Barholm Woodland Expansion

Soils Report



GROUND TRUTH FORESTRY

Ground Truth Forestry Ltd.

on behalf of

EJD Forestry Ltd.

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1 Introduction

1.1 Background

The survey area, called Barholm Woodland Expansion, comprises of 5 distinct geographical areas, which are located near Creetown in Dumfries and Galloway. These sites are undergoing surveys to inform woodland creation proposals, currently being developed by EJD Forestry. The total area of the sites surveyed is shown in Table 1.1. Not all of the surveyed areas will eventually be considered for woodland creation due to various constraints.

Table 1.1: Total survey area of each site

Barholm	234.47 ha
Claughreid	79.28 ha
Garrocher	137.03 ha
Kirkbride	56.13 ha
Kirkmabreck	190.93 ha
Survey Area Total	**697.84 ha**

1.2 Objectives

The objectives of this report are to:

- Survey and describe the soil conditions across the site.
- Stratify and categorise the main soil types according to Fiona Kennedy's *"The identification of soils for forest management"*.
- Assess the suitability of each soil type for woodland creation in terms of tree species.
- Identify which, if any, areas of the site would require additional drainage and/or fertiliser to successfully establish trees.

1.3 Site Description

Although Barholm Woodland Expansion, which encompasses 5 geographically distinct sites, is being considered as a whole in terms of woodland creation, for the purposes of this report the five geographical areas have been described individually. This is not in order to separate them on an application level, but to highlight the differences in soils, topography, existing woodland, and potential suitable new woodland species, in each area. As such, the five geographical areas are described below.

1.3.1 Garrocher

This property is a Christmas tree farm in the north of the site. The core of Garrocher has been in Christmas tree production for a long time (over 20 years), the westernmost compartment was more recently planted over several phases. Areas of existing conifer, mixed and broadleaved woodland are also encountered. Garrocher overlies land which is gently sloping towards the west, or generally flat. In the central compartment, small raised drumlins are common, interspersed with lower lying flushes of wetter and organic soils. The easternmost compartment lies on the lower slopes of Glenquicken Hill where the terrain begins to rise gently towards the higher ground of the hill. The area is characterised by its sloping topography, forming a transitional landscape between the lower-lying ground and the more elevated slopes above. Altitude ranges from 80 m above sea level (a.s.l.) on the westernmost compartment to 225 m a.s.l. to the east on the slopes of Shiel Hill.

1.3.2 Barholm

Barholm comprises the core of the woodland creation site and lies immediately to the south of Garrocher. Most of its land is rough grazing and moorland or existing woodland, which has been planted in recent years under the Forestry Grant Scheme (mainly productive conifer with a smaller percentage of native broadleaves). Better quality fields that have been subject to improvement are encountered to the southwest (around Cambret House) and to the northwest. Barholm is centred around Cambret Hill, and the land falls away moderately steeply to the northwest and southeast to form Cambret Moor. Carsluith Burn forms the valley bottom to the south of Cambret Moor, before the land rises again in the lower and mid slopes of Cairnharrow. Altitude ranges from 155 m a.s.l. to the northwest of the site, by the Englishman's Burn, to 351 m a.s.l., by the summit of Cambret Hill. Overall, these features give Barholm a varied topolography, with northwest and southeast facing slopes, which in turn leads to differences in soil type and distribution between distinct areas of the site.

1.3.3 Claughreid

This site covers the northern and eastern summits and slopes of Strife Hill and Cairnholy Hill, sloping down to the upper reaches of Cleugh of Claughreid. It is mainly comprised of rough grazing and moorland, with occasionally visible bedrock outcrops. A small section of semi-improved ground is encountered to the north of the site. The topography of Claughreid is moderately steep slopes, particularly in the south and east. The lowest point of the site is by the Kirkbride Burn, which runs along the eastern border of the site. Altitude ranges from 140 m a.s.l. by the Claugh of Cleughreid, to 267 m a.s.l. at the summit of Strife Hill.

1.3.4 Kirkmabreck

This section is centred on the remains of Kirkmabreck Church and comprises of small to medium scale improved and semi-improved fields, with some areas of rough grazing on poorer, wetter ground running through the centre of the site in the depression formed by the Kirkbride Burn and its minor tributaries. A large area of disturbed ground associated with past quarrying activity is encountered immediately below Fell Hill, and young woodland planted under FGS is found at Blackmyre Moor to the west, adjacent to existing woodland on Barholm. Semi-natural woodland fragments occupy the gully formed by the Kirkbride Burn and the disused Fell Quarries. The site extends over the lower slopes of Larg Hill and Knockeans Hill, which rise to the north of the site, and encompass the lower summit of Kirkbride Hill (162 m), around the centre of the site. The topography of Kirkmabreck is variable, as it encompasses a large area of ground and the faces of multiple low hills, and has been subject to historic opencast activity. The ground is generally south and west facing, with altitude decreasing westwards towards Wigtown Sands from Blackmyre Moor. Altitude ranges from 90 m a.s.l. by Kirkmabreck House, to the west of the site, to 185 m a.s.l. by Blackmyre Moor to the east.

1.3.5 Kirkbride

Kirkbride is located immediately to the south of Kirkmabreck, on the lower slopes of Kirkbride Hill and extending onto the coastal fields to the west of the A75 by Wigtown Sands. It is bounded by the Kirkbride Burn to the east, and comprises of improved fields in the main with small fragments of semi-natural woodland along the Kirkbride Burn and on the lower, west facing slopes of the site. The topography of Kirkbride is consistently moderately sloped, with a south and westerly aspect, leading to relatively uniform soils. Kirkbride Burn borders along it's eastern edge. Altitude ranges from 5 m a.s.l. by the coast to 125 m a.s.l. on the higher ground.

A detailed site location plan is shown in Map 1.1.

