Kirkan Windfarm

Forestry technical appendix

1. Introduction

Kirkan Wind Farm ("the proposed development") would be situated to the southeast of the Glascarnoch Dam, near Garve, on Strathvaich Estate.

The proposed development is for 17 turbines, 7 of which are located within a woodland area (1 further turbine being just outside, as well as other ancillary infrastructure) which is the subject of this Forestry Technical Appendix.

The main aims of this report are: to report the findings of an assessment of the effect of the Kirkan Wind Farm proposals on the existing forestry plantings; to provide advice on any mitigation that may reduce the effects of the tree removal plans; and to address Forestry Commission Scotland's (FCS) and the Highland Council's responses to Kirkan Wind Farm EIA Scoping Report (RSK 2018).

This technical appendix does not address, to any great extent, the potential or actual effect of the woodland removal on the landscape or ecology or any of the other technical areas as they are covered by the other relevant EIA report chapters.

This appendix has been produced by Roy Dyer NDF, DMS, MICFor, Chartered Forester.

2. Forestry Policy and guidance documents

The following key policy and guidance documents have all been given detailed consideration:

- *Scottish Forestry Strategy, Scottish Executive 2006*
- *Highland Forest and Woodland Strategy (2006)*
- *Control of Woodland Removal, Forestry Commission Scotland (2009)*
- *Trees, Woodlands and Development supplementary guidance, The Highland Council, 2013*
- *Guidance to Forestry Commission Scotland staff on implementing the Scottish Government Policy on control of woodland removal. March 2015*

All tree plans and work also fully comply with:

Forestry Commission (2017) *The UK Forestry Standard – The Government's Approach to Sustainable Forestry*

3. Forestry Assessment

Following an initial desk-based study, a site visit to the project area during W/C 14th January 2019 was completed in order to carry out a full site assessment including taking samples of tree heights and diameters for the purpose of estimating yield classes, timber volumes etc. The sample tree heights were selected following the Forestry Commission guidance which states that "*in even-aged pure stands, each top height must be selected from a plot of 0.01ha. The height of the largest breast height diameter within a radius of 5.6m is then measured*".

The woodland area within is open moorland overlying blanket bog and wet heathland. Much of the project area was ploughed over 20 years ago prior to being planted with large groups of Scots pine (*pinus sylvestris*) and downy birch (*betula pubescens*).

The FCS have confirmed that a Woodland Grant Scheme contract was approved for the area in 1990 (pers.com. email from Donald MacLeod, Woodland Officer, dated 24/01/19). The scheme was for 217 ha of new native woodlands, which it is assumed were planted over the winter of 1990/91. The trees are therefore assumed to be 28 years old. The species planted were Scots pine and downy birch and the latest Native Woodland Survey of Scotland habitat map (Figure 1) below shows the areas of Scots pine shaded green and the areas of downy birch shaded blue.

