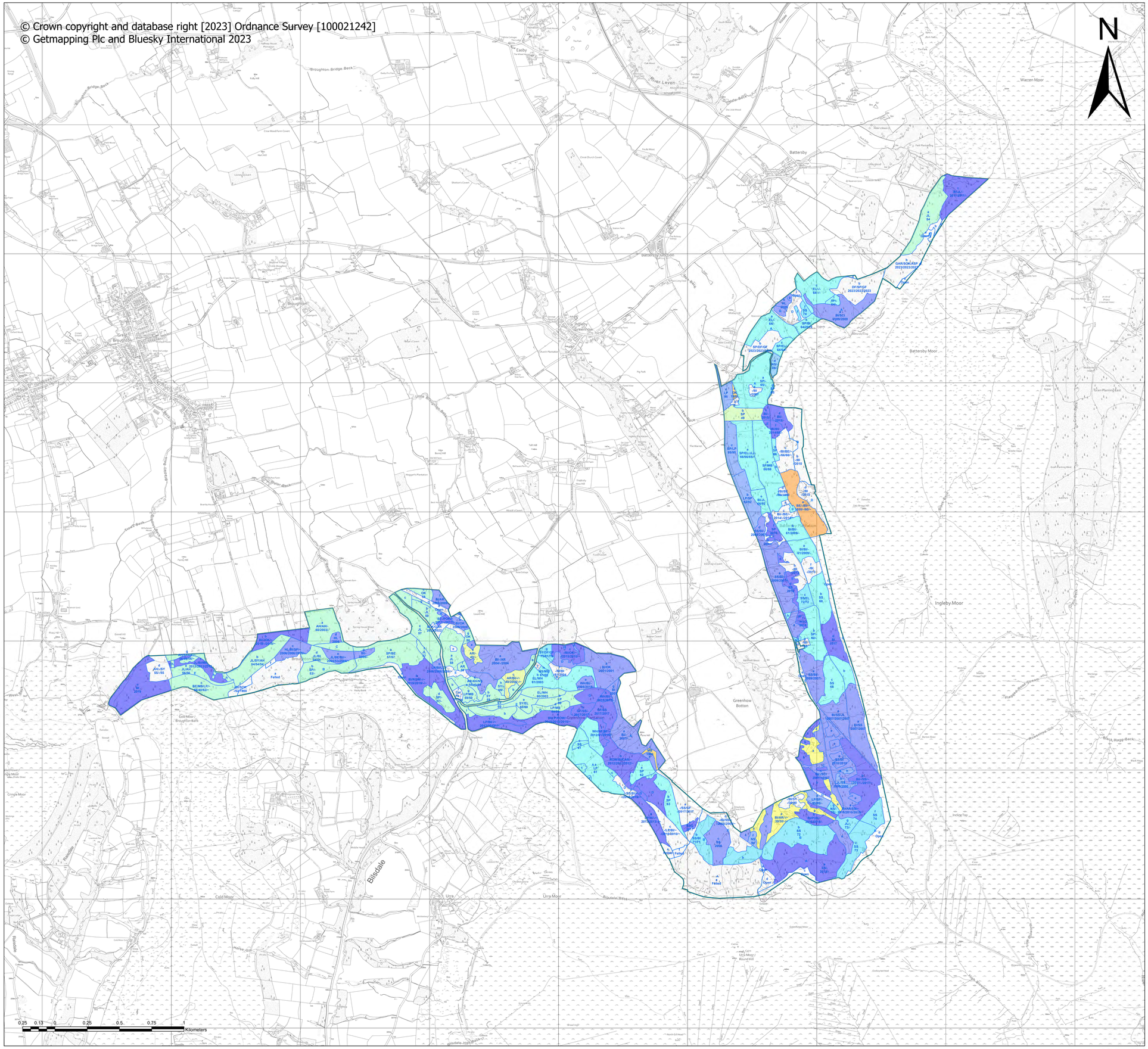
Scale: 1:10,000

When Printed @ AO

Created: August 2023

- Beech
- Larch
- Oak
- Other Broadleaves
- Other Conifers
- Pine
- Spruce
- No Species

0.25 0.13 0 0.25 0.5 0.75 1 Kilometers




Forestry England

Ingleby Greenhow Forest Plan

FP Map 03 – Age Class

Scale: 1:10,000

When Printed @ AO

Created: August 2023

- 1801 - 1850
- 1851 - 1900
- 1921 - 1930
- 1931 - 1940
- 1941 - 1950
- 1951 - 1960
- 1961 - 1970
- 1971 - 1980
- 1981 - 1990
- 1991 - 2000
- 2001 - 2010
- 2011 - 2022

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N

Forestry England

Ingleby Greenhow Forest Plan

FP Map 04 – Management Information

Scale: 1:10,000

When Printed @ AO

Created: August 2023

- Forest Block
- Sites of Special Scientific Interest
- Public Rights Of Way
- Watercourses
- Water Pipelines
- Underground telephone or fibreoptic
- Underground Gas Pipeline

0 0.25 0.5 0.75 1 Kilometers

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FSC www.fsc.org FSC® C123214 The mark of responsible forestry

PEFC PEFC/14-44-1001 Promoting Sustainable Forest Management www.pefc.org

Proposed Harvesting Map

The map shows how we intend to manage tree felling in Ingleby Greenhow 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.