Project:

Barholm Complex
Dumfries & Galloway

Title:

Soils: Site boundary

Figure 1.1

Legend

- Grid reference point (NX 520 570)
- Property boundary
- Internal site boundaries

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N

0 0.5 1 km

Scale @ A3: 25000

Coordinate System: British National Grid

Map reference:	Date: 25/08/2026

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247000 248000 249000 250000 251000 252000 253000 254000

560000 559000 558000 557000 556000 555000

Barholm
Garrocher
Kirkmabreck
Kirkbride
Claughreid
Creetown
Cambret Hill
Cambret Moor
Glenquicken
Glenquicken Moor
Shiel Hill
Stronach Hill
Pibble Hill
Knockeans Hill
Blackmyre Moor
Kirkdale Hill
Cairnharrow
Barholm Hill
Ben John
Kirkbride Bank
Creetown Old Quay
Carskeel Point
Castle Cary Bight
Point Fishery
Upper Kirkbride Fishery
Lower Kirkbride Fishery
Stake Nets
Barholm Mains
Balhasie Cottage
Chain Bridge
Chapelton
Chapelton Wood
Craigenboy
Kilwhirn Bridge
Drumraik
Balloch Bridge
Ballochanamour
Ballochanamour Wood
Holm Park
Barholm Bridge
Beardie's Bridge
Ferry Bridge
Park Cottage
Castle Cary Wood
Castle Cary Tower (remains of)
Larg
Larg Hill
Raven's Crags
Fell Hill
Fell Quarries (disused)
Kirkmabreck Quarry (disused)
Kirkmabreck House
Kirkmabreck Church (remains of)
Kirkbride Hill
Glebe House
Kirkbride Bridge
Kirkbride Cottage
Bar Hill
Quarries (dis)
Carsluith Mill
Carsluith Bridge
White Hill
Hazelwood
Doon of Carsluith
Doon of Stroans
Daffin
Birks Wood
Sloucher's Grot Wood
Mark Bridge
Drum Bridge
Thorny Hill
Knockwar Hill
Long Wood
Fore Drum
Glenquicken Quarry
Quarry (dis)
Billy Diamond's Bridge
Englishman's Bridge
Starling Stone
Stone Circle
Sheepfold
Burnt Mound
Cattle Grid
Corse of Slakes Road
Stronach Lissoit
Hungry Stone
Cairn
Cairn and Stone Circle
Standing Stone of Bagbie
Bagbie Sheds
Knocktaggart
Torr Knowe
Knock Gray
Strife Hill
Cairnholy Hill
Grouse Butt
Craigmule
Kirkmair
Breach Loch
Cup & Ring marked Rock
Cup & Ring marked Rocks
Cup marked Rock
Stone Circle
Waterfall
Gypsy Well
Spa Well (Chalybeate)
Old Military Road
Mossyard Burn
Balloch Burn
Carsluith Burn
Englishman's Burn
Cauldside Burn
Mark Burn
Fore Burn
Kirkbride Burn
Cleugh of Doon
Cleugh of Claughreid
Cauldside Plantation
Glen Plantation
Little Glen Plantation
Dam Glen
Mid Hill of Glen
Sheepfold
Slipway
Works
Sch
PO
NTL
A75

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2 Survey Methodology

2.1 Stratification of soils

The Hutton 25k soil survey database was used as a backdrop to inform the soil survey. Strata boundaries of this database were redefined for the survey area on QGIS software using aerial photography, ecology habitat shapefiles (Direct Ecology), and sample soil pit/soil corer data from an initial brief survey to produce adjusted soil strata for the soil survey.

Areas suspected to have peaty soils were determined using a combination of the Hutton 25k soil survey vegetation classification from aerial photography. These were mapped on GIS and a 50 x 50 m grid was applied to produce dedicated peat survey map.

These maps were then utilised on site surveys which took place between January and April 2026.

2.2 Site survey

A combination of soil pits and soil corer samples were dug/probed in each of the strata produced as described in section 2.1 to achieve a soil survey accuracy of 1:10,000 (1 sample point per hectare). The density and distribution of samples were varied to reflect site conditions encountered - lower densities were used on areas of mineral soils with relatively uniform vegetation and condition, and higher densities undertaken in areas of variable soil types or peat depths. On site, a combination of mapped strata, aerial photography, land topography, and visible changes in ground vegetation informed soil pit location.

Soil pit classification was based on Fiona Kennedy's *"The identification of soils for forest management"*.

Peat depth was probed using a 60 cm soil corer. This was either carried out at each point along the 50 x 50 m grid mapped in section 2.1, or as a targeted peat survey in areas of localised organic soils. At each probe point, depth of the organic matter was noted to the nearest 5 cm, along with a note of the underlying mineral substrate. Where peat depth unexpectedly appeared shallower, additional probe points were undertaken around 1 metre away from the original probe point to ground truth soil depth.

Deviation from the grid was undertaken on site to encapsulate localised areas of wet hollows and linear flushes that may support organic soils.

Where deep peat (equal or greater than 50 cm peat depth) was found, a higher density of sample points were undertaken around the deep peat sample to find the edge of the peat body. In instances where the peat edge was easily picked up due to variations in local topography or ground vegetation, ground truthing along the edge of the peat body was carried out. In contrast, on more uniform areas or within sections of more variable peat depth, a smaller grid (10 to 20 m) was used to find the peat edge.

Data was recorded using Avenza Maps, and imported in back into QGIS software following the site surveys. Deep peat bodies were mapped using a combination of site observations and survey points, GIS interpolation on areas of regular grid points, and available LiDAR data.

2.3 Climatic Conditions

Climatic conditions were derived from Ecological Site Classification (ESC). Climatic conditions were researched for a number of example soil pits, which in combination with soil data, can help more accurately determine site suitability for certain tree species. Following the site survey, soil data was entered into ESC software along with the accompanying grid reference point, and the following climatic conditions recorded. Relevant to soil pit *location*:

- Accumulated Temperature (AT)
- Continentality (CT)
- Exposure (DAMS)

- Elevation (determined using 5 m contours in QGIS mapping software)

Relevant to soil *type* as determined from site survey:

- Moisture Deficit (MD)
- Soil Moisture Regime (SMR)
- Soil Nutrient Regime(SNR)

This information is described for each soil pit.

2.4 Geology and Parent Materials

Parent materials were derived from the British Geological survey database. This information informs soil classification. The bedrock geology within the site is Unit 6 or 7 Wacke from the Silurian period; this type of bedrock is detrital and comprises coarse- to fine-grained slurries of debris from the continental shelf flowing into a deep-sea environment, forming distinctively graded beds. The superficial overlying deposits are Quaternery Devensian-Diamicton Till; a sedimentary deposit which is glacigenic in origin. This till is detrital, created by the action of ice and meltwater.

3 Characterised Soil Types

The following overall soil types were found over the five areas which comprise the overall site. This section describes the soils found and their characteristics, and states how they are referred to in the remainder of the report.

3.1 Brown earths

Brown earths are characterised by uniform brown horizons and limited surface organic matter indicative of free drainage and relatively high biological activity.

Brown earths formed the dominant soil type found at Kirkbride and Kirkmabreck, but also occurred in more localised areas within Garrocher, Claughreid, and Barholm.

Soil moisture regime for brown earths was generally classified as ”fresh” to ”slightly dry”, although in some places where the soils were more stony or shallow, this tended towards ”slightly dry”.