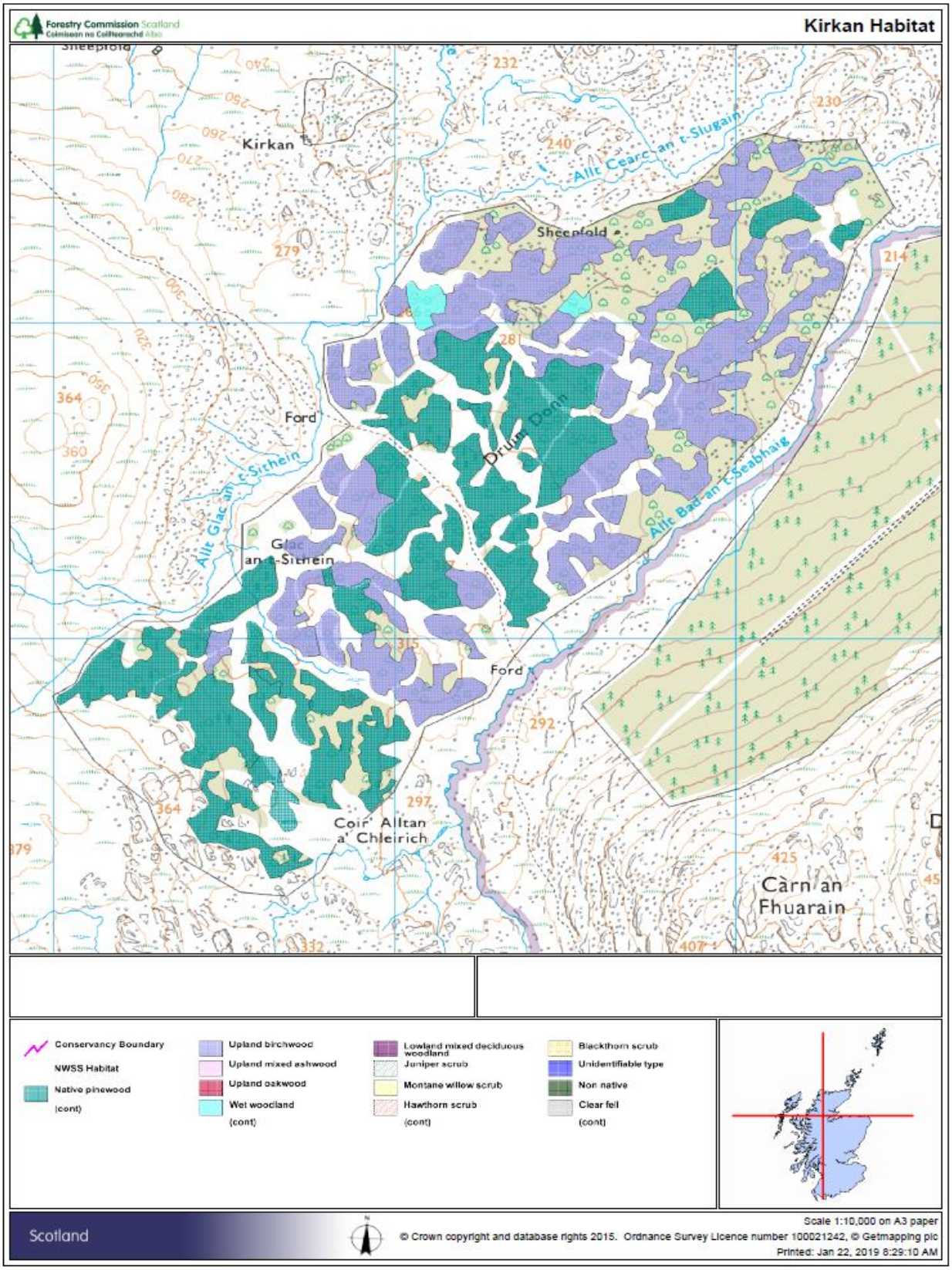
Forestry Commission Scotland
Coimisean na Coilltearachd Alba
Kirkan Habitat
Kirkan
Sheepfold
Ford
Ford
Allt Ceàrc an t-Slugain
Allt Glac am t-Sithein
Allt Bad an t-Seabhaig
Drum Donn
Glac an t-Sithein
Coir' Alltan a' Chleirich
Càrn an Fhuarain
Conservancy Boundary
NWSS Habitat
Native pinewood (cont)
Upland birchwood
Upland mixed ashwood
Upland oakwood
Wet woodland (cont)
Lowland mixed deciduous woodland
Juniper scrub
Montane willow scrub
Hawthorn scrub (cont)
Blackthorn scrub
Unidentifiable type
Non native
Clear fell (cont)
Scotland
Scale 1:10,000 on A3 paper
© Crown copyright and database rights 2015. Ordnance Survey Licence number 100021242, © Getmapping plc
Printed: Jan 22, 2019 8:29:10 AM

Fig 1. Native Woodland Survey of Scotland habitat map

The 217 ha approved for planting covers the whole area shown Figure 1, which includes a large area to the northeast of the proposed development. It is also assumed that the area approved includes both the planted and unplanted areas, which in some instances are quite large. This in fact ties in with the figures taken from the National Forestry Inventory record on the UK Government's interactive mapping web site (https://magic.defra.gov.uk). This provides the land area of each section actually planted within the project area; the total of these is 50.34 ha, which closely correlates to the estimate calculated within this assessment.

