

# **FOREST PLAN**

## **BROWNHILLS FOREST**

**18/09/08**

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UPM Tilhill.**

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## A WOODLAND DESCRIPTION

### A.1 Property

Applicant	Tilhill Forestry Ltd
Owner	Tilhill Forestry Ltd
BRN	123456
Main Location Code	123/4567
Agent	UPM Tilhill (TF), Carlow House, Locharbriggs, Dumfries DG1 1QS. All correspondence should be sent through TF
Payee	Tilhill Forestry Ltd. Send to Carlow House, Locharbriggs, Dumfries DG1 1QS

### A.2 Location & Background

Brownhills Forest has been under the ownership and management of Tilhill since 1988. The Forest is located within extensive upland forest, some 5 miles south of Dalmellington and 4 miles north of the village of Carsphairn.

A Location Map is shown in Map 1. Entrance Grid Ref: NS 514013.

Forest Plan Area 1442.24 ha

Single ownership, managed as a commercial plantation and comprising two blocks bisected by the A713. This is the first main management plan of the forest, which continues the process of restructuring of the woodland.

Local Authority Districts: Stewartry (Dumfries & Galloway) & Cumnock and Doon Valley District (East Ayrshire)

### A.3 Existing Schemes and Felling Licences

Scheme	Compartments
SFGS 034900234	101-103, 314, 322 and 402
Felling Licence 034/77/02-03	322
Felling Licence 034/102/02-03	314, 328 and 329
Felling licence 034/60/03-04	312, 325, 326 and 403

### A.4 Stakeholder Engagement

Three Stakeholder Meetings were held. Findings are detailed in the Scoping Report.

The main features highlighted during scoping were

- the direction and timing of timber movements
- the need to manage the archaeological features in a positive manner
- maintenance of public access at the Water of Deuch

## A.5 Long term Vision and Management Objectives

The long-term vision is to manage the forest on a commercial basis, to maximise the value of standing crops through the production of quality sawlog material and to restructure the forest to diversify age class distribution. The desire is to enhance both the biodiversity value and the public access opportunities of the woodland.

The management objectives are:

- Maximise owner's investment.
- Sequester carbon and secure additional income from the sale of the verified net increase in carbon stocks.
- Create a long term forest structure of: 65 to 70% primary coniferous species, 5% secondary coniferous species, 15 to 20% in open ground within the forest area, 5% native broadleaves and 2% additional area managed for biodiversity.
- Establish management prescriptions in line with UKWAS and the UK Forestry Standard.
- Carry out designed felling to break up single canopy within the constraints of an upland location and a future compartment structure that takes into account natural land form and features.
- Extend planting range to create a more diverse forest structure.
- Protect sites of archaeological value.
- Maintain any existing rights of way.

## A.6 Site Description

**Table 1: Species Distribution**

	SS	HL	JL	LP	NF	MC	MB	Bare / Felled	UP	GOS	Total
Area	1039.12	3.52	14.25	32.49	3.69	6.62	7.68	265.36	37.79	31.73	1442.24
Species %	72.05	0.24	0.99	2.25	0.26	0.46	0.53	18.40	2.62	2.20	100%

**Table 2: Planting Year by Area**

	1970	1971	1972	1999	2001	2002	2003	2004	2005	Hill top / Bare / Felled	Total
Area	730.17	222.48	25.76	25.28	0.09	19.64	37.17	46.84	31.68	303.14	1442.24
PYear %	50.63	15.43	1.79	1.75	0.01	1.36	2.58	3.25	2.20	21.02	100%

The yield class of larch and pine range from yield class 4 to 8. The Spruces range from 6 to 20. Average productivity of Sitka spruce is 14.

The underlying geological structure is composed of drifts of greywacke and shales. These generate, together with the influence of glacial drifts, soils of moderate fertility.

Soil types range from poor blanket bogs on the hilltops to more fertile flushed bogs and peaty gleys. Peaty iron pans and skeletal soils characterise the steeper slopes around Glenmuck Craig and Sloan's Cairn. Small areas of upland brown earths exist around this area and on the eastern side of White Hill.

Windthrow Hazard Class ranges from 4 to 6. The average is 5.

Two Scheduled Monuments exist in compartments 502 and 503. Other features include old sheep folds.

An ecological audit was commissioned in 1997. Three key sites are a burnside, a natural wetland and a high bog peatland.

Although no Rights of Way exist in the property a claimed right of way runs along the forest road to the south east of the property. Permissive use of the ground at the end of the minor county road at grid reference NS 557 015 as a small car park has allowed pedestrian access to the forest.

