Forestry and Land Scotland
Coilltearachd agus Fearann Alba

East Region

Durris

Land Management Plan 2024 - 2034

Plan Reference No: LMP 22
Plan Approval Date:
Plan Expiry Date:

We manage Scotland's National Forest Estate to the United Kingdom Woodland Assurance Standard – the standard endorsed in the UK by the international Forest Stewardship Council® and the Programme for the Endorsement of Forest Certification. We are independently audited.

Our land management plans bring together key information, enable us to evaluate options and plan responsibly for the future. We welcome comments on these plans at any time.

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1.0 Summary of Proposals

This plan is a review of Forestry and Land Scotland's (FLS) management of the Durris LMP area, which encompasses a collection of forest blocks situated between Banchory and Stonehaven in Aberdeenshire. The plan area extends to 2290ha.

The purpose of the plan is to outline felling and thinning proposals over 20 years, with the first 10 years in detail, along with restocking proposals for the whole plan area.

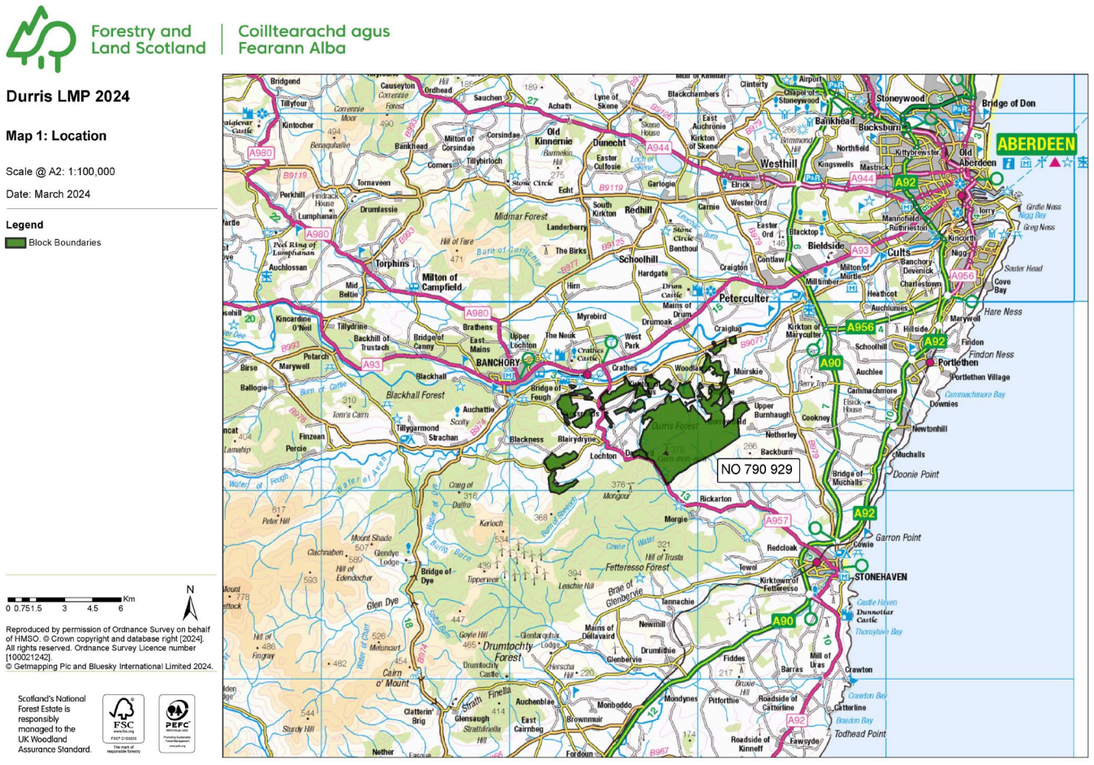

Figure 1: Map showing Durris LMP location

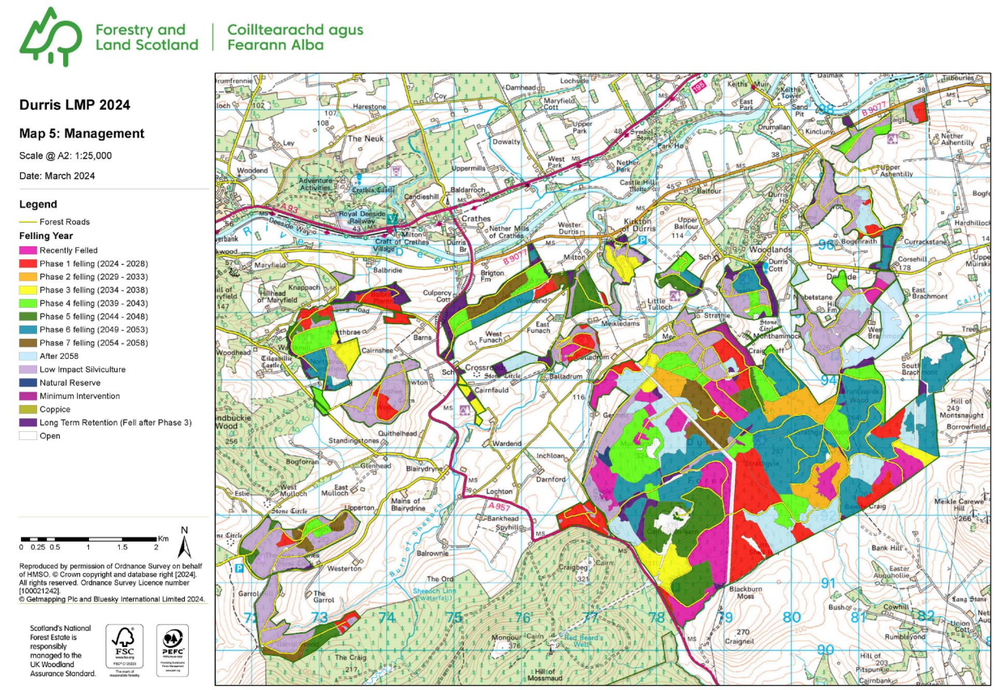

Figure 2: Map of planned felling coupes and phase of felling

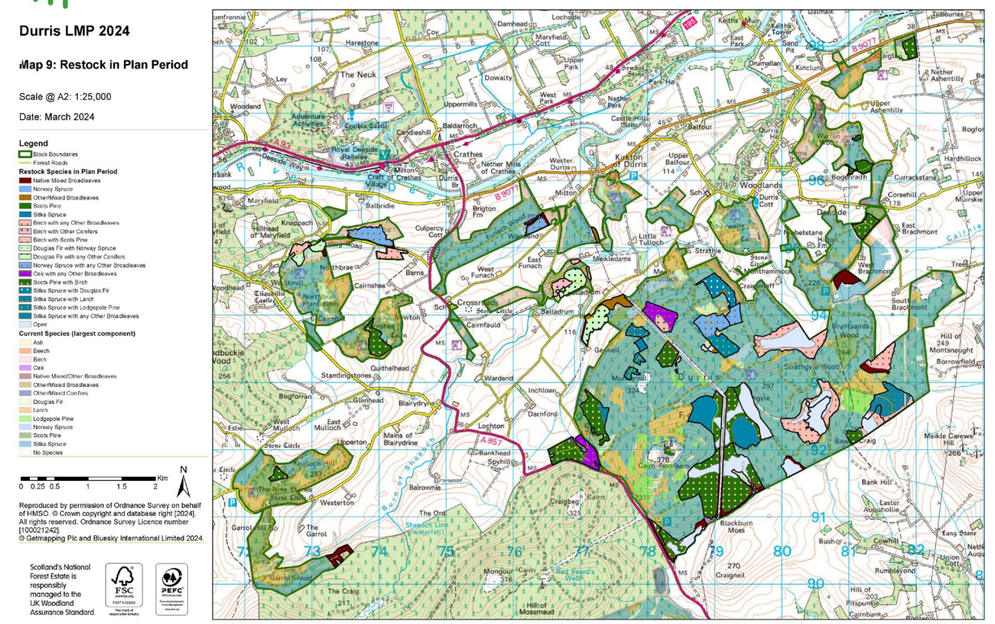

Figure 3: Map showing areas to be restocked within plan period and species to be planted

The plan will be reviewed after five years to ensure the objectives set out in the LMP are still appropriate for the management of the forest in the current conditions. All operations, both planned and completed, will also be reviewed to ensure they are still necessary to achieve the stated objectives.

In addition to this overarching strategic level plan, all operations will be preceded with a more detailed operational planning process. This will be guided by the work plan document that provides an opportunity for all sections of FLS (visitor services, environment, civil engineers, etc.) to provide detailed information that pertains to the planned operation. The forest works manager is then able to plan the operation with the fullest and latest information available, which enables them to make any changes or undertake any mitigation measures necessary to minimise any potential negative impacts identified.