One important aspect in relation to the project area is that, as can been seen in Figure 1, the Kirkan woodland area comprises numerous relatively small groups of tree plantings and a considerable amount of open spaces. The detailed assessment confirms that only 45% of the Kirkan woodland area is actually planted with trees and 56% is unplanted, which includes a particularly large open area in the southwest corner. This has been calculated as follows:

- Total area of the Kirkan woodland area = 1,178,700 m^2.
- Area planted with trees (birch and pine) within the Kirkan woodland area = 525,271 m^2 (45%)
- Clear areas within the Kirkan woodland area = 653,429 m^2 (55%)

- *Birch plantings*

A large number of the birch planted along the southeast half of the project area have either not survived or are in a very poor condition. Most of the birch that have survived in this section are very small and of very poor quality, with most being multi stemmed trees. Despite the ground preparation (drainage) carried out before the trees were planted, the main reason for this poorquality establishment is considered to be the large area of wet and peaty ground conditions and to a lesser extent the relatively shallow or protruding bedrock in other parts of the site.

Photo 1. Typical birch group in eastern corner

Moving towards the northern half of the site, the birch get progressively taller, larger in girth and most of them are single stemmed trees. The reason that establishment here has been relatively better is considered to be the shallower peat depths.

Photo 2. Successful birch planting in the Northern half of the site

Although the woodlands are estimated to be 28 years old, as the best available growth-rate data are recorded in 5-year intervals the figures below are based on the trees being 30 years of age. There is no evidence or estate record that any of the trees have been thinned, so all figures are based on the woodlands pre-thinning.

The Normal Yield Classes for birch range from Yield Class 4 to Yield Class 12 (General Yield Class Curves, Forestry Commission (1981) *Yield Models for Forest Management).*

Height measurements of the birch have indicated that a large percentage of the plantings are of an insignificant yield class (i.e. below Yield Class 4), although some of the very best are Yield Class 4. As there are no Yield Class tables for birch below Yield Class 4, all data is based on Yield Class 4 acknowledging that this is likely to overstate the results.

30 year old birch, Yield Class 4 prior to thinning would be expected to have the following characteristics:

- 1567 trees per hectare (2,500 would have been planted initially at 2m x 2m spacing)
- A top height of 12.4 m. ("Top Height" is the average height of the 100 largest trees per hectare).
- An average diameter (at 1.3 m) of 12 cms.
- An average of 76 m^3 of timber per hectare.

- *Scots pine plantings*

The Scots pine have in general survived much better than the birch. In the central area however, the trees are very stunted (see photo 3). Moving away from the central area, towards the outer edges of the site, the trees become progressively better (see photos 4 and 5) and 50 – 60% of the plantings are judged to be reasonably successful and productive. As for the birch, this variation in success is considered to be directly linked to the ground conditions, which vary in terms of wetness and depth of peat.

Photo 3. Typical stunted scots pine in central/SE area

Photo 4. Average quality (for the site) Scots pine group

The Normal Yield Classes for Scots pine range from Yield Class 4 to Yield Class 14.

Height measurements of the Scots pine have indicated that where the trees are stunted they have an insignificant yield class (i.e. below Yield Class 4). The areas of medium quality plantings are assessed to be Yield Class 4 and the better areas average Yield Class 10. On balance, there is a larger proportion of the better-quality trees and so it is considered conservative for this assessment that overall calculations should be based on an assumed Yield Class 8.

Photo 5. Example of successful Scots pine planting

30-year-old Scots pine, Yield Class 8 prior to thinning would be expected to have the following characteristics:

- 3,605 trees per hectare.
- A top height of 10.3 m.
- An average diameter (at 1.3 m) of 10.5 cms.
- An average of 107 m^3 of timber per hectare.

All the above figures for birch and Scots pine are based on a fully stocked plantation.