**B SURVEY DATA**

<b>Survey</b>	<b>Date</b>	<b>Data Location</b>
Soil Map	1974	UPM Tilhill, Locharbriggs
Ecological Report	1997	UPM Tilhill, Locharbriggs
Aerial Photography	2007	UPM Tilhill, Locharbriggs
Compartment Schedule	Revised 2008	
Viewpoint Photos	2008	

## C ANALYSIS OF INFORMATION

### C.1 - Constraints and Opportunities Analysis (see Map 2)

#### C.1.1 SITE CONSTRAINTS IMPACT

Factor	Constraint	Opportunity
Soils	Poor soils limit species choice.	<ul style="list-style-type: none"> <li>• Introduce secondary conifer where better soil exists.</li> <li>• Match broadleaf species to site conditions, exploiting pockets of better soil for Ash etc., to increase species diversity.</li> </ul>
Windthrow	Soil types and exposure impacting on tree wind firmness (wind blow has already occurred in the forest).	<ul style="list-style-type: none"> <li>• Introduce wind firm restructuring compartment boundaries to follow features such as watercourses, dry ridges and roadsides.</li> </ul>
Ownership Boundaries	<p>Straight southern boundaries have provided "hard" line edges.</p> <p>Neighbouring forests operations.</p>	<ul style="list-style-type: none"> <li>• Add diversity through open ground and broadleaf planting to "soften" edges.</li> <li>• Consider felling plans of adjacent forests to try and achieve 2 metre height separation between restructuring coupes or consider felling adjacent neighbouring coupes at the same time to remove visually intrusive boundary edges.</li> </ul>
Roads	<p>Some parts of the forest have poor access.</p> <p>Poor access onto A713.</p>	<ul style="list-style-type: none"> <li>• Construct new roads which can also be used for improved public access.</li> <li>• Development of bell mouth will improve safety.</li> </ul>

#### C.1.2 ARCHEOLOGICAL IMPACT

Factor	Constraint	Opportunity
SAMS	Sites are under trees and liable to damage. Control measures required to minimise ground damage during harvesting operations.	<ul style="list-style-type: none"> <li>• Open ground around SAMS and improve settings.</li> </ul>
Other Features		<ul style="list-style-type: none"> <li>• To be identified when clear felling.</li> </ul>

### C.1.3 VISUAL IMPACT

Factor	Constraint	Opportunity
Ownership Boundary	Shape of boundary conflicts with landform.	<ul style="list-style-type: none"> <li>• Boundary line can be developed along the same design principles as neighbours to develop a natural landscape despite change of ownership.</li> <li>• Boundary line along Water of Deugh and southern edges can be improved by use of long term retentions.</li> </ul>
Power Lines	<p>Intrusive impact on visual amenity.</p> <p>Trees close to power lines.</p>	<ul style="list-style-type: none"> <li>• Introduction of shrub species and open ground to provide more sensitive landscape boundaries.</li> <li>• Next rotation kept back from line to minimise supply disturbance and reduce need of felling edge trees and associated wind damage risk.</li> </ul>
A713	Poor visual amenity.	<ul style="list-style-type: none"> <li>• Restructuring to follow "Forest Design Planning" Guide.</li> </ul>

### C.1.4 ECOLOGICAL IMPACT

Factor	Constraint	Opportunity
Watercourses	Conifers planted close to watercourses causing shade.	<ul style="list-style-type: none"> <li>• Development of riparian zones and introduction of broadleaves and open ground.</li> </ul>
Plantings on poor soils/high exposure	Slow tree growth and planting on deep peat.	<ul style="list-style-type: none"> <li>• Develop open ground and associated margins for Black Grouse and consider peat restoration.</li> <li>• Opportunities to restore heather.</li> </ul>
Black Grouse	Limited open ground.	<ul style="list-style-type: none"> <li>• Develop habitat.</li> </ul>
Merlin	Timing of felling.	<ul style="list-style-type: none"> <li>• Enhance biodiversity within forest</li> </ul>
Conservation	<p>Lack of existing broadleaf woodland.</p> <p>Lack of mature timber.</p>	<ul style="list-style-type: none"> <li>• Introduce broadleaves in riparian, roadside and higher visibility areas.</li> <li>• Manage some larch and spruce for long term retention.</li> </ul>