2.0 Scottish Forestry Regulatory Requirements

This section provides a summary of the elements of the LMP which are regulated by Scottish Forestry, focusing on relevant operations and activities being carried out in the first ten years of the plan.

2.1 Summary of planned operations

Planned Operations	2023-2033 plan period
Clearfell	294.6ha
Thinning	1013.4ha
Restock	384.2ha
Woodland establishment	5.7ha
Road construction (transfer points)	200m
Peat Restoration	88.9ha
Quarry expansion	0.3ha

Table 1: Planned operations in 10 year plan period

2.2 Proposed felling in years 2024-2034

Proposed felling year	Fell area (ha)	% forest area
Phase 1 - 2024-2028	226.8	9.9%
Phase 2 - 2029-2034	67.8	3%

Table 2: Proposed Phase 1 and Phase 2 felling over this plan period (gross coupe size)

Coupe	Phase	SS	SP	LP	NS	Firs	Larch	Broadleaves	Total
22005	1	10.43		1.29					**11.72**
22008	1		0.6	0.4	1.99		0.03		**3.02**
22025	1	2.16	1.93					0.4	**4.49**
22028	1				5.03	0.48		0.09	**5.60**
22029	1				2.47	0.62			**3.09**
22031	1	9.00				0.74			**9.74**
22032	1	7.78						2.88	**10.66**
22033	1	2.75				0.29		1.66	**4.70**
22036	1	0.55					0.16	0.08	**0.79**
22039	1	2.7			1.36				**4.06**
22049	1		3.9		1.29				**5.19**
22235	1	0.69			2.97	0.86		1.27	**5.79**
22467	1	5.8							**5.80**
22517	1	8.75		2.29					**11.04**
22684	1	11.38				0.03			**11.41**
22689	1	7.57			0.95	5.26	1.03	2.12	**16.93**
22737	1						2.36		**2.36**
22860	1	23.59	6.49	7.3					**37.38**
22968	1	28.78					1.25		**30.03**
22622	1	18.05	0.4			0.38	2.24		**21.07**
22875	1	5.05							**5.05**
22343	1	1.54							**1.54**
22424	1	15.38							**15.38**
22066	2	22.16			0.59		0.56		**23.31**
22040	2	6.39	0.11			0.39	6.24		**13.13**
22848	2	31.34							**31.34**
Total		**221.84**	**13.43**	**11.28**	**16.65**	**9.05**	**13.87**	**8.5**	**294.62**