4. Scale of woodland removal

It is not planned to clear fell all the trees as part of the proposed development. Instead, it is being proposed to carry out keyhole felling to fell the minimum area needed to carry out the construction work and to maintain a clear area for operation, maintenance and wind yield.

In order to accurately calculate the area to be felled, the native woodland plan (shown in Figure 1) has been overlaid with the proposed areas to be felled and the areas that need to be kept clear during operation (see Figure 2).

From this, the areas of Scots pine and birch that will need to be felled and the amount of timber harvested have been calculated, as shown in the following table.

Table 1 Summary of the areas of woodland to be felled during construction

Species	Total Area	Area to be felled during construction	Timber volume to be felled per ha	Total timber volume to be felled
	Hectares	Hectares	m^3	m^3
Scots pine	35.1074	12.7	107	1,359
Downy birch	17.4197	3.9	76	296
Total	52.5271	16.6		1,655

The total area of Scots pine and birch that is to be felled is therefore 16.6 ha. In addition to this, following detailed pre-construction surveys a final decision will be taken as to the exact location of each turbine and other infrastructure elements, within the micro-siting tolerance for the project as identified in Section 2.6.28 of Chapter 2 of the EIA-R. It is understood that there will be a limited amount of flexibility in relation to the exact location of the turbines and other infrastructure and where it is possible to re-position elements slightly to reduce the impact on the trees then this will be considered, alongside other engineering and environmental factors.

The table above also shows that the total maximum volume of timber to be felled is estimated to be 1,655m^3; however, this is based on the assumption that all areas being felled are fully stocked plantations, which has been demonstrated to not be the case, particularly in relation to the birch but also to the Scots pine. Therefore, this is very much a maximum figure for the considered scenario with the actual volumes likely to be considerably less.

Insert full-scale version of Figure 2 here.

5. Tree stability/windthrow

The trees are growing on an exposed wet heathland/blanket bog site and most are situated on what is effectively a raised planting site between drainage ditches. However, whilst the site conditions indicate wind-blow may be an issue at some stage in the future, the trees are currently only 28 years old; so, although there is no evidence of windblow at the moment, the trees are likely to get progressively more vulnerable to windblow as they increase in height.

Many of the plantings have not established very successfully and even the best areas are quite slow growing. As stated above, the birch is Yield Class 4 at best and when planted on other sites with optimum ground conditions, can achieve Yield Class 12. The best areas of Scots pine are considered to be Yield Class 10 and on other optimum sites can achieve Yield Class 14. The plantings are also a mixture of Scots pine and downy birch and the birch in particular is considered to be quite windfirm.

Perhaps the most important reason why these plantings appear not to be vulnerable to wind-blow is that the whole area is an intimate mixture of both very irregularly shaped planted blocks and large open spaces (see Fig 1). Therefore, there are far more edge trees than there would be if it had been planted as one large plantation. Edge trees are very important to the stability of coniferous plantations. Some of these edge trees will be removed, but not to the extent that it would seriously compromise the stability of the plantation as a whole. In addition, newly exposed trees in blocks towards the centre of the overall woodland would still benefit from a degree of protection from the retained, surrounding woodland which will have numerous edge trees.

In addition to this, most of the numerous tree groups which will be retained already have tapered edges as recommended in the FC Technical Paper 16 *Designing Forest Edges to Improve Wind Stability.*

We will therefore seek to make optimum use of these edge trees, when micro-siting the final position of the turbines and other infrastructure i.e. by making both optimum use of the open spaces that exists between the tree blocks and by minimizing the felling of existing edge trees.

6. Forest removal and forest waste

Account has also been taken of The Scottish Environment Protection Agency (SEPA)'s response to the scoping document which stated in relation to forestry removal and forest waste, the following:

Key holing must be used wherever possible as large scale felling can result in large amounts of waste material and in a peak release of nutrients which can affect local water quality. The supporting information should refer to the current Forest Plan if one exists and measures should comply with the Plan where possible.