### C.1.5 HERBIVORE IMPACT

Factor	Constraint	Opportunity
Deer	High resident population and pressure from neighbouring forests.	<ul style="list-style-type: none"> <li>• Develop deer management plan and liaise with neighbours.</li> <li>• Introduce more open ground and glades to facilitate deer control.</li> </ul>

### C.1.6 SOCIAL IMPACT

Factor	Constraint	Opportunity
Timber Traffic	Increased use of A713.	<ul style="list-style-type: none"> <li>• Improve access. Provide anticipated movements to Local Authority to inform their road maintenance programme.</li> <li>• Inform local users of peak traffic times to improve general safety.</li> </ul>
Public Access	<p>Cars block access at Deughwater.</p> <p>Public subject to conifer corridors.</p>	<ul style="list-style-type: none"> <li>• Provide parking at end of road.</li> <li>• Develop open ground and improve landscape next to paths.</li> </ul>
Water Supplies	Currently covered by trees; potential contamination.	<ul style="list-style-type: none"> <li>• Develop sympathetic key catchment areas and protect water supplies during forest operations to maintain water quality.</li> </ul>
Employment	Contract labour from outwith the local area.	<ul style="list-style-type: none"> <li>• Try to encourage qualified and competent local operators.</li> </ul>

### Forest & Water Guidelines

A Critical Loads Exceedance map for acidity of UK freshwater ecosystems was used to indicate where additional scavenging of atmospheric pollutants could lead to further acidification of fresh water.

Sampling was undertaken in 2005. This indicated that the water catchments in Brownhills Forest were not acid sensitive. It was therefore agreed that no further work was required on the Critical Loads Assessment. A Site Impact Assessment was also not required.

## C.2 LANDSCAPE ANALYSIS

### C.2.1 Landscape Character Analysis

Most of Brownhills has low landscape sensitivity. Western edges are, however, visible from the A713 and medium landscape sensitivity in this area requires a landscape character analysis.

Brownhills Forest is located within two Council Regions and the landscape has been characterised in separate documents for each Region.

The eastern end of Brownhills is located in Dumfries and Galloway.

The landscape character has been identified in the Dumfries and Galloway Landscape Assessment (DGLA) published in 1998 and the Dumfries and Galloway Local Forestry Framework (DGLFF) published in March 2000.

Under the DGLA the landscape which the forest is located has been described as “Southern Uplands with Forests”.

This landscape is characterised by smoothed, domed shaped hills dissected by steeply sided gullies. Prior to forest establishment, the vegetation ranged from coarse grasses to bracken and heather. There is a lack of walled enclosures and a general exposed quality.

Since afforestation, the forest cover has influenced the landscape character.

Sitka spruce is the dominant tree species mixed with larch to provide some colour contrast. The forest extends over many hill summits. Now the rotational nature of the forest management provides textural and colour changes as illustrated by felling and replanting.

In the DGLFF the landscape has been identified as “Deugh 6”, dense productive forestry, predominately non native conifers.

Guidelines for “Deugh 6” recommend that attention is paid to the views from the valleys and the use of broadleaves to soften the edges and increase diversity. Potential to increase Black Grouse habitat should be considered.

The western end of the property is located in East Ayrshire.

The landscape character has been identified in the Ayrshire Landscape Assessment (ALA) published in 1998.

Under the ALA, the landscape in which the forest is located has been described as “Foothills”. This has been coded N<sup>o</sup> 18 in the Landscape Character Types.

Foothills are found at heights between 170 & 250 m above sea level. Gently undulating and rounded, the landscape is dissected by many burns. Smaller woodlands extend into larger coniferous plantations. Archaeological sites exist.

Both Landscape Assessments detail similar characteristics, which are reflected within the property. The rounded slopes have been dissected by many burns

such as Craig Burn, Peat Burn and Lochen Burn in the western end and which all flow into Muck Water.

In the eastern end the Pochrigavin Burn, Murray's Burn, Brownhills Burn, Black Burn and Cubbies Burn all flow into the Water of Deugh.

The main lines of force are provided on Map 3. They reflect the spurs and gullies, which will be, used in the future design particularly along the A713.

Photographs were taken from two selective viewpoints in 2007. The two montages illustrated the compartments that were planned for felling in the five year period and the shape of the felling coupes. The Plan views illustrated the boundaries together with the restock patterns and the creation of new ride alignments.

These features can now be seen in the new photo montages. Compartment 313 felled in 1997 and restocked in 1999 is now established. The spruce/larch mixtures and the new ride shape between compartments 313 and 314 are now clearly visible in the landscape. Similarly, compartment 318 has been felled and restocked and separation with compartment 319 has been achieved. Compartment 320 has been felled and restocked and the new ride between compartment 320 and 321 can also be seen. The remaining parts of this new ride will be established when compartment 321 is felled and restocked.