Table 3: Clearfell details by coupe (ha)

* Please note that although felling permissions have been requested for broadleaf components within coupes, this is primarily to allow the clearance of windblow or for unavoidable operational issues. Our default approach will be to retain broadleaves where possible, particularly in LEPO areas and where broadleaves will form a constituent part of, or compliment, the future restock species.

Age of trees	Growth stage	Percentage of class at given year	
		2024	2034
0 – 10	Establishment	9.6%	26%
11 - 20	Thicket	11.9%	5.5%
21 – 40	Pole stage	35.0%	23.5%
41 – 60	Maturing high forest	10.2%	19.4%
61+	Old high forest	18.7%	13.2%
Open/felled	n/a	14.6%	12.5%

Table 4: Change in age class over plan period (%)

2.3 Proposed thinning in years 2024-2034

Coupe	Thinning Year	Area (ha)	Approx Volume (m^3)
22001	2024/25, 2031/32	35.22	2908 (combined)
22011	2025/26, 2032/33	22.9	2403 (combined)
22009	2025/26, 2032/33	94.77	9866 (combined)
22004	2026/27, 2033/34	118.04	10450 (combined)
22012	2026/27, 2033/34	68.45	4642 (combined)
22006	2027/28	82.39	4471
22008	2027/28	41.07	1750
22005	2028/29	36.06	1360
22002	2028/29	45.62	2159
22007	2029/30	54.72	2152
22003	2030/31	74.73	3271

Table 5: Proposed thinning in Phases 1 and 2

2.4 Proposed restocking in years 2024-2034

Coupe	SS	SP	LP	NS	DF	HL*	MC	Oak	Alder	BI	MBL	Open	Peat Rest.	Total
22006	15.11	3.96								1.13	0.57		2.29	**23.06**
22013	0.19		0.19	0.22							0.06			**0.66**
22073	8.25	0.31							9.18	1.55		0.57	0.71	**20.57**
22332	4.91				4.91						1.26			**11.08**
22245	2.31	9.89								4.24				**16.44**
22572		3.33								2.22	1.65	2.45	5.29	**14.94**
22861	22.62									5.65	0.86	0.86	5.08	**35.07**
22875	4.64		4.64	13.46							3.36			**26.10**
22948		5.24								1.31	0.59			**7.14**
22979	8.77	5.8	0.81			0.87				1.91	0.57			**18.73**
22944							1.61			2.41				**4.02**
22005	0.51	2.91							1.37	2.55			4.38	**11.72**
22008		2.42								0.60				**3.02**
22025											4.05	0.44		**4.49**
22028				1.20	1.20			1.29		1.28	0.63			**5.60**
22029				1.29	1.29						0.31	0.20		**3.09**
22031		7.79								1.95				**9.74**
22032	1.85				7.39					0.85	0.57			**10.66**
22033		3.76								0.94				**4.70**
22036											0.68	0.11		**0.79**
22039											3.51	0.55		**4.06**
22049		5.19												**5.19**
22235				3.32							2.43			**5.75**

Coupe	SS	SP	LP	NS	DF	HL*	MC	Oak	Alder	BI	MBL	Open	Peat Rest.	Total
22424		1.09								0.31	0.20		13.78	**15.38**
22467											1.08		4.72	**5.80**
22517									2.49	3.32	2.95	2.28		**11.04**
22684	5.46				5.46						0.25	0.24		**11.41**
22689				8.53						2.54	5.86			**16.93**
22737		0.69								0.46	1.21			**2.36**
22860		18.11								4.53	2.45	2.33	9.96	**37.38**
22968	13.45	7.82								2.23	1.12		5.41	**30.03**
22622		8.92						4.16		3.83	4.16			**21.07**
22343											0.48	1.06		**1.54**
22066		2.05							6.16	10.26	0.38		4.46	**23.31**
22040		1.32						5.90		1.97	3.94			**13.13**
22848		1.63							5.03	8.52	0.22	0.48	15.46	**31.34**
Total	**88.07**	**92.23**	**5.64**	**28.02**	**20.25**	**0.87**	**1.61**	**11.35**	**24.23**	**66.56**	**45.4**	**11.57**	**71.54**	**467.34**

Table 6: Restock details by coupe (ha)

*Larch component included as already observed natural regeneration, expected to reach establishment height in early stages of plan period.