Low Impact Silvicultural Systems

Change is managed more slowly using a combination of heavier thinnings and small group felling or strip felling. The purpose of 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 this site has tree cover at all times and at one or more levels.

N

0.25 0.13 0 0.25 0.5 0.75 1 Kilometers

Forestry England

Ingleby Greenhow Forest Plan

FP Map 05 - Proposed Felling

Scale: 1:10,000

When Printed @ AO

Created: August 2023

- Block
- 2023 - 2026
- 2027 - 2031
- 2032 - 2036
- 2037 - 2041
- Beyond 2042 or LISS
- Other / Open Land
- Long Term Retention

Forestry England

# Ingleby Greenhow Forest Plan

FP Map 06 - Management Type

Scale: 1:10,000

When Printed @ AO

Created: August 2023

- Block
- Clearfell
- Long Term Retention
- Group shelterwood
- Irregular shelterwood (general)
- Minimum Intervention
- Other\Open Land

0.25 0.13 0 0.25 0.5 0.75 1 Kilometers

Forestry England forests and woodlands have been certified in accordance with the UK Woodland Assurance Standard (UKWAS)

FSC www.fsc.org FSC® C123214 The mark of responsible forestry

PEFC PEFC/16-45-0041 Promoting Sustainable Forest Management www.pefc.org

The maps shows the main species group 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, dependent 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 Corsican Pine and Larch for restocking. Species showing drought tolerance and disease resistance characteristics such as Macedonian Pine, Oriental Spruce, European Silver Fir, Coast Redwood and Douglas Fir will be considered.

Predominantly mixed broadleaf areas will be restocked by natural regeneration primarily using site native species. This will be predominantly Birch 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.

N

0.25 0.13 0 0.25 0.5 0.75 1 Kilometers

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Ingleby Greenhow Forest Plan

FP Map 07 - Future Habitat & Restock

Scale: 1:10,000

When Printed @ AO

Created: August 2023

- Block
- Other Broadleaves
- Other Conifers
- Successional Open

Forest landscape character is strongly influenced by the forests location on the scarp slope between the Cleveland Hills, Upland Fringe and Cleveland Hills plateaux landscape character areas.
* Continue to design clearfell coupes that respond to landform and increase structural diversity through the development toward uneven aged, mixed conifer/broadleaf woodland.
* Where conditions allow, manage recently felled sites through lower impact silvicultural systems to promote more structural and species diversity.

Sustainable timber production remains a priority objective across the forest whilst mindful of impacts from climate change on species choice and plant health.
* The introduction of alternative conifer species i.e. Macedonian pine, European silver fir, Coast redwood and Giant redwood will be considered for restocking where conditions are suitable.
* Develop low impact silvicultural systems and extended rotation silviculture to allow natural regeneration and enrichment planting with alternative species to become established.

Ingleby Greenhow forest sits within the Leven River Catchment where numerous streams and watercourses flow through the forest into Little Broughton Beck and Ingleby Beck.
* Continue working with the Tees Rivers Trust and other partners to restore and maintain wetland habitats, promoting the development of wet woodland and reducing sediment delivery into watercourses.
* Develop riparian corridors across the forest replacing conifer-dominant stands with a mosaic of successional habitats, managing sites toward broadleaf-dominant woodland and contributing to improving watercourse ecological condition.

Restoration and maintenance of ancient woodland sites that are resilient to potential threats from climate change remains a priority objective across the forest.
* Conifer stands will be restored to native and naturalised species by a combination of felling, thinning, natural regeneration and reducing the impacts of invasive species. Enrichment planting will be carried out where primary species are absent or unlikely to become established through natural regeneration.
* Ancient woodland sites will be buffered by converting adjacent conifer stands to predominantly mixed broadleaf woodland.
* Maintain existing and develop additional deadwood resource through management interventions and allowing natural mortality of large dimension trees.

Botton Head SSSI and North York Moors SSSI/SPA/SAC cut across parts of the upper margins of the forest.
* Operational activity will be carried out in line with SSSI requirements to maintain these units in favourable condition.

0 0.275 0.55 1.1 1.65 2.2 2.75 km



Forestry England

*Title:* **FP Map 04 - Analysis & Concept**

*Date:* 14 February 2023

*Author:* Nigel Rylance

*Scale @ A3:* 1:25,000

**Legend**

- Convert and maintain as predominantly mixed broadleaf woodland.
- Continue to manage as predominantly productive mixed conifer woodland.
- Restore and maintain ancient woodland sites
- SSSI's will continue to be managed in line with agreed plans.