### **C.2.2 Concept Design**

Site and crop limitations will affect the design process. This will generally mean felling to green edges, along the existing ride structure, and to develop the new compartment structure over the next twenty years. Map 2 highlights the areas where future design will be restricted and where present forest layout can be improved.

The over all concept is to consider the future coupe structure using open space to define these areas. All existing natural features, primarily watercourses, and fixed features such as forest roads and tracks, will be used to divide future crops. Where possible the old geometric patterns will be removed particularly along the landscape sensitive area visible from the A713.

Riparian design will reflect natural characteristics, with generous use of open space in the lower reaches of the burns narrowing to the water's source. The use of broadleaves will also emphasise this design and provide structural diversity in these areas.

In addition, natural gullies and burns, which were planted up in the first rotation, will be opened up and used as crop or compartment boundaries in the future. For example, compartments, 101 and 102 which have already been felled and restocked, will open up Cubbies Burn and Black Burn and their tributaries.

The western end of the forest is considered sensitive in the landscape due to its position next to the A713, a tourist route. Initial design features were introduced in 1997 at the time of the original Woodland Grant Scheme application. These two viewpoints established at that time will be used again to assess the impact work to date has had on the landscape and to consider any changes to the

design. In addition, a single viewpoint that was used to assess the impact of crop change in Deughwater Forest, a neighbouring property will be used to analyse the eastern end of Brownhills Forest.

In compartments 205, 206 and 207 the nature of the ground and the productivity of the crop led to the decision to retain the slowly growing spruce and pine crops as Natural Reserve. This will result in a variable upper planting limit together with some age and ecological diversity in the future.

The upper planting boundary will be lowered and stocking density will be reduced from 2,700 to 1,100 plants per hectare on the upper planting margins around Windy Standard in compartments 329, 330, 331 and 410 to reflect natural dispersion. This, together with the significant areas of natives broadleaves planted in the property should provide improved habitat for Black Grouse.

The planting design within these areas will be to create dense groups in a matrix of open space to achieve a gradual reduction in tree numbers between the forest and open hilltop. However, the overall density of 1,100 trees per hectare will be achieved by year 10.

To achieve the UK Forestry Standard of separation between adjacent crops, adjoining crops should not be felled before the restocking of the first area has reached an average height of at least two metres. We expect this to be achieved in 5 years following planting.

Any unforeseen reduction in separation during the period of the Plan will be formally agreed with the Forestry Commission Scotland as an amendment.

## **D. MANAGEMENT PROPOSALS**

### **D.1 Silvicultural Policy**

The silvicultural policy of the woodlands for the next 20 years will concentrate on the sequential clearfelling of large coupes followed by restocking to break up the even aged structure and create more diverse woodland.

Felling, thinning & restructuring proposals are shown in Maps 4 and 5

### **D.2 Prescriptions**

#### **D.2.1 Felling**

No coupes are expected to exceed 100 hectares in size and the average will be far less than this, The use of smaller coupes alongside the A713 will minimise the landscape impact. The use of greater open ground, broadleaves and Natural Reserves will also lessen the impact in future rotations.

Current windthrow has reduced the scope for retention of some crops. However, some crops have been retained beyond their predicted Terminal Age to help achieve separation. Other coupe boundaries will have less than full separation during the next rotation because of the need to carry out immediate restocking to maintain site timber productivity. Second rotation coupe shapes will allow better future separation.

#### **D.2.2 Thinning**

Thinning will be considered in areas with lower than WHC 3 status. Best Practice will be followed with typically one semi mechanical thinning to remove one row in 5-7 and selection of poorer trees between the rows.

#### **D.2.3 Restructuring**

##### **Conifers**

The main species selected for restocking will be Sitka spruce planted as a pure species covering 67% of the restocked area (including OG).

Larch/spruce mixes will be planted on visible slopes at an average ratio of 70:30 LAR:SS. On the lower slopes, a higher percentage of larch will be planted gradually merging to a higher spruce concentration on the higher ground where this mixture meets other areas of pure spruce. Scots pine and Larch will be planted as a 50:50 mix again, to provide ecological and landscape variation. Conifer mixtures will cover 5% of the restocked area (including OG).

Planting will be carried out to achieve a target density of 2500 stems per hectare at year 10.