Species	Area (ha) 2024	% Cover 2024	Area (ha) 2034	% Cover 2034
Sitka spruce	1174.8	51.3%	1005.3	43.9%
Japanese larch	178.8	7.8%	159.1	6.9%
Scots pine	155.5	6.8%	251.9	11.0%
Birch	130.7	5.7%	188.9	8.2%
Lodgepole pine	55.2	2.4%	51.5	2.2%
Hybrid larch	56.4	2.5%	52.6	2.3%
Norway spruce	48.4	2.1%	56.1	2.4%
Mixed broadleaves	55.3	2.4%	127	5.5%
Douglas fir	36.4	1.6%	48.6	2.1%
European larch	16.2	0.7%	16.2	0.7%
Beech	14.6	0.6%	13.7	0.6%
Mixed conifers	11.9	0.5%	13.6	0.6%
Oak	11.2	0.5%	20.6	0.9%
Sycamore	6.3	0.3%	5.6	0.2%
Grand fir	4	0.2%	0.9	0.0%
Felled	185.2	8.1%	0	0%
Open/Unplantable	149.1	6.5%	278.4	12.5%
Total	**2290**	**100%**	**2290**	**100%**

Table 7: Species change over plan period

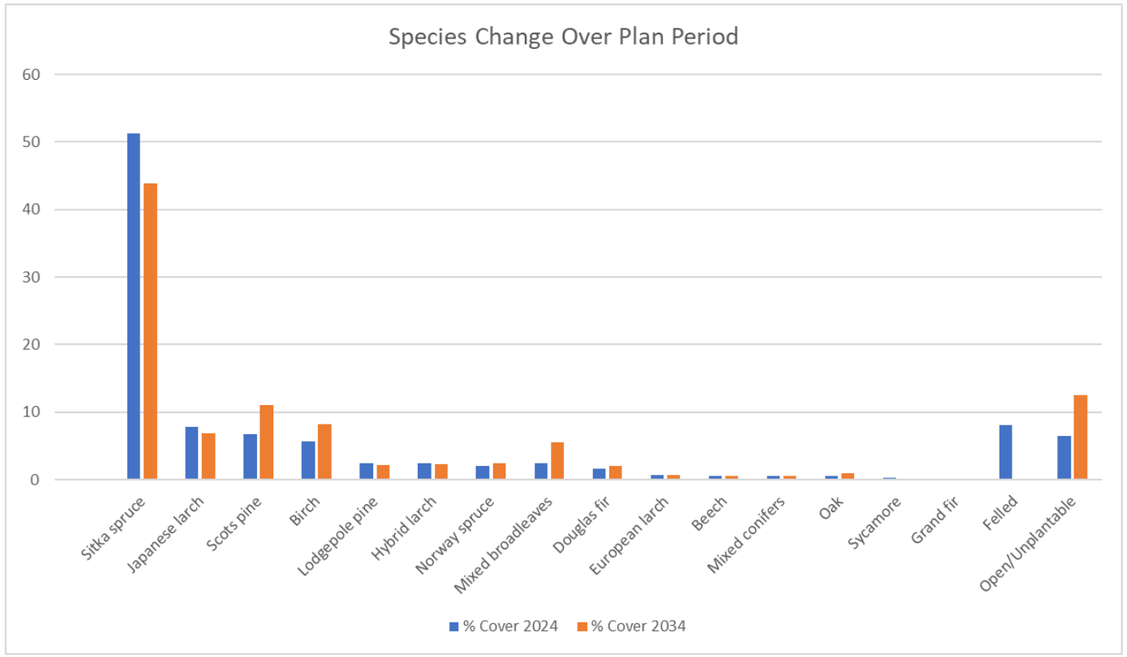

Figure 4: Graph showing species change over plan period

An effort has been made to continue to increase the broadleaf coverage in this plan area during the next period. Although the current coverage, at 9.9%, is currently well over the UKFS minimum of 5%, increasing broadleaf coverage, both as part of a mix with commercial conifer crops and as stand-alone crops, will have significant positive influences in the future resilience of the LMP area as well as increasing the biodiversity potential.

At the end of this plan period, the broadleaf coverage will stand at 15.5% and Sitka spruce coverage will have dropped by over 7%, with a large percentage of this area replanted with Scots pine and native mixed broadleaves or restored to active peatland.

This, combined with other areas of habitat restoration, and an area of afforestation, ensure that the block will be fully UKFS compliant and also contributing towards biodiversity, resilience and carbon capture targets by the end of the plan period.