Clear felling may be acceptable only in cases where planting took place on deep peat and it is proposed through a Habitat Management Plan to reinstate peat-forming habitats. The submission must include:

a) A map demarcating the areas to be subject to different felling techniques.

b) Photography of general timber condition in each of these areas.

c) A table of approximate volumes of timber which will be removed from site and volumes, sizes of chips or brash and depths that will be re-used on site.

d) A plan showing how and where any timber residues will be re-used for ecological benefit within that area, supported by a Habitat Management Plan.

Full account has also been taken of SEPA's Land Use Planning System Guidance Note LUPS-GU27 – "*Use of Trees Cleared to Facilitate Development on Afforested land*" – joint Guidance from SEPA, SNH and FCS.

One of the main concerns in this document is that contractors involved in such projects possibly lack experience in the exploitation of woodland as a timber resource. It also states that professional forester input is required to quantify the likely volumes, markets and economic uses of trees to be exported from the site and that there should be a commitment to employ a professional forester to implement and maximise the removal of timber and forest residue on site. As stated in the introduction a Chartered Forester has prepared this technical appendix and is providing the necessary technical forestry support.

All felling at this site is expected to be keyhole felling. There would therefore be no large-scale clear-felling, and there will be a Habitat Management Plan (HMP) and related Peat Management Plan (PMP) put in place to reinstate peat forming habitats. An outline HMP is included as Appendix 6.6 of the Environmental Impact Assessment report (EIAR).

The sections above on the forestry assessment and scale of woodland removal include sufficient photographs showing the wide range of the timber quality on the afforested sections and a table detailing the volumes of timber to be removed.

All of the timber (i.e. with a diameter of 7cms+) will be removed from the project area and sold at roadside. Due to the small size of the Scots pine timber, it is likely to be used for pulpwood and the birch, which is even smaller in size is likely to be sold for either pulpwood or firewood. All of this material will therefore be used for economic benefits and not disposed of as waste.

There are several options for marketing the timber. If there is a sufficient quantity, then consideration will be given towards selling it through an online auction. The other options are to sell the timber by sealed tender, or by private treaty to local timber merchants.

The whole area is made up of relatively small blocks of trees interspersed with areas where either trees have failed or were never planted in the first place due to adverse ground conditions. In some places these areas of open ground are large in size. This, coupled with the expectation to carry out keyhole felling rather than clear felling, should keep the tree felling to a reasonable minimum. The amount of "lop and top" from the felled trees ought not therefore to be of sufficient quantity to release sufficient nutrients that will have any adverse effect on the local water quality, however in any event adequate mitigation measures and best practice will be put in place. All lop and top will also be kept clear of streams and watercourses.

Much of the wooded area within the project boundary comprises blanket bog with drains installed for the benefit of the existing trees albeit currently having only a limited success. The outline PMP and HMP currently propose some filling-in of drains within the woodland to encourage bog habitat restoration, as has been successfully demonstrated nearby in the Strathvaich estate's Drum Buidhe plantation to the north across the A835. The key environmental consideration in relation to lop and top therefore is whether it would encourage the natural regeneration of non-native species, but this is not considered to be a problem on this particular site. In actual fact, any regeneration of woody species is likely to be either Scots pine or downy birch (generated from the seeds of the existing trees) and if this did occur it would simply increase the number of native tree species on the site by a small amount and this would be beneficial in terms of forestry resource. No residual waste is therefore considered likely to be generated that will require removing and disposal.

To avoid damage to the soil from timber extraction, the plan is to carry out the felling in the first instance, then construct the road and extract the timber on completion of the roadworks. All of the felled trees will be very close to the new access roadway, so there will be limited need to use timber extraction vehicles directly on the soil itself. This will avoid excessive ground and other environmental disturbance.

7. Maintaining turbine efficiency

As the minimum area of woodland that needs to be felled for the construction phase is greater than the anticipated area that needs to be kept clear for operational purposes, there is unlikely to be a significant requirement for further felling for at least 10 years. The relatively slow apical and lateral growth of the trees on this site also reduce the threat of trees in relation to the operation and efficiency of the turbines.

