Appendix D.3. Peatland Restoration Plan

See Peatlands and Habitats, Presumption to Restore, Assessed and Restock Maps.

The proposed forest-to-bog restoration is evidenced below and aligns with following key Scottish Government and Scottish Forestry and practice:

- Forestry Commission Scotland (2009). Scottish Government's policy on control of woodland removal: implementation guidance: Annex 3 woodland removal without the requirement for compensatory planting
- Forestry Commission Scotland (2015). Deciding future management operations for afforested deep peatland
- Forest Research (2000). Forests and Peatland Habitats
- Forestry Commission (2017). UK Forestry Standard
- Tackling the Nature Emergency - Scottish biodiversity strategy to 2045

D.1.1. Long Term Vision

The long-term vision for the areas of peatland identified in Elchies is to restore these afforested peat sites to UK Biodiversity Action Plan (BAP) as Priority Habitat, Blanket Bog, securing the carbon source and protecting existing areas of Blanket Bog. Key peat-forming species, such as sphagnum mosses and cotton grass, become the dominant ground flora, and wildlife thrives in this priority habitat. Adjacent areas of native woodland will compliment this habitat and further increase the biodiversity value of the area.

D.1.2. Management objectives

1. Systematically restore the deep peat areas to a functioning peatland system which will act as a long-term carbon store and increase its value for biodiversity and water quality.
2. Produce timber products from the current conifer crop while balancing this with the primary objective of peatland habitat restoration.
3. Protect the existing bog habitat, future peatland, and riparian areas, by the control of regeneration of non-native conifers.

D.1.3. Critical success factors

- Phasing of restoration to minimise the hydrological disruption caused by the installation of Rothes III wind farm infrastructure.
- Utilise appropriate harvesting techniques to minimise ground impacts and so protect the carbon storage potential of the blanket bog habitat.
- Where practical realise the biomass potential of all scrub and harvesting waste, leaving as clean a site as possible to help facilitate peatland restoration.
- Minimise road or track construction and utilise low impact forwarding track methods to minimise surface damage.
- Protect Private Water Supply (PWS) as per current policy and best practise.
- Apply current best practice and expertise in peatland restoration operations, using the NatureScot, Peatland Action Technical Compendium.
- Maintain a level of deer browsing conducive to regeneration of native species.

D.1.4. FLS approach to peatland management

FLS's approach to peatland management is different to the rest of the forest industry. FLS's objectives and legislative framework has an added dimension. Being a Scottish Government agency, FLS has an added 'Biodiversity Duty,' as stated in the Nature Conservation Scotland Act (2004). Protection of conservation values is required as part of UKWAS certification and principles of sustainability are required under the UKFS. This means that for afforested peatlands restoration is considered before deciding if replanting is appropriate. This is set out in Making future management decisions of afforested peatlands Practice Guide. This practice guide outlines how to manage afforested peatlands that are not going to be restored for biodiversity reasons. It states that replanting must be justified by considering if the crop will achieve YC 8 or more for Sitka Spruce. The default is to not replant unless there is evidence it will achieve a good growth rate of harvestable timber. If YC 8 or above is not achievable then restocking peatlands is unsustainable. A slow growing crop will not result in a profit, it will be acting as a carbon source thus contributing to climate change and so society would be disadvantaged or threatened based on current scientific information.

Restoration of blanket bogs and lowland raised bogs is a key action from the Scottish Biodiversity Strategy, both habitats are included on the Scottish Biodiversity List. Beyond its value as a carbon store, peatlands contain a huge diversity of organisms. Planting trees on peat leads to a fundamental change in the ecosystem[1].

The following tables present current and future management of afforested peatlands for Elchies. Set out in 'Forestry Commission Scotland (2015). Deciding future management operations for afforested deep peatland' are three Scenarios detailing peat types, characteristic habitat, and vegetation. For the tables below, Scenario A peat types are considered as 'presumption to restore' peatlands and Scenario B and C peat types are considered as 'assessed peatlands'.

Table 1: summary current management of peatlands in the LMP area.

Current management of peatlands in the LMP area	Hectares (ha)	Comments
Afforested deep peatland	643.8	Total area of afforested peatlands based on analysis of aerial images and site surveys (ha).
Existing open habitat on deep peat	0	Total area of open peatland (ha).
TOTAL - All deep peat soils	643.8	Total area size (ha) of deep peat soils within the forest block area based on the soils data. Deep peat soils are defined as per the SF Practice Guide: Scenario A, B and C soils. Presence of peat soils confirmed via peat surveys.

[1] Payne et al., 2018: The future of peatland forestry in Scotland: balancing economics, carbon, and biodiversity. Scottish Forestry. pp. 34-40.