Soil nutrient regime generally conformed to “medium”.

3.1.1 Brown earth types across Barholm Woodland Expansion

Typical (1) Typical brown earth, free draining, and may contain small stones. Vegetation indicating typical brown earth soils was often improved or semi-improved grassland, or bracken.

Gleyed brown earth (1g) Gleyed brown earths contain a small amount of gleying and slight mottling in the subsoil due to finer texture within lower horizons causing percolating water to slow seasonally. Vegetation indicating gleyed brown earths was bracken or improved / semi-improved grassland.

Upland brown earth (1u) Upland brown earths are generally poorer, with superficial gleying in the topsoil on account of a high rainfall regime and/or a finer soil texture. Vegetation indicating upland brown earths was bracken stands or acid grassland.

Podzolic brown earth (1z) Podzolic brown earths are also poorer in nutrients than typical or gleyed brown earths. They contain some level of podzolisation which is visible from a slightly bleached AE horizon but lacking the distinct deposition of humus or iron associated with the typical podzols. Vegetation indicating podzolic brown earths was bracken stands or acid grassland.

3.1.2 Cultivation of brown earths

The primary constraint of these soils in terms of cultivation is, on typical and higher nutrient brown earths is the potential weed burden as relative free drainage is already present and fertility adequate for a range or herb species. Poorer brown earths such as upland or podzolic brown earth are less constrained by weed burden. To avoid weed burden on higher nutrient brown earths, excessive soil disturbance which may exacerbate the situation should not be used during cultivation (e.g linear strip or complete cultivation). As an alternative, invert or continuous mounding will allow lower soil disturbance levels. However, continuous mounding creates raised planting positions which may risk drought in the spring/summer. Direct planting or screefing would be suitable on these soils if practical to have no mechanical cultivation.

3.2 Gleys

Gley soils are characterised by varying degrees of waterlogging, leading to high soil moisture regimes and poor aeration. They mainly occurred on flatter topography or anywhere the parent material limits free vertical drainage. Where chronic waterlogging persists or climatic inputs are extreme, surface organic matter (peat) begins to develop faster than it be recycled, leading to the development of peaty gleys (6p).

Fertility and moisture regimes varied greatly depending on specific soil type. On more fertile types such as flushed surface water gley (7f), SNR was frequently “medium” and SMR “moist – very moist”. On permanently

waterlogged soils such as peaty gleys (6p) typified purple moor grass and cotton grass, SNR varied from "poor – very poor" and SMR "very moist – wet". Typical and cultivated gleys (7, 7c) lie somewhere in the middle of these.

3.2.1 Gley types across Barholm Woodland Expansion

Typical surface-water gley (7) Typical gleys are distinguished by grey coloured topsoil and mottling in the subsoil. They are often compact, heavy, and poorly aerated. Vegetation indicating typical gleys is often rushes or marshy grassland.

Flushed gleys (7f) Flushed gleys are more fertile than typical gleys due to the passage of nutrient-rich water through the soil. Vegetation indicating flushed gleys is therefore often taller, typically tufted hair grass and soft rush.

Cultivated gley (7c) This soil is essentially typical surface-water gleys (7), that have been improved via cultivation, leading to better drainage and nutrient status in the topsoil. The subsoil often remains heavy, and grey/mottled in colour. Vegetation indicating cultivated gleys is often misleading, as can be improved grassland, rushes, or a combination.

Peaty gley (6, 6p) Peaty gleys have a build-up of organic matter on the surface, due to highly impeded drainage. This can be 10-25 cm (6) or 25-45 cm (6p). Peat depths of 50+ cm were classified as deep peat. Vegetation on peaty gleys tended to be marshy grassland or wet heath.

3.2.2 Cultivation of gleys

Drainage is the main factor that needs to be addressed in the cultivation of gley soils, particularly on peaty gleys and very wet mineral gleys. Hinge mounding will provide a temporary raised planting position to aid establishment but will require additional surface drainage networks to maintain this effect longer term. On the poorest peaty gley soils, consideration should be given to the inclusion of nurse species to help with poor nutrient regimes. On less severely waterlogged gleys, invert mounding (with a surface drainage network as required) may provide a sufficiently raised, weed free position to facilitate establishment until crop transpiration can contribute to reducing excess water.

3.3 Podzols and Ironpans

Podzols are free draining acidic soils distinguished by a characteristic bleached Ea horizon which has had iron oxides removed and translocated further down the profile into the B horizon. Raw mor humus is typical at the surface and often humus has leached alongside iron oxide to give a dark Bh horzon. Ironpan soils are a separate group although still considered podzolic soils. They are distinguished by the presence of a Bf horizon composed of accumulated iron oxides which crystallise into a pan which is a barrier to the downward movement of water and roots. SNR is generally "poor – very poor" and SMR depends greatly on type, see below.

3.3.1 Podzol types across Barholm Woodland Expansion

Typical podzol (3) Typical podzols are characterised as described above by a bleached Ea horizon, and often a dark Bh horizon. These soils are waterlogged in the topsoil and poor and freely draining in the subsoil. Vegetation indicating podzols is often acid grassland.

Peaty podzols (3p) These soils have an accumulation of organic matter on the surface of the soil sitting over a leached mineral subsurface. Vegetation indicating these soils are acid grassland and marshy grassland.

Peaty gleyed podzols Peaty gleyed podzols are as above, but contain significant gleying, due to seasonal waterlogging. They are also indicated by the presence of acid grassland and marshy grassland.

3.3.2 Cultivation of podzols

These soils have the potential for significant improvement through cultivation. The podzols benefit greatly from mixing of the organic and mineral components to restore a texture and structure intermediate of the constituent parts. Invert mounding or continuous mounding with ripping will serve this purpose. Guidance published by Scottish Forestry does not support the use of ploughing. Manual cultivation using mattock screefing would be possible on the mineral versions but not advisable on peaty variants as the pan will be out of reach.

3.4 Alluvial Soils

These soils are associated with alluvial deposits adjacent to watercourses. Alluvial soils are not a soil type within the forestry commission soil classification system so largely conform to brown soils where the parent material is coarse sands and gravels and mineral gleys where the parent materal is composed of finer silts and clays. The coarser soils come with heightened drought risk for species with high water demand due to high gravel content and open texture. Alluvial soils are generally ”medium - rich” in fertility due to the silt deposits, and SMR is ”moist - very moist”.