2.5 Woodland establishment

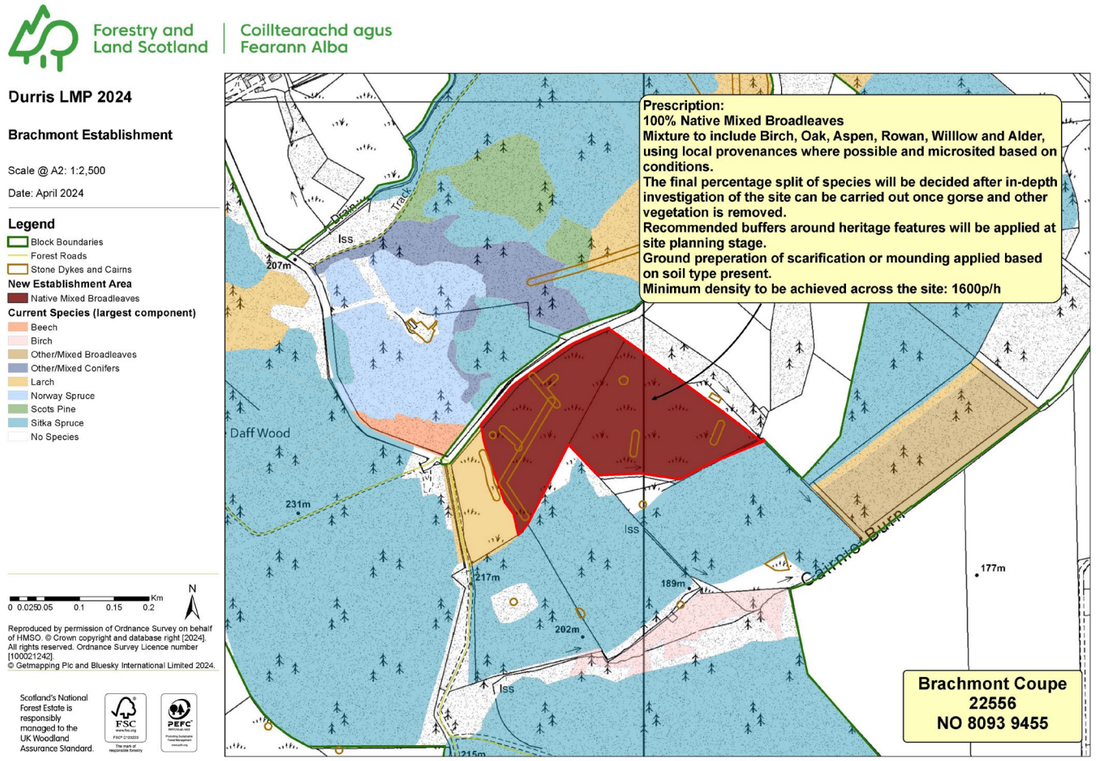

Figure 5: Map showing afforestation area at Brachmont

There is 5.7ha of new woodland establishment to be completed within this plan period. This is an area which was approved for planting within the previous plan but which was never completed.

The field, which was predominately used for grazing in the past, will be established with a diverse native broadleaf mix, primarily to serve as an improved habitat for biodiversity and long-term carbon capture.

Full details of the establishment plan can be found in **Appendix G: Brachmont Establishment EIA Screening Opinion Request.**

2.6 Access and roading 2024-2034

There are no proposals for significant lengths of new roads in the plan period, although there is the need for two new roadside accesses to enable the harvesting of current windblown crops, totaling 200m of new roading. These accesses fall below the threshold for EIA Screening Opinion Requests but will require full planning permission to be submitted separately from this LMP.

There is also a requirement to re-open some stretches of forest roads and two existing roadside accesses which have become severely overgrown. These will also require Prior Notifications to be submitted to the local authority prior to any operations taking out.

Please see below map and table for the locations of these proposals.

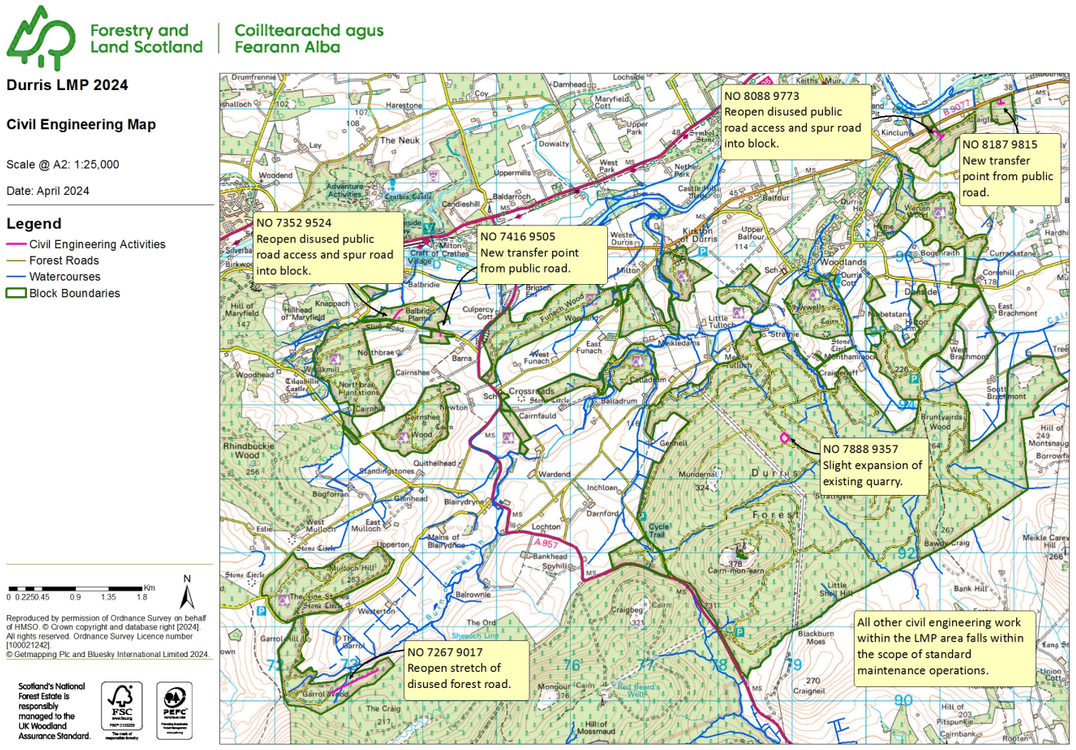

Figure 6: Map showing locations of planned civil engineering operations within the plan period.