If the woodlands were to be managed to maximise the mean annual increment (MMAI) (i.e. for commercial forestry reasons) the Scots pine (based on Y.C.8) would be on a rotation of 75-80 years, at which time they will have reached a Top Height of 22 m and will then be clear felled circa. 2065-2070. The birch on the other hand (based on Y.C.4), would be on a rotation of 50 years so would be felled circa. 2040 at which time it will have reached a Top Height of only 15.7 m.

However, as the landowner does not currently manage the trees to maximize timber production then he is likely to retain them past the age of MMAI. That being the case, after 100 years (from date of planting), the Top Height of the Scots pine will only have increased to 23.7 m and the Top Height of the birch will have only reached a Top Height of 17.8 m after 80 years.

Therefore, as the trees will continue to increase in height year on year, albeit at a fairly slow rate, it may be necessary to carry out some further tree work at some stage in the future to maintain turbine efficiency.

The FCS "Guidance to Forestry Commission Scotland staff on implementing the Scottish Government's Policy on Control of Woodland Removal" states that:

> "*Tree felling in vicinity of turbines, the purpose of which is to avoid turbulence that can be created by the forest canopy and that can affect the performance and efficiency of the turbines, should be considered felling for forest management purposes and will be the subject of a Long Term Forest Plan which must be submitted to, considered and consented by Forestry Commission Scotland under the Forestry Act 1967 as part of a conditional felling licence*."

If/when the need for this arises, a good starting point would be to discuss this with the Estate's forestry agents to establish whether this can be incorporated into any forest plans that the Estate may already have in place.

8. Compensatory planting

As this project involves the permanent removal of woodland for the purposes of conversion to another type of land use, the Scottish Government's Policy on Control of Woodland Removal (2009) has been fully considered to establish whether the FCS are likely to require an area of new woodland establishment to compensate for the area felled.

The FCS "Guidance to Forestry Commission Scotland staff on implementing the Scottish Government's Policy on Control of Woodland Removal" states that:

1. *"Options to avoid or reduce the need for Compensation Planting should always be fully considered as part of the decision making process. Compensation Planting should be seen as the final option once all other solutions have been exhausted".*

However, it also states in relation to wind farm developments the following:

2. *"With regards to windfarm development, trees cleared for turbines bases, access roads and any other wind farm related infrastructure (infrastructure felling) should be considered as part of a planning application (under the Electricity Act 1989 or the Town and Country Planning Act 1997) and the felling should be consented with Compensation Planting requirements".*

It is not considered that the project would qualify for change of land use without compensatory planting, as it could not contribute significantly to any of the relevant criteria detailed in Appendix C of The Scottish Government's Policy on Control of Woodland Removal.

The question though is whether the FCS considers that new planting in a different location would contribute significantly to any of the following:

- *Helping Scotland mitigate or adapt to climate change*
- *Sustainable economic growth and rural/community development*
- *Scotland as a tourist destination*
- *Increasing the quality of Scotland's woodland cover.*

The maximum area of land that would need to be planted (the FCS default position) is an area equivalent to the area being felled and left unplanted, which is estimated under the keyholing scenario to be 16.6 ha. It is noted however that some amount (to be agreed via planning condition) of riparian planting is being proposed as part of the HMP (Appendix 6.6 of the EIA-R), and it is anticipated that this contribute to any compensatory planting requirement.

It is considered that there is more than enough available land within the wider Strathvaich Estate for the above to be considered, should this be required, and that the exact location(s) for this can be agreed via planning condition.

If compensatory planting is required, a full specification will be drawn up to include ground preparation, drainage, planting technique, stocking density, species, maintenance and protection. A site plan will also be provided. It is highly likely though that any replanted areas, subject to today's best practice (in particular as regards ground conditions), would result in woodlands of much higher quality.

Correspondence with the FCS

Following an initial request for FCS information relating to the site, Donald Macleod, FCS Woodlands Officer, Dingwall Office (pers.com. email from Donald MacLeod, dated 24/01/19) confirmed that Kirkan new native woodland was originally conceived when the WGS contract was approved in 1990 and that 217 ha of native broadleaves & Scots pine were planted. He also kindly provided the Native Woodland Survey of Scotland habitat map of Kirkan from a few years ago showing how the woodland has become established since then.