3.4.1 Cultivation of alluvial soils

On wetter or flood-prone alluvial soils, hinge mounding may provide a temporary raised planting position to aid establishment, although the effectiveness of mounding will depend on the duration and frequency of flooding. Where appropriate, consideration should also be given to surface drainage, while recognising that drainage infrastructure may have limited effectiveness where sites are subject to regular flooding. On better-drained alluvial soils, invert mounding may provide a sufficiently raised, weed-free planting position to facilitate establishment, although the need for mounding will depend on soil moisture status, texture and site drainage. On sites with a high risk of flooding, consideration should also be given to species selection.

3.5 Rankers and Shallow Soils

Rankers are shallow soils of less than 30 cm before bedrock is hit. The principal constraint is a lack of soil depth preventing rooting of trees, and potentially high stone content in the soil that is present. SNR varies from “poor” to “medium” depending on parent material. SMR of rankers through the survey area was generally “fresh – slightly dry”. During droughts, which are becoming increasingly frequent, these soils have a smaller water reserves which may exacerbate drought damage.

3.5.1 Cultivation of rankers

Cultivation of any depth, such as mounding, is unlikely to be successful and may create more of an issue with stone content. A Shallow screef which removes a minimal amount of material, either mechanical, manual, or chemical may be the only viable option.

3.6 Deep Peat

A survey of peat depth to discover areas of deep peat was undertaken through the site, the points of which are shown on Maps 4.4 - 4.8. Deep peats are classified as any soils with a peat depth of 50+ cm. These have been mapped and should be excluded from planting consideration.

4 Soil Type Distribution

4.1 Barholm

A range of soil types were found at Barholm, as described in the table below (Table 4.1, Map 4.4).

Table 4.1: Distribution of soil types by area at Barholm

Soil type	Area (ha)	Percentage of Barholm (%)
Brown earths	71.24	30.38%
Brown earths; Brown rankers	0.55	0.23%
Disturbed ground	1.44	0.61%
Noncalcareous gleys	5.24	2.24%
Peaty alluvial soils	0.09	0.04%
Peaty gleyed podzols	124.54	53.12%
Peaty gleys	22.28	9.50%
Alluvial soils	0.54	0.23%
Undifferentiated basin peats	1.29	0.55%
Dystrophic blanket peat	4.48	1.91%
Valley complex	2.78	1.19%
Grand Total	**234.47**	**100.00%**

The dominant soil type at Barholm is a mosaic of peaty gleyed podzols and peaty podzols which cover the majority of the central higher ground of Barholm, along Cambret Moor. Peat depth in this area ranged from 0 to 50+ cm, but was most commonly in the range of 15 - 20 cm. This peaty gleyed podzol / peaty podzol mosaic was interspersed with areas of bracken, of which the soil was a poor brown earth. Small pockets of deep peat were identified and have been mapped. The largest of these was in the eastern corner of Barholm, in an area which transitioned into peaty gleys in the surrounding soils. The northern section of Barholm transitions from peaty gleys on the higher ground to upland brown earths or mineral gley soils. Some areas of peaty gleys were shallow, bordering into classification of a ranker (see Fig. 4.1). These brown earths are distributed mainly around the margins of the site and on slightly elevated or better-drained slopes. The western corner of the site, around the lowest slopes of Cambret Hill, also contains brown earths, which were either of a podzolic (1z) or upland (1u) subtype. Some alluvial soils were found in the lower-lying ground along Englishman's Burn. The soil distribution at Barholm is shown on Map (4.4).

4.2 Claughreid

A range of soil types were found at Claughreid, as described in the table below (Table 4.1, Map 4.4).

Table 4.2: Distribution of soil types by area at Claughreid

Soil type	Area (ha)	Percentage of Claughreid (%)
Brown earths	23.12	29.16%
Brown earths; Brown rankers	8.47	10.69%
Noncalcareous gleys	1.36	1.72%
Peaty gleyed podzols	32.14	40.54%
Peaty gleys	5.30	6.69%
Peaty podzols	0.50	0.63%
Rankers and shallow soils	6.57	8.28%
Undifferentiated alluvial soils	1.51	1.91%
Undifferentiated basin peats	0.31	0.39%
Grand Total	**79.28**	**100.00%**

The soil type distribution at Claughreid consisted of predominantly a peaty gleyed podzol / peaty podzol mosaic, along with poor (upland or podzolic 1z, 1u) brown earths along the western side of the site in the higher ground around the summit of Cairnholy Hill / Strife Hill(see Fig. 4.2). The central high ridge across Claughreid



Figure 4.1: Shallow peaty gley soil at Barholm.

and the south-western corner which rises into the mid slopes of Craigmule contain shallow ranker soils, mostly brown earths, but some peaty podzol through the centre. There are multiple narrow ridges extending from the summits which contain areas of shallower soils interspersed with deeper sections along localised hollows. Localised depressions by Kirkdale Burn were found to have a peat depth of > 50 cm. The soil distribution at Claughreid is shown on Map (4.5).

4.3 Garrocher

Garrocher yields a range of soil types in a complex distribution, as described in the table below (Table 4.3, Map 4.6).

Table 4.3: Distribution of soil types by area at Garrocher

Soil type	Area (ha)	Percentage of Garrocher (%)
Brown earths	70.72	51.61%
Disturbed ground	1.22	0.89%
Dystrophic blanket peat	4.40	3.21%
Noncalcareous gleys	17.91	13.07%
Peaty alluvial soils	0.45	0.33%
Peaty gleyed podzols	4.70	3.43%
Peaty gleys	33.36	24.35%
Peaty podzols	0.02	0.01%
Undifferentiated alluvial soils	0.94	0.69%
Undifferentiated basin peats	3.30	2.41%
Grand Total	**137.03**	**100.00%**

Garrocher is split into three blocks. The largest block, which is the eastern of the two blocks which lie to the north of Old Military Road, is a complex distribution of brown earths, peaty gleys, mineral gleys, and deep



Figure 4.2: Podzolic brown earth at Claughreid.

peats. This distribution is due to the hummocky nature of the site, with small freely draining drumlins raising above small flatter plateaus where water can collect. This pattern is reflected in the smallest block, which lies directly to the south. The western block has a more uniform soil distribution as the ground is a regular shallow slope, consisting of predominantly brown earths with some peaty gleyed podzols / peaty podzols along the northern boundary.

The soil distribution at Garrocher is shown on Map (4.6).

4.4 Kirkbride

Kirkbride has the most uniform soil distribution of the five sites, as described in the table below (Table 4.4, Map 4.7).