Any other civil engineering works during this plan period will fall under standard roads maintenance.

Grid Reference	Operation
NO 8187 9815	New transfer point from public road
NO 7416 9505	New transfer point from public road
NO 8088 9773	Re-open disused public road access and spur road into block
NO 7352 9524	Re-open disused public road access and spur road into block
NO 7267 9017	Re-open stretch of disused forest road.

Table 8: Details of planned civil engineering operations

2.7 Recreation facilities

Current car-parks will be maintained but no new facilities will be added.

2.8 Departure from UKFS guidelines

The LMP seeks to follow the UKFS in all requirements.

2.9 Standards and guidance on which this LMP is based

This land management plan has been produced in accordance with a range of government and industry standards and guidance as well as recent research outputs. A list of these standards and guidance can be found here: https://forestryandland.gov.scot/what-we-do/planning/links

In addition Forest Guidance Notes regarding delivering forest operations to preserve biodiversity will be adhered to. These can be found here: https://forestry.gov.scot/forests-environment/biodiversity

FLS and East region have a full set of national and local policies and plans plus working groups to deal with all major contingencies that may affect the forest during the period of the plan.

2.10 Tolerance table

Please see Appendix C

3.0 EIA screening determination for forestry projects

3.1 Proposed deforestation

This plan requests permission to carry out deforestation of 83.3ha for the purposes of deep peat restoration across the LMP area.

There are patches of deep peat across the plan area but after investigation, the areas suitable for restoration have been identified and are focused in seven distinct areas as per the maps within Appendix E: Peat restoration plan.

Areas to be deforested are primarily on deep peat soils and will be restored to a functioning peatland system that includes Blanket Bog (Priority Habitat). This will involve the removal of any remaining live conifers and undertaking ground works to restore the original ground surface as best as possible. An EIA screening determination is being sought as part of this plan submission to allow the deforestation to be undertaken. The EIA Screening Opinion Form along with the relevant maps can be found within separate **Appendix F – Deforestation Environmental Impact Assessment Screening Opinion Request.**

3.2 Proposed forest road works

There are no road works in the period requiring an EIA determination.

3.3 Proposed forest quarries

There is a proposed quarry extension, as shown in the below map, to be carried out during this plan period which will require an EIA screening determination. The EIA Screening Opinion Request Form can be found in separate **Appendix H - Quarry Extension EIA Screening Opinion Request.**

Figure 7: Map showing proposed quarry expansion at Curly Brae, Durris

3.4 Proposed afforestation

There is 5.7ha of proposed afforestation within the plan period as detailed in Section 2.5 and in Map 9: Restocking in plan period. The EIA Screening Opinion Request Form can be found in separate **Appendix G - Brachmont Establishment EIA Screening Opinion Request.**

4.0 Introduction

4.1 The existing land holding and history

The Durris LMP area consists of one main forest block, comprising roughly 65% of the total plan area, and a collection of 14 outlier blocks located to the north and west of the main block. The blocks are spread over an area of approximately 30 square miles situated between Banchory and Stonehaven in Aberdeenshire. The total landholding is 2290ha.

Durris main block (1555ha) – Prior to the Forestry Commission acquiring the existing forestry and the surrounding land, only around 360ha of the current landholding had forestry cover according to historic ordnance survey data. The Forestry Commission then planted the remainder of the present area in occasional phases between the 1950s and 1980s.

The woodland structure is dominated by Sitka spruce with smaller areas of other conifers, predominantly larch, Lodgepole pine, Scots pine and Douglas fir. There are small areas of broadleaf species present but they currently constitute a very small percentage of the species coverage.

The main Durris block has undergone vast felling and restocking operations in the last 50 years and currently only around 25% of the afforested area was planted before 1980. 65% of the landholding was planted in the last 35 years or is currently awaiting restocking operations.

Durris outliers (735ha) - The Durris outlier blocks are a group of 14 small distinct woodlands and have all been afforested since before the turn of the 20th century.

Since being acquired by the Forestry Commission, they have been restructured and replanted several times resulting in a varied age structure of older plantations established between the 1940s and 60s and second or third rotation plantations re-established in in the 70s, 80s and 90s.

The predominant species are Sitka spruce, Scots pine, Hybrid larch and Douglas fir. There are also significant areas of broadleaf, consisting of mainly old growth Beech and naturally regenerated birch, although much of the birch appears in mixtures with Sitka planting.

More details on the existing physical characteristics and background to the site can be found in Appendix B.

This plan is a revised submission of an earlier plan, approved in 2012.

4.2 Setting and context

The **Durris main block** is located to the south-east of Banchory, towards Stonehaven, on rolling hills dominated by Cairn-Mon-Earn (378m) and Mundernal (315m). Neighbouring settlements include Woodlands of Durris and Denside of Durris.

The north and west faces of the block are prominent in the local landscape, particularly for traffic travelling south on the A957, otherwise known as Slug road. There is also a recently expanded, 80 meter width, pylon wayleave crossing the entire block from north to south which is visible in the landscape from some areas.

There is a large area of private forestry immediately west of this block and the extensive Fetteresso forest to the south-west, on the western side of Slug road, and a large moorland estate has boundaries to the south and east. The rest of the block is surrounded by mixed agricultural land.