Agata Baranska, FCS Regulations & Development Manager, Dingwall Office (pers.com. email from Agata Baranska, dated 24/01/19) subsequently confirmed that the FCS no longer hold the records of the case, and that all the information they have available is the location, date of approval and area of new planting.

9. Without windfarm and with windfarm Forest Plan

Given that the woodland is not actively managed for future timber production (and so consequently there is to extant forest plan), there is no clear felling planned, and the fact that the site is an intimate mixture of tree plantings and open spaces, there is considered to be very little benefit from producing a "without windfarm" and "with windfarm" forest plan.

It is true that the felling will create some additional open spaces, but as there are large unplanted areas already between the tree plantings, the effect on the treescape is considered to be relatively minor.

Figure 3 shows the existing woodland blocks and the woodland blocks after felling. The Scots pine areas are shown in red and the birch in green. The plans also clearly indicate that it is mainly Scots pine trees that are being felled (12.7 ha) and the birch will be much less affected with only 3.9 ha being felled.

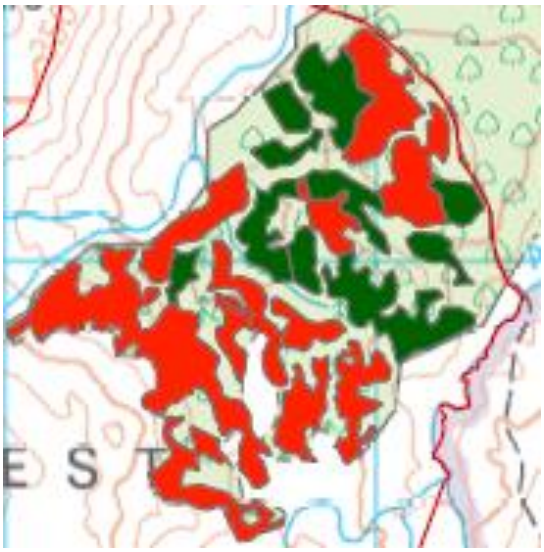	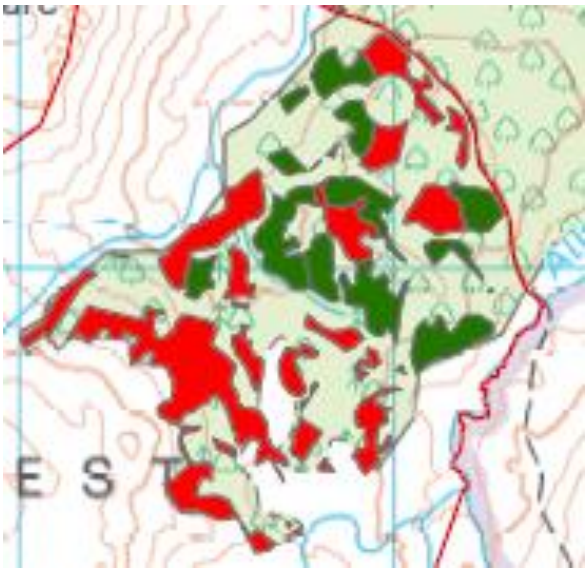
Site before felling	Site after felling

Fig3. Comparison of woodland areas before and after felling

There would be slightly less potential for future timber production at this site after the trees are felled, which will amount to a reduction in MMAI of 114 m^3 (per annum). However, the financial loss in terms of Net Present Value, which takes into account the loss of both future revenue and costs discounted back to the present day, would be minimal due to the low yield classes of both the Scots pine and downy birch. In addition, the loss of potential timber production in the long-term on the estate would be negligible if an equivalent area to that felled needs to be established as compensatory planting.