Table 4.4: Distribution of soil types by area at Kirkbride

Soil type	Area (ha)	Percentage of Kirkbride (%)
Brown earths	44.68	79.60%
Brown earths; Brown rankers	7.29	12.99%
Disturbed ground	1.17	2.09%
Undifferentiated alluvial soils	2.98	5.32%
Grand Total	**56.13**	**100.00%**

Soils at Kirkbride were fertile, and much higher in nutrient value than either Barholm or Garrocher. They consisted of predominantly freely draining fertile brown earths, mostly improved grass fields, which overlie a topography of gently sloping ground which allows free drainage of water. An example of the brown earths at Kirkbride is shown in Fig. 4.3. There were some knowes in which the soils were shallower, but still fertile. The localised area around Kirkbride Burn was lower lying, and consisted of fertile alluvial soils. The soil distribution at Kirkbride is shown on Map (4.7).



Figure 4.3: Typical brown earth at Kirkbride.

4.5 Kirkmabreck

The western half of Kirkmabreck is very similar to Kirkbride in its general uniformity, however the eastern section on the higher ground contains a more varied distribution of soil types (Table 4.5, Map 4.8).

Table 4.5: Distribution of soil types by area at Kirkmabreck

Soil type	Area (ha)	Percentage of Kirkmabreck (%)
Brown earths	102.94	53.92%
Brown earths; Brown rankers	34.00	17.81%
Disturbed ground	20.74	10.86%
Noncalcareous gleys	13.59	7.12%
Peaty alluvial soils	2.17	1.14%
Peaty gleyed podzols	0.12	0.06%
Peaty gleys	14.21	7.44%
Undifferentiated alluvial soils	0.04	0.02%
Undifferentiated basin peats	3.12	1.64%
Grand Total	**190.93**	**100.00%**

The western half of Kirkmabreck is gently sloped similar to Kirkbride, and contains mainly fertile brown earths, interspersed with knowes containing shallower, but still fertile, soils. A localised area of deep peat and peaty gley lies in a topographical hollow just north of the wind turbine. The western half of Kirkmabreck is more complex, consisting of peaty gleys and mineral gleys, interspersed with areas of deep peat. This reflects the underlying topography which becomes hummocky and undulating, leading to an uneven distribution of water drainage and collection. These are in a mosaic with brown earths, and localised brown rankers where rock outcrops occur, which are less fertile than those found in the east of the site.

The soil distribution at Kirkmabreck is shown on Map (4.8).

Project:

Barholm Complex
Dumfries & Galloway

Title:

Soils Survey Map: Barholm

Figure 4.4

Legend

Barholm

Peat depth

- 0 - 25
- 30 - 45
- 50+

Soil type

- Brown earths
- Brown earths; Brown rankers
- Complex: Peaty gleyed podzols; Peaty podzols
- Disturbed ground; Built-in
- Dystrophic blanket peat
- Noncalcareous gleys
- Peaty alluvial soils
- Peaty gleys
- Undifferentiated alluvial soils
- Undifferentiated basin peats
- Valley complex

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N

0 100 200 300 400 500 m

Scale @ A3: 10000

Coordinate System: British National Grid

Map reference:

Date: 02/06/2026

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Locharbriggs,
Dumfries,
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EJD Forestry

251000 251500 252000 252500 253000 253500

558500 558000 557500 557000 556500 556000

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Project:

Barholm Complex
Dumfries & Galloway

Title:

Soils Survey Map: Claughreid

Figure 4.5

Legend

- Claughreid

Peat depth

- 0 - 25
- 30 - 45
- 50+

Soil type

- Brown earths
- Brown earths; Brown rankers
- Noncalcareous gleys
- Complex: Peaty gleyed podzols; Peaty podzols
- Peaty gleys
- Peaty podzols
- Rankers and shallow soils
- Undifferentiated alluvial soils
- Undifferentiated basin peats

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N

0 100 200 300 400 m

Scale @ A3: 7500

Coordinate System: British National Grid

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251000 251500 252000 252500 253000

556000 555500 555000 554500

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Project:

Barholm Complex
Dumfries & Galloway

Title:

Soils Survey Map: Garrocher

Figure 4.6

Legend

Garrocher

Peat depth

- 0 - 25
- 30 - 45
- 50+

Soil type

- Brown earths
- Complex: Peaty gleyed podzols; Peaty podzols
- Disturbed ground; Built-in
- Dystrophic blanket peat
- Noncalcareous gleys
- Peaty alluvial soils
- Peaty gleys
- Peaty podzols
- Valley complex; Undifferentiated alluvial soils
- Undifferentiated basin peats

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N

0 0.25 0.5 km

Scale @ A3: 12500

Coordinate System: British National Grid

Map reference:

Date: 04/06/2026

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248500 249000 249500 250000 250500 251000 251500

559500 559000 558500 558000 557500 557000

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Project:

Barholm Complex
Dumfries & Galloway

Title:

Soils Survey Map: Kirkbride

Figure 4.7

Legend

- Kirkbride

Peat depth

- 0 - 25

Soil type

- Brown earths
- Brown earths; Brown rankers
- Disturbed ground; Built-in
- Undifferentiated alluvial soils

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N

0 100 200 m

Scale @ A3: 5000

Coordinate System: British National Grid

Map reference:

Date: 16/06/2026

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EJD Forestry

248000 248500 249000

556000 555500 555000

Kirkmabreck
Wind Turbine
162m
Kirkbride Hill
Woodfall Cottage
47m
FB
Car Park
Spreads
Sks
Iss
Spreads Iss
CG
Galloway House
6m
De Lury's Place
Souter's Croft Wood
Track
Iss
Mud
8m
Kirkbride
Track
Drain
13m
Bar Hill
84m
Bagbie Cottage
Canniegeesie Wood
Collects
Pit (dis)
16m
Clauchan Cottage
Rough Bar
Mud

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Project:

Barholm Complex
Dumfries & Galloway

Title:

Soils Survey Map: Kirkmabreck

Figure 4.8

Legend

Kirkmabreck

Peat depth

- 0 - 25
- 30 - 45
- 50+

Soil type

- Brown earths
- Brown earths; Brown rankers
- Complex: Peaty gleyed podzols; Peaty podzols
- Disturbed ground; Built-in
- Noncalcareous gleys
- Peaty alluvial soils
- Peaty gleys
- Undifferentiated alluvial soils
- Undifferentiated basin peats

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N

0 100 200 300 400 500 m

Scale @ A3: 10000

Coordinate System: British National Grid

Map reference:

Date: 16/06/2026

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248000 248500 249000 249500 250000 250500

557500 557000 556500 556000 555500

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5 Suitability for Woodland Creation

5.1 Land Capability for Forestry

In terms of Land Capability for Forestry (see Map 5.1), a significant part of the proposed planting area lies within land classified as F4 (land with moderate flexibility for the growth and management of tree crops), with the large majority being within areas of F5 land (limited flexibility), and a small proportion being classified as F6 (very limited flexibility) and F7 (unsuitable for tree crops) as seen in Table 5.1.