The **outlier blocks** are predominately situated to the south of the River Dee and are within two miles of the river, with the exception of Mulloch Wood and Garrol Wood which are further to the south-west.

The blocks form a significant part of the local landscape, providing contrast with the surrounding agricultural land use and also form a link with the extensive upland conifer plantation of the Durris main block. The blocks are particularly visible from sections of the Deeside way which runs to the north of the River Dee and looks south onto many of the outliers.

4.3 LMP Presentation

The land holding as a whole will be considered in this LMP.

5.0 Plan Objectives

5.1 Issues

The main issues to consider in this LMP are:

- Large areas of the forest were severely affected by Storm Arwen in winter 2021, with much of the windblow in the outlier blocks still to be cleared along with what remains in the main block.
- Sitka spruce regeneration is known to be extremely prevalent in some areas.
- A number of UK Biodiversity Action Plan priority species are recorded in the block including red squirrel, pine marten, otter, and various schedule one raptor species.
- There are significant areas of deep peat and bog habitat present. Some which have been planted with unsuitable species in the past.
- Some riparian zones have unsuitable species present, whether planted or regenerated.
- Some watercourses within the LMP area are tributaries to River Dee and have additional protections in place as they form part of a Special Area of Conservation.
- The wayleave for the high voltage pylon line which runs through the Durris and Free Church Wood blocks is currently being upgraded from 40m wide to 80m.
- There are several scheduled monuments located within the LMP area.
- Large parts of the LMP area, particularly in the outlier blocks, are designated as Ancient (of semi-natural origin) or Long-Established (of plantation origin, (LEPO)).
- There is an ongoing issue with windblown trees causing damage to boundary fences along the south-eastern boundary of the main Durris block with the neighbouring estate.
- Forest roads and informal trails are well used by cyclists and walkers throughout the plan area.
- There are some large areas of larch within the plan area which could potentially be threatened by the spread of Phytophthora ramorum disease during the plan period.

5.2 Key Challenges

- How to produce quality timber from blocks potentially high in recreation and environmental value.
- How to protect priority habitats within LMP area.
- How to restore damaged areas of deep peat effectively.
- How to manage potential impacts on river catchments known to have a flood risk and special protections.
- How to conduct necessary forest operations without having a detrimental effect on visitor experience.
- How to ensure LISS prescriptions are applied to suitable areas.
- How to increase resilience and species diversity within the LMP area.
- How to protect UK BAP species habitats during forest operations.
- How to conduct felling operations without a detrimental effect on the landscape.
- How to clear large areas of windblown timber in a short period of time to maximise timber recovery.
- How to ensure boundaries are structured to protect neighbouring infrastructure and landholdings in the long term.

5.3 National Spatial Overview

The Forestry and Land Scotland National Spatial Overview includes Durris within Zone 7: Moray and Aberdeenshire Uplands.

The aims and objectives identified that Zone 7 can best contribute to include:

- **Ecosystem services and additional public benefits:** support for small sawmills; establish and support started farms; secure carbon sequestration through CCF; maintenance of high water quality of salmon rivers; provide shelter for stock on neighbouring land; high recreation use of NFE contributes to increased health and well-being; sustainable timber production
- **Other national commitments:** investment in silvicultural practices; management of tree disease; habitat management for Scottish wildcat
- **Contribution to financial sustainability:** high quality timber crops; high potential for saw logs; diversity of softwood species; specialist timber markets; windfarms

Focusses of effort and investment challenges for this area include:

- **Continue to develop a thinning and CCF programme**. More CCF would extend the resilient forest structure and reinforce ‘coniferous forest as mature habitat’ in this zone, while potentially increasing saw log production. Challenges are likely to be deer management, contractor and staff skills, provenance of recruited species, potential impacts of climate change and of tree disease, while benefits may include reduced restocking costs and long term carbon sequestration
- **Respond to predicted impacts of climate change.** Including current and up-coming disease threats related to third rotation forests and changing climate, potential drought and predicted

longer growing season. The challenge is to reduce the risk to future forest structure and high quality timber products

- **Accommodate the increasing number of overhead lines proposed to cross the NFE**, alongside continued wind farm development. Challenges include planning roads and efficient felling patterns within a more fragmented forest area, ensuring on going 'resilience' of infrastructure and timescales involved with construction
- **Increase broadleaf to at least 5% in each LMP area and develop an associated management and marketing strategy,** as the zone overall does not meet UKFS requirements. There are opportunities to use broadleaves to provide shelter for farmland, maintain and improve water quality for salmon rivers; and expand woodland habitats; build on LISS and CCF management expertise and contractor base to expand broadleaf silviculture, higher value productive BL outputs and marketing

5.4 Management Objectives

5.4.1 Primary objectives

- **Continue to manage the Durris LMP area to produce a sustainable timber supply.** There are opportunities to produce a significant amount of timber during this plan period through a combination of windblow clearance, standard clearfelling of suitable crops, regular thinnings and the application of appropriate LISS prescriptions. A future timber resource can also be guaranteed by restocking with productive species suitable to the ground conditions and which are likely to be resilient to future climatic challenges.
- **Increase the future resilience, biodiversity value and carbon capture potential of the LMP area.** By selecting suitable restock species in clearfelled areas, continuing work to convert PAWS and LEPO designated areas, identifying areas suitable for peat restoration and maintaining suitable habitat for priority species, the future health of the forest should be improved and the LMP area will more fully contribute to climate change mitigation targets.