Table 2: summary of future management of afforested peatlands within the plan period (2025 and 2035).

Future management of afforested peatlands	Hectares (ha)	Comments
'Presumption to restore' peatlands. Forest-to-bog restoration of afforested peatlands including the hydrological catchment	192.7	Only includes afforested peatlands which lie next to open existing peatlands, or Scenario A peatland types, as per the SF Practice Guide.
'Assessed' peatlands. Forest-to-bog restoration to secure carbon store and sequestration and maximize ecosystem services.	166.0	Only includes Scenario B and C peatland types, as per the SF Practice Guide. Total area of afforested peatlands that will be restored following an assessment of predicted growth (YC). This is where no evidence found to support the conclusion that the next rotation stand would grow Sitka spruce YC8 or more with minimal disturbance and low level of peatland modifications. The areas of the hydrological units are also included.
Peat Edge Woodland	8.3	Area bisected by water supply infrastructure, supply point (50 m buffer) and water pipeline (20 m buffer) that makes peatland restoration operationally challenging.
Peatland to be restocked	4.1	**Burn of Loishkeen (NJ 2171 4627)** Afforested peatlands that will be restocked because evidence was found to support the conclusion that the second rotation will clearly be YC8 or more with minimal disturbance and with a low level of peatland modifications.
Peatland to be partially restocked	2.3	**Muirtown (NJ 2457 4483)** Due to a private sewage treatment works (see D.1.5).

To the north of Elchies is a large expanse of 11b [Calluna, *Eriophorum vaginatum* Blanket Bog] on Rothes Estate and is hydrologically connected to the existing Blanket Bog on Elchies. Rothes Estate will consider the area for restoration under a future phase but are currently focused on the moss of Rothes as a priority. Dependent on funding options available at the point at which the Rothes III Windfarm footprint becomes their focus, they will then define what is to be put forward for restoration under what schemes.

Table 3: Presumption to restore, description of key features. Only relevant for Presumption to Restore peatlands (Scenario A peat types) where deforestation would prevent the significant net release of greenhouse gases. Within the plan period.

	Description	Location of described attribute
Description of any designated sites, priority peatland habitats needing to be protected and enhanced.	Existing remnants of degraded Blanket Bog (UK BAP) that are currently afforested with poorly performing crop. Bog forming species present e.g. sphagnum mosses and cotton grass. A range of peat depths between 50 cm to 200 cm.	See Presumption to Restore Map
Description of the Scenario peat types present in the forest (all will be restored), and any characteristics of interest.	10b [Upland Sphagnum Bog]. Bog forming species present e.g. sphagnum mosses and cotton grass. A range of peat depths between 50 cm to 200+ cm.	See Presumption to Restore Map
Description of hydrological units, extent, relation to peatlands to be restored and the topography.	The hydrological units of the scenario A peat types extend to include areas of existing blanket bog and integral areas of 11c which have been subject to survey to verify peat depth. Site survey verified the extent of the hydrological units. **Hill of Stob (NJ 2057 4798)**: the northern most presumption to restore site extends along the northern boundary of Elchies with the peatland extending into neighbouring ground. There are areas of existing blanket bog habitat in this area. FLS is engaging with the neighbour to ensure the entire hydrological unit is restored. The tree crop is poorly performing Sitka Spruce/Lodgepole Pine with bog vegetation present. **Bruchanlour Burn (NJ 2001 4696):** a narrow restoration between the forest road, and the forest boundary with remnants of blanket bog present. Bog forming plants present, and the Sitka Spruce/Lodgepole Pine planted on some of the restoration area performing poorly and showing signs of deficiencies. The restoration area is bisected by watercourses and includes both wind turbine and PWS infrastructure. **Marnoch Road (NJ 1984 4576):** is a more compact site with the hydrological unit forming in a depression between two watercourses. The flush tracks southeast into the forest. Existing trees (planted and regenerated) are widely spaced and dead or dying with several large drains.	See Presumption to Restore Map

	Burn of Roehoish (NJ 2266 4638): there are areas of existing blanket bog, with bog forming vegetation throughout this hydrological unit both north and south of the Burn of Roehoish. Sitka Spruce/Lodgepole Pine re-generation is very patchy with obvious deficiencies. **Muirtown (NJ 2457 4483):** the hydrological unit slopes gently to the forest edge and the second rotation plantation of Sitka Spruce/Lodgepole Pine is very patchy with obvious deficiencies. Peat depth is generally 2m+.	
State any points of note from survey	NA	NA

Table 4: only relevant for Assessed Peatlands (Scenario B and C peat types) where there needs to be clear evidence that restocking on peat soils will produce a yield class equivalent to Sitka spruce 8 or more. Within the plan period.