Table 5.1: Land Capability for Forestry

		Land Capability for Forestry		
Class	**Description**	**% of ownership**	**% of NWC search areas**	**Location**
F4	Moderate flexibility for trees	24 %	33 %	Most of Garrocher, entirety of Kirkbride, and lower slopes of Kirkmabreck
F5	Limited flexibility for trees	58 %	44 %	Most of the ground around Barholm and the core of Kirkmabreck
F6	Very limited flexibility for trees	15 %	19 %	Upper slopes at Cambret Hill and Cairnholy
F7	Unsuitable	2 %	3 %	Summit of Cambret Hill

This suggests that the land should allow the establishment of a limited range of productive conifer and broadleaved tree species on the more marginal areas, and a moderate to wide range on the better ground, as well as supporting timber production in the medium to long term. This is supported by the Ecological Site Classification (ESC) analysis results below.

Project:

Barholm Woodland Expansion, Dumfries & Galloway

Title:

ESC Assessment, Land Capability for Forestry

Figure 5.1

Legend

- Grid reference point (NX 520 570)
- Property boundaries

Land Capability for Forestry (250 k)

- F3 - Land with good flexibility for the growth and management of tree crops
- F4 - Land with moderate flexibility for the growth and management of tree crops
- F5 - Land with limited flexibility for the growth and management of tree crops
- F6 - Land with very limited flexibility for the growth and management of tree crops
- F7 - Land unsuitable for producing tree crops

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N

0 0.5 1 km

Scale @ A3: 25000

Coordinate System: British National Grid

Map reference:

Date: 20/07/2026

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248000 250000 252000 254000

560000 558000 556000

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5.2 Ecological Site Classification (ESC)

An ESC analysis was undertaken based on a range of different locations within the site reflecting a variety of conditions, including different soil types, nutrient and moisture regimes, and degrees of exposure.

Table 5.2 includes information on soil types, vegetation, and location of each sample, together with data from the ESC Decision Support System software on soil nutrient and moisture status. Information gathered during the soils survey was used to derive soil nutrient and moisture regimes. Site suitability for each tree species is summarised in this table, alongside a note on the limiting factors for marginal and unsuitable species. Exposure is generally one of the major limiting factors, followed by nutrient availability in poorer locations on the higher ground, and by moisture status on rankers or very wet soils.

This ESC analysis has been considered in the selection and siting of the proposed productive and native species mixes, in conjunction with detailed site observations and prior experience of woodland establishment. It suggests that the site is suitable for a considerable range of productive coniferous, productive broadleaved and native broadleaved species, as long as they are closely matched to site conditions.

Table 5.2 below includes forecast yield classes from selected species in their potential locations.

Table 5.2: Yield Classes of Productive Species

Species	YC Range	Notes
Scots pine	8-10	YC 8 on more exposed locations, YC 10 at Claughreid, YC 12 on better ground at Kirkmabreck
Noble fir	20	Only one location
Sitka spruce	18-26	YC 18 on higher ground by Cambret Hill and poorer wet soils, and on upland brown earths to the east of Garrocher, YC 20 on peaty gleys at Garrocher, YC 26 on mineral soils at Garrocher
Norway spruce	12-18	YC 12 at Claughreid on shallower soils, YC 14 on upland brown earths at Garrocher, YC 18 on better more sheltered ground at Garrocher
Douglas fir	14-20	YC 17 on more exposed areas at Kirkbride, YC 20 on more sheltered areas
Coast redwood	18	
Downy birch	6	To be planted in gleyed brown earths and gley soils
Silver birch	6-8	YC 8 on better soils at Kirkbride
Sessile oak	4-8	YC 4 on poorer soils at Claughreid and Barholm
Aspen	6-10	YC 6 on poorer soils ar Claughreid and Barholm
Pedunculate oak	6	
Wild cherry	6	
Sycamore	6-10	YC 6 on higher, poorer ground in Barholm, YC 10 on better soils at Garrocher