##### **Broadleaves**

Native broadleaves will be used primarily to improve biodiversity and add structural diversity to the landscape. They will be located in the most advantageous positions along side burns and the new coupe boundaries. Broadleaves will cover 5% of the restocked area (including OG).

Native Broadleaves will be planted as groups of approximately 50 trees within a matrix of open space and according to site conditions to achieve an overall stocking density at year 10 of 1100 stems per hectare. Core species will be Grey willow (15% of the broadleaf area), Common alder (15%), Downy birch (45%) & Rowan (20%). On the most sheltered sites broadleaf trees will include Ash (5%).

### **Biodiversity**

Open ground will be used to maintain the riparian zones and establish broad coupe boundaries for the future forest design. It is expected to amount to 20 % of the gross restocked area.

47.15 hectares of the total crop area will be retained as Long Term Retentions (LTR) to be managed to retain crop structure or as Natural Reserve (NR) which will be allowed to develop over time by a process of non intervention.

**Table 3: Species Distribution in 10 & 20 years**

	<b>Sitka Spruce</b>	<b>Mixed Conifer</b>	<b>Broadleaf</b>	<b>Open Ground</b>	<b>Bare/Felled Land</b>	<b>Total</b>
<b>Area Year 10 (ha)</b>	902.24	65.80	41.77	178.33	254.10	1442.24
<b>Species %</b>	63	5	3	12	18	
<b>Area Year 20 (ha)</b>	937.50	75.00	74.36	287.56	66.08	1442.24
<b>Species %</b>	65	5	5	20	5	

### **D.2.4 Protection & Maintenance**

Red and roe deer pose the main browsing threat and trees will be protected by deer culling according to the property's Deer Management Plan. Deer Management Grant is already received for Brownhills under the Scottish Forestry Grant Scheme (SFGS) and neighbouring forests in the complex. Fences will be kept stockproof next to agricultural land.

Other maintenance operations will include beating up and spot application of herbicide to control weeds will be used as required.

### **D.2.5 Public Access**

Public access is low key and informal and will not be restricted. Opportunities will be improved by developing car parking at Deugh Water.

### **D.2.6 Road Operations**

A loading and turning area will also be constructed to facilitate the felling of compartments 315 and 317. Discussions will be held with the local Roads

Department to agree on the specification. This facility is intended to be a temporary structure and discussions with the Roads Department will cover the future of the bell mouth.

Quarries of less than 1 ha will be developed within the forest using readily available material. New roads are anticipated near compartment 709 (c 500m in 2014) from compartment 203 to 207 (c 1800m in 2023). No EIA determination is required as operations are planned beyond 5 years time.

## TOLERANCE TABLE

Table 4 Tolerance Table

	Adjustment to felling period*	Adjustment to felling coupe boundaries**	Timing of Restocking	Changes to species		Changes to road lines	Designed open space ***
<b>FC Approval normally not required</b>	Fell date can be moved within 5 year period.  Where separation or other constraints are met	1.0 ha or 10% of coupe area – whichever is less	Up to 2 planting seasons after felling	Change within species group eg evergreen conifers or broadleaves			Location of temporary open space eg deer glades if still within overall Open Space design  Increase by 0.5 ha or 5% of area - whichever is less
<b>Approval by exchange of letters and map</b>		1.0 ha to 5 ha or 10% of coupe area – whichever is less				Additional felling of trees not agreed in plan  Departures of > 60m in either direction from centre line of road	Increase of 0.5 ha to 2 ha or 10% - whichever is less  Any reduction in open space
<b>Approval by formal plan amendment may be required</b>	<ul style="list-style-type: none"> <li>Felling delayed into second or later 5 year period</li> <li>Advance felling into current or 2<sup>nd</sup> 5 year period</li> </ul>	> 5 ha or 10% of coupe area	Over 2 planting seasons after felling	Change from specified native species  Change between species group		As above, depending on sensitivity	More than 2 ha or 10%  Any reduction in open space in sensitive areas  Colonisation of open areas agreed as critical

## **E - PRODUCTION FORECAST**

Basic crop data for Brownhills Forest Plan is supplied via the Forestry Commission Scotland Production Forecast Spreadsheet.

## APPENDIX 1

### LANDSCAPE DESIGN PERSPECTIVES

- 1 View 1  
View point to the north from county road (Grid Ref NS 514 014) and Digital Terrain Model (DTM) from the same location.
  
- 2 View 2  
View point to the east from county road (Grid Ref NS 515 018) and Digital Terrain Model (DTM) from same location.