Attribute described	Description	Location of described attribute
ESC statement, respective to peat types	Soil Nutrient Regime (SNR) generally very poor, SMR (Soil Management Regime) ranging from very wet to wet across the peatland areas. The 11 peat types are limited by SNR and the 9 peat types limited by DAMS and occasionally SNR (especially 9e). Summary: • 11 peat types YC prediction is 6. • 9 peat types YC prediction is 8 to 10. • 8 peat types YC prediction is 6.	Peatland areas across whole forest block.
Accumulated Annual Temperature	1200 - 1800 (warm)	Elchies
DAMs score	15-17 (moderately exposed)	Elchies
Crop deficiencies (needles, colour, leader length)	For most surveyed sites, the crop was not performing as per the predicted Yield Class. Some restock sites appear to grow slowly soon after planting because of nitrogen deficiencies exacerbated by heather check. Other stands appear to have grown quite well in the first 15 years, and then experienced a dramatic slowing of growth rate.	Second rotation crops on peatlands across whole forest block.
Location and extent, proportion of healthy crops (no signs of deficiencies) and reason	**Burn of Loishkeen (NJ 2171 4627):** Within the plan period identified as suitable for conventional restocking due to the absence of peat soils and/or the finding of evidence	See Assessed Restock and Assessed Restock Map.

Attribute described	Description	Location of described attribute
	of good growth and clearly shows that the second rotation should grow at Yield Class 8 or more with minimum intervention. Additional areas identified, the restock is out with of the plan period.	
Statement of correction factors used to predict of next rotation from ESC outputs (drainage, fertilising, flushing, heather control, peat compaction, and the combination of all of these per peat type)	YC predictions in ESC are overly optimist for peat soils, based on several assumptions that appear to be inaccurate. The variable tree sizes means that normal mensuration methods will over-state the actual volume of timber produced, and therefore the actual amount of carbon sequestered over the length of the rotation. In addition, the soil compaction from the first rotation is not considered in the ESC prediction.	
Statement of actions required to limit carbon loss from peatland soil. For example, partial re-wetting, referencing average water table height and density of drains.	Stump flip and ground smooth all furrows and drains with the addition of peat dams where there is sufficient peat.	
Where Peat Edge Woodland is proposed, confirm, and explain why restoration of deep peatland is not possible	**Presney Well (NJ 2060 4450):** area bisected by water supply infrastructure, supply point (50 m buffer) and water pipeline (20 m buffer) that makes peatland restoration operationally challenging. The area will instead be restocked as Peat Edge Woodland.	See Assessed Restock and Assessed Restock Map.

Table 5: restoration proposals. Describes the restoration techniques to be applied to the proposed restoration areas.

Attribute described	Description	Location of described attribute
Treatments used to restore the hydrology.	Block artificial drainage features (drains, grips) to re-instate a more natural hydrology and retain more water on a peatland. Any conifer regeneration present will be mulched and removed to prevent further drying of the restoration areas.	Across all restoration areas.
Treatments used to restore the topography (remove afforestation modifications, and previously hagged sites)	Ground smoothing, to remove the ridges and furrows on previously afforested sites, and to create a flatter topography like near natural peatlands. This aids re-wetting to produce conditions conducive to the recovery of peatland species. The technique must, be used in conjunction with peat dams wherever peat depths allow, to ensure that water preferential pathways do not develop along the base and sides of the drains in the future.	Whole afforested site.
Treatments used to counter-act peat cracking or other modifications caused by the afforestation of the peatland	No peat cracking noted on the survey.	NA

D.1.5. Private Sewage Treatment Works

The forest-to-bog restoration proposed at NJ 2457 4483 has a private sewage treatment works (PSTW) to the south-east and adjacent to the forest boundary. The PSTW is reliant on a rate of flow from the drains originating in Elchies and discharging onto private ground, before re-entering Elchies and then joining watercourses further downstream. Given the sensitivity of the site, a combination of conventional forest-to-bog rewetting techniques will be used alongside less disruptive techniques. The historic mill lade and the two main forest drains originating at NJ 2443 4471 and NJ 2453 4473 will not be blocked. Deep peat to the west of the mill lade will be restocked with native broadleaves to protect the flow of water to the PSTW. To the east of the mill lade all minor drains will be blocked, ridge and furrow systems smoothed, and tree slumps flipped as per standard operations. This modification should reduce any long-term risk to water flow being reduced to the PSTW.

During re-wetting operations, to minimise the impact on the water table, felling and restoration will be carried out during the winter (November to March) to allow the water table to rise naturally between operations. This will reduce the risk of any short-term risk of disrupted flow to the PTSW.