Figure 5.2: Ecological Site Classification

ESC Analysis:														
ESC Point Ref	ESC 1	ESC 2	ESC 3	ESC 4	ESC 5	ESC 6	ESC 7	ESC 8	ESC 9	ESC 10	ESC 11	ESC 12	ESC 13	ESC 14
Grid reference	NX510583	NX525574	NX534576	NX517566	NX515558	NX515551	NX488591	NX503588	NX513586	NX488558	NX487554	NX483568	NX489570	NX491557
Location	NW of Barholm, improved field by BDB stone circle	Higher ground on SE slopes of Cambret Hill	Lower ground towards Cauldside Burn	By Cambret, near Carsluith Burn	Claughreid, northern slopes	Claughreid, southern slopes	Garrocher, western block	Garrocher, central block	Garrocher, eastern block	Kirkbride, higher ground	Kirkbride, lower ground	Kirkmabreck, west	Kirkmabreck, higher ground	East by Carsluith Burn
Soil type	Brown earth	Podzols (brown / gleyed)	Peaty gley	Upland brown earth	Peaty gley	Brown earth and brown rankers	Gleyed brown earth	Peaty gley	Upland brown earth	Brown earth, stony	Brown earth	Brown earth	Upland brown earth	Brown earth
Vegetation	Neutral grassland	Wet heath	Acid grassland	Semi-improved grassland	Unimproved grassland	Neutral grassland	Christmas trees	Christmas trees	Christmas trees	Improved grassland	Improved grassland	Improved grassland	Improved grassland	Improved grassland
SMR / SNR	Fresh / Medium	Fresh / V. Poor	Wet / Poor	Fresh / Poor	Wet / Poor	S. Dry / Poor	Moist / Medium	Wet / Poor	Fresh / Poor	S. Dry / Medium	Fresh / Medium	S. Dry / Medium	Fresh / Poor	Fresh / Medium
Site Management	None	Fertiliser	None	None	None	None	None	None	None	None	None	None	None	None
Exposure	DAMS 16 (High)	DAMS 18 (high)	DAMS 16 (High)	DAMS 17 (High)	DAMS 15	DAMS 16 (High)	DAMS 14	DAMS 14	DAMS 16 (High)	DAMS 14	DAMS 13	DAMS 15	DAMS 18 (High)	DAMS 14
Proposed planting	Noble fir	Sitka spruce	Sitka spruce	Scots pine / Norway spruce / Broadleaves	Sitka spruce	Scots pine / Norway spruce / Broadleaves	Norway spruce / Broadleaves	Sitka spruce	Sitka spruce	Mixed woodland	Broadleaves	Mixed woodland	Sitka spruce	Douglas fir / Norway spruce
Species														
Lodgepole pine	v.suitable	suitable	v.suitable	v.suitable	v.suitable	v.suitable	v.suitable	v.suitable	v.suitable	v.suitable	v.suitable	v.suitable	suitable	v.suitable
Macedonian pine	v.suitable	suitable	suitable	v.suitable	suitable	v.suitable	v.suitable	suitable	v.suitable	v.suitable	v.suitable	v.suitable	suitable	v.suitable
Scots pine	suitable	suitable	marginal**	suitable	marginal**	suitable	v.suitable	marginal**	suitable	v.suitable	v.suitable	v.suitable	suitable	v.suitable
Norway spruce	suitable	marginal***	suitable	marginal***	suitable	suitable	suitable	suitable	suitable	v.suitable	v.suitable	suitable	marginal***	v.suitable
Oriental spruce	marginal***	unsuitable***	unsuitable**	unsuitable***	unsuitable**	marginal***	suitable	unsuitable**	marginal***	suitable	v.suitable	suitable	unsuitable***	suitable
Serbian spruce	suitable	marginal***	marginal**	suitable	marginal**	suitable	suitable	marginal**	suitable	suitable	v.suitable	suitable	marginal***	suitable
Sitka spruce	v.suitable	suitable	suitable	suitable	suitable	suitable	v.suitable	suitable	suitable	v.suitable	v.suitable	suitable	suitable	v.suitable
Douglas fir	marginal***	unsuitable***	unsuitable**	unsuitable***	unsuitable**	marginal***	suitable	unsuitable**	marginal***	suitable	v.suitable	suitable	unsuitable***	suitable
Western red cedar	marginal***	unsuitable***	suitable	marginal***	suitable	marginal***	suitable	suitable	suitable	suitable	v.suitable	suitable	unsuitable***	suitable
Japanese cedar	marginal***	unsuitable***	unsuitable**	marginal***	unsuitable**	marginal***	suitable	unsuitable**	marginal***	suitable	suitable	suitable	unsuitable***	suitable
European silver fir	marginal***	marginal***	unsuitable**	marginal***	unsuitable**	marginal***	suitable	unsuitable**	suitable	suitable	v.suitable	suitable	marginal***	suitable
Grand fir	marginal***	unsuitable***	unsuitable**	marginal**	unsuitable**	marginal**	suitable	unsuitable**	marginal***	suitable	v.suitable	marginal**	unsuitable***	suitable
Noble fir	v.suitable	marginal**	unsuitable**	marginal**	unsuitable**	marginal**	v.suitable	unsuitable**	suitable	v.suitable	v.suitable	marginal**	marginal**	suitable
Pacific silver fir	v.suitable	suitable	unsuitable**	suitable	unsuitable**	suitable	v.suitable	unsuitable**	v.suitable	v.suitable	v.suitable	suitable	suitable	v.suitable
Western hemlock	suitable	marginal**	unsuitable**	marginal**	unsuitable**	marginal**	suitable	unsuitable**	suitable	v.suitable	v.suitable	marginal**	marginal**	v.suitable
Giant redwood	suitable	marginal*	unsuitable**	marginal*	unsuitable**	marginal*	suitable	unsuitable**	marginal*	suitable	suitable	suitable	marginal*	suitable
Coast redwood	marginal***	unsuitable***	marginal***	marginal***	marginal*	marginal***	suitable	marginal*	marginal***	suitable	v.suitable	suitable	unsuitable***	suitable
Downy birch	suitable	marginal**	suitable	marginal**	v.suitable	marginal**	v.suitable	v.suitable	suitable	suitable	suitable	marginal**	marginal**	suitable
Silver birch	suitable	marginal***	unsuitable**	marginal***	unsuitable**	suitable	suitable	unsuitable**	suitable	suitable	v.suitable	suitable	marginal***	suitable
Norway maple	marginal***	unsuitable***	marginal**	marginal***	marginal**	marginal***	v.suitable	marginal**	suitable	v.suitable	v.suitable	suitable	unsuitable***	v.suitable
Sycamore	suitable	marginal*	unsuitable**	suitable	unsuitable**	suitable	v.suitable	unsuitable**	suitable	v.suitable	v.suitable	v.suitable	suitable	v.suitable
Beech	suitable	unsuitable***	unsuitable**	suitable	unsuitable**	suitable	v.suitable	unsuitable**	suitable	v.suitable	v.suitable	v.suitable	marginal***	v.suitable
Pedunculate oak	suitable	unsuitable***	unsuitable**	marginal***	unsuitable**	marginal***	suitable	unsuitable**	suitable	suitable	suitable	suitable	marginal***	suitable
Sessile oak	suitable	unsuitable***	unsuitable**	suitable	unsuitable**	suitable	v.suitable	unsuitable**	suitable	v.suitable	v.suitable	suitable	marginal***	v.suitable
Aspen	suitable	marginal***	suitable	suitable	suitable	suitable	v.suitable	suitable	suitable	v.suitable	v.suitable	suitable	suitable	v.suitable
Black poplar	suitable	unsuitable*	unsuitable*	unsuitable*	unsuitable*	unsuitable*	suitable	unsuitable*	unsuitable*	suitable	suitable	unsuitable**	unsuitable*	suitable
Common alder	suitable	unsuitable**	suitable	unsuitable**	suitable	unsuitable**	suitable	suitable	suitable	suitable	suitable	unsuitable**	unsuitable**	suitable
Rowan	v.suitable	v.suitable	unsuitable**	v.suitable	unsuitable**	v.suitable	v.suitable	unsuitable**	v.suitable	v.suitable	v.suitable	v.suitable	v.suitable	v.suitable
Wild cherry	marginal***	unsuitable***	unsuitable**	unsuitable***	unsuitable**	marginal***	v.suitable	unsuitable**	marginal***	suitable	v.suitable	suitable	unsuitable***	v.suitable
Notes				*In more exposed locations, NS, SOK and SBI will be focused on lower lying areas by Carsluith Burn with more shelter (DAMS 16).*						*Most marginal location for DF due to exposure, but v. suitable to east and west with higher yields*				*DF to be planted on more sheltered areas on lower and east facing ground, whilst NS will be focused on more exposed higher ground*

**limiting factor is SNR*

***limiting factor is SMR*

****limiting factor is DAMS*

*****limiting factor is MD*

5.3 ESC for National Vegetation Classification (NVC)

For areas suitable for native broadleaves, Ecological Site Classification of National Vegetation Classification was carried out, to determine which woodland types were most suited to the soil and climatic conditions in each area. As with the ESC for species, information gathered during the soils survey was used to derive soil nutrient and moisture regimes. Site suitability for several relevant NVCs is summarised in this table, alongside a note on the limiting factors for marginal and unsuitable species.