10. Mitigation

- *All forestry operations will be carried out in accordance with FCS and industry best practice.*
- *All forestry plans and operations will fully comply with the UK Forestry Standard (2017).*
- *The plan to carry out keyhole felling rather than clear felling would minimise the amount of felling required. The area removed would only be c. 7.5% of the total area that was planted in 1990. Of the total area of 217ha that was planted in 1990, 200ha would still be retained and of the 52.53ha planted in the project area, 35.93ha would be retained.*
- *The extraction of the timber will be carried out after the road has been installed, so as all the felled trees will be very close to the road most of the timber extraction will be carried out on the hard road and not over the bare ground. This will avoid/minimize any damage to the soil.*
- *All timber (above 7 cms) will be removed from the site and stacked for sale at roadside.*

- *Lop and top will be left on the ground and kept clear of actively managed drains and streams including drains that may be blocked under the HMP/PMP plans.. If necessary, brash mats will be used to minimize rutting.*
- *All felling will be carried out outside the bird nesting season which is normally March – August, except where otherwise approved by the Ecological Clerk of Works*
- *Site refueling and maintenance areas will be sited well away from watercourses and best practice measures will be taken to mitigate risks of spillages.*
- *If required, an area of compensatory new planting equivalent to the area felled will be established elsewhere on the wider Strathvaich estate.*

11. Conclusions

Although this is a fairly large site where 7 turbines are to be installed within woodlands, the area of tree felling and the amount of timber that needs to be removed can be relatively small.

The main reasons for this are that:

1. The area is made up of numerous, relatively small plantings of Scots pine and downy birch intermixed with some quite large unplanted areas. As such, a considerable amount of the area needed for the access road, turbines and other infrastructure will involve no tree felling at all.
2. The woodland plantings are less than 30 years old and so the trees in even the most successful of the plantings are relatively small in size.
3. Many of the woodland plantings, especially in the southeastern half have either failed completely, are poorly stocked with weedy trees, or are severely stunted.

Some of the plantings in the northwest half of the woodland area have been more successful and the volume calculations are based on fully stocked plantings and conservatively high average yield classes, which is likely to overestimate the amount of timber to be felled.

In addition, it is understood that there is a certain degree of flexibility in relation to the final siting of the turbines. It would therefore be desirable, when carrying out the micro-siting decisions following more detailed pre-construction site investigations, to consider re-positioning of elements (within the permitted parameters), subject to any other applicable constraints, where this could potentially result in a reasonable reduction in the area of trees to be felled.

The timber extracting will be carried out after the access road has been installed, with all timber being removed from the site and sold at roadside. The felled area is estimated to be 16.6 ha and an equivalent is potentially available on the estate, for compensation planting if this is required.

12. References

Scottish Executive (2006) *Scottish Forestry Strategy*

The Highland Council (2006) *Highland Forest and Woodland Strategy*

Forestry Commission (1996) *Technical Paper 16: Designing Forest Edges to Improve Wind Stability*

Forestry Commission (2009) *The Scottish Government's Policy on Control of Woodland Removal*

Forestry Commission (2015) *Guidance to Forestry Commission Scotland staff on implementing the Scottish Government's Policy on Control of Woodland Removal*

The Highland Council (2013) *Trees, Woodlands and Development supplementary guidance*

Scottish Environment Protection Agency (2014) *Land Use Planning System SEPA Guidance Note LUPS-GU27 – Use of Trees Cleared to Facilitate Development on Afforested Land*

Forestry Commission (2017) *The UK Forestry Standard – The Government's Approach to Sustainable Forestry*

Forestry Commission (1981) *Yield Models for Forest Management*

RSK 2018. *Kirkan Wind Farm: Environmental Impact Assessment Scoping Report.*

The Highland Council (June 2018) *Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 - Response to the Scottish Government on Scoping Opinion*.

Forestry Commission Scotland (June 2018) Electricity Act 1989. *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Proposed Section 36 Application for Kirkan Wind Farm. Comments on the Scoping Report*.

Forestry Commission Scotland. Pers.com. email from Donald MacLeod, Woodland Officer, dated 24/01/19

Forestry Commission Scotland. Pers.com. email from Agata Baranska, Regulations & Development Manager, dated 24/01/19