This ESC NVC analysis has been considered in the selection and siting of the proposed native species mixes, in conjunction with detailed site observations and prior experience of woodland establishment. It suggests that the site is suitable for two main NVCs, falling into a W4/W7 combination on wetter ground, and a W11 mixture on drier ground.

Figure 5.3: Ecological Site Classification of National Vegetation Classification

NVC ESC Analysis						
No	NVC ESC 1	NVC ESC 2	NVC ESC 3	NVC ESC 4	NVC ESC 5	NVC ESC 6
NGR	NX526576	NX518555	NX521551	NX499594	NX482557	NX498571
Location	West Barholm	North Claughreid	South Claughreid	West Garrochar	West Kirkbride	Central Kirkmabrek
Soil type	Gleyed podzol	Shallow podzol	Brown earth	Peaty gley	Brown earth	Upland brown earth
Vegetation	Mosaic heath	Mosaic heath	Bracken	Christmas trees	Improved grass	Semi-improved grass
SMR	Very moist	Slightly dry	Fresh	Wet	Fresh	Moist
SNR	Poor	Medium	Medium	Poor	Medium	Poor
Drainage	None	None	None	None	None	None
Fertiliser	None	None	None	None	None	None
DAMS Score	18	13	13	16	13	16
Exposure	Highly exposed	Moderately exposed	Moderately exposed	Highly exposed	Moderately exposed	Highly exposed
Proposed planting	W4/W7	W4/W7	W4/W7	W4/W7	W11	W4/W7
Species						
W4 - Birch with purple moor grass	v.suitable	unsuitable**	unsuitable**	v.suitable	unsuitable**	suitable
W6 - Alder with stinging nettle	unsuitable*	unsuitable**	suitable	unsuitable*	suitable	unsuitable*
W7 - Alder-ash with yellow pimpernel	marginal*	unsuitable**	marginal**	marginal*	marginal**	marginal*
W10 - Mixed broadleaved with bluebell/wild hyacinth	unsuitable****	suitable	suitable	unsuitable**	suitable	marginal*
W11 - Oak-birch with bluebell/wild hyacinth	suitable	v.suitable	v.suitable	unsuitable**	v.suitable	suitable
W16 - Oak-birch with bilberry/blaeberry	unsuitable**	suitable	suitable	unsuitable**	suitable	marginal**
W17 - Oak-birch with bilberry/blaeberry (Upland)	marginal**	suitable	suitable	unsuitable**	suitable	suitable
W18 - Scots pine with heather	suitable	unsuitable*	unsuitable*	unsuitable**	unsuitable*	suitable
W19 - Juniper with wood sorrel	marginal	marginal	unsuitable	unsuitable**	unsuitable	unsuitable

**limiting factor is SNR*

***limiting factor is SMR*

****limiting factor is DAMS*

*****limiting factor is MD*

6 Conclusions

The soil survey has identified a diverse range of soil conditions across the five geographical areas comprising the site. The survey has demonstrated that soil type, drainage, nutrient availability, soil depth, exposure and moisture status vary considerably between and within the individual sites, and recommendations have been given for cultivation and species suitability of these soils.

Brown earths are the dominant soil type at Kirkbride and form a substantial proportion of both Garrocher and Kirkmabreck. These soils are generally freely draining and have relatively favourable nutrient conditions, making them suitable for a broad range of productive and native broadleaved species. Kirkbride in particular contains predominantly fertile brown earths and represents some of the better quality ground.

Barholm and Claughreid contain substantial areas of poorer soils, which are more constrained by moisture and nutrient availability. Exposure also becomes a limiting factor on the higher ground. Species selection and cultivation are therefore more limited in these areas, but still appropriate for forestry.

Garrocher contains a more variable and complex mixture of brown earths, gleys, peaty gleys and areas of deep peat. The western block contains a relatively high proportion of brown earths and provides favourable conditions for productive woodland. Appropriate buffering of deep peat areas, and species selection on wet mineral gleys and peaty gleys will be an important consideration at Garrocher.

Kirkmabreck has fertile brown soils across its eastern half, however the western half is considerably more complex, with a mixture of brown earths, gleys, peaty gleys and areas of deep peat. This variation means that woodland design and species selection should respond to local soil and drainage conditions rather than being applied uniformly across the site.

Deep peat was identified at a number of locations across the site. Areas with peat depths of 50 cm or more have been mapped and should be excluded from planting consideration. The presence of shallower peaty soils does not necessarily prevent woodland creation, but these areas require careful consideration of soil moisture, nutrient status, cultivation requirements and potential carbon impacts. It is recommended that further checks for deep peat are carried out when marking out the site prior to ground preparation. Should any further pockets of deep peat be identified at any stage, further surveying should take place to map them accurately, with the application amended to retain these areas uncultivated.

Cultivation requirements will also vary between soil types. Brown earths generally require relatively limited intervention, while wetter gley soils may require raised planting positions and appropriate drainage. Podzols and ironpan soils may benefit from cultivation that mixes the organic and mineral soil horizons. Shallow ranker soils have limited scope for mechanical cultivation because of restricted soil depth and higher stone content.

The Land Capability for Forestry assessment indicates that most of the ownership falls within F4 and F5 land, with smaller areas of F6 and F7 land. The better ground has moderate flexibility for tree growth and management, while the larger areas of more marginal ground have more limited flexibility. The small areas classified as F7 are unsuitable for tree crops and should not be considered for productive woodland creation.

The Ecological Site Classification assessment supports the potential for a considerable range of productive coniferous, productive broadleaved and native broadleaved species across the site. However, species suitability varies according to local conditions. Exposure is an important limiting factor, particularly on higher ground, while nutrient availability limits species choice on poorer soils and moisture status is an important constraint on rankers and very wet soils. Diverse conifers such as Douglas fir and productive broadleaves such as oak and beech can be considered on the better drained and more fertile soils, whilst species with a such as birch, aspen, Sitka spruce, or Scots pine should be used in poorer areas depending on the local conditions.

Overall, the soil survey indicates that Barholm Woodland Expansion contains substantial areas capable of supporting woodland creation, including areas with good potential for productive forestry.