5.4.2 Secondary objectives

- **Protect and improve the water environment.** Redesigning the existing future restock plans to include suitable riparian buffer zones along any watercourses present within the plan area, with particular focus on designated SAC tributaries to the River Dee, will help maintain or improve water quality both within the forest and in the surrounding areas. Creation of functioning riparian buffers will also help improve habitat connectivity and reduce the likelihood of flooding downstream.
- **Ensure all areas requiring proactive management in the near future have suitable access in place.** Many areas of the forest require felling, thinning, LISS management activities or restock within this plan period or the near future, and some of these areas do not currently have any roading or roadside access in place. It will be a priority to ensure this plan includes details of all future access requirements and permissions gained where necessary.
- **Reduce any potential for negative impacts on adjacent landowners and local community by ensuring forest design takes impact on landscape and boundaries into consideration.** By effectively designing the felling and restock plans in landscape sensitive areas such as Mundernal Hill, along the newly expanded pylon wayleave and our boundaries with neighbouring estates, any impact on the surrounding community can be reduced or a positive change can take place.
- **Protect all scheduled monuments and other archaeological features from damage and improve setting where possible.** All scheduled monuments within the plan area should be identified and managed as per current guidance from HES and the UKFS to protect them from forest operations and ensure they are accessible and visible to any visitors.
- **Maintain or increase levels of recreation within the LMP area.** By protecting the existing informal paths and road network during forest operations and applying LISS systems in high use areas, the woodlands can continue to be a pleasant place for recreational use by the local community.

6.0 Opportunities and Constraints

6.1 Opportunities and Constraints Analysis

The following table details the objectives, opportunities and constraints that have determined the design concept for the Durris LMP.

Issue	Opportunities	Constraints	Concept
Large parts of the LMP area were badly affected by windblow following Storm Arwen in November 2021.	• Clearance of large areas of windblow and associated crop in a short period is likely to increase the production of timber resources from the LMP area in the immediate future. • Felling large areas earlier than planned allows for potential to diversify species composition through restocking sooner than expected, helping to achieve biodiversity and resilience targets.	• There are currently some issues with clearing windblown areas due to a lack of roading or access from public roads. • Large scale felling of mature and semi-mature crop is likely to have an adverse effect on the age range of the remaining standing crop, with the proportion of immature or newly established trees likely to be much higher than mature, well-established woodland.	• Continue to fell windblown areas to produce a sustainable timber resource. • Identify areas where access is an issue and design new infrastructure to allow harvesting to take place. • Look for opportunities to retain mature crops to help preserve some age range diversity in the remaining standing crop. • Choose restock species carefully to help improve the future biodiversity value of the woodland and increase resilience to climate change associated challenges in the future.
Soil maps indicate the presence of large areas of peaty soils in the main Durris block, some of which may be suitable for peat restoration.	• Carrying out peat restoration has a multitude of benefits, including: increasing carbon capture/reducing loss in restored areas, increasing biodiversity by restoring natural habitats, and reducing peak flow rates after heavy rain which in turn reduces flood risk elsewhere.	• Many areas of peat have been heavily modified in the past to aid tree establishment and may be too degraded to be successfully restored. • Some areas identified as having peaty soils present have been recently restocked. • Natural regeneration of Sitka spruce is prolific in the main Durris block, increasing the costs and complexity of peat restoration operations.	• Carry out surveys on areas identified as having peat restoration potential on soils map to gauge how successful peat restoration is likely to be and prioritise areas with high restoration potential for operations within the upcoming plan period. • On peaty areas deemed unsuitable for peat restoration, ensure suitable species such as native Scots pine or birch woodland are applied for restock. A second rotation of spruce is unlikely to be successful without an unreasonable amount of ground preparation and fertilisation.
The wayleave for the high voltage pylon line which runs through the Durris and Free Church Wood blocks is currently being upgraded from 40m wide to 80m.	• Potential to add corridor of shrubby native broadleaves on extended areas of the wayleave, providing greater habitat connectivity through the forest and raising overall biodiversity value.	• The wayleave upgrade operation will result in the removal of the wind-firm edge of some areas of standing timber, increasing the risk of windblow in the near future. • There may be difficulties establishing a narrow corridor of broadleaf species due to the impact of deer browsing and the	• Look at areas of standing timber impacted by the wayleave expansion and prioritise areas deemed at high risk of windblow for felling within this plan period. • Help mitigate the long-term impact on the landscape and aid the establishment of broadleaf areas by redesigning the restock

Issue	Opportunities	Constraints	Concept
		complexities of effectively managing deer in these areas. • Some parts of the wayleave pass through peaty soils which may be more suited to peat restoration. • There will be a negative impact on the landscape caused by the expansion on the North side of the main Durris block	prescription in areas adjacent to the wayleave. It is easier to manage deer on larger scale restock sites and expanding the planting out from the wayleave will also reduce the linear appearance on the landscape. • Survey and identify areas along the wayleave which would be better suited for peat restoration or open space rather than restock.
Much of the LMP area drains to the River Dee which is designated as a Special Area of Conservation along with several of it's tributaries.	• Potential to protect and enhance water quality, increase habitat connectivity and reduce flood risk by adding good quality riparian buffers along all watercourses within the LMP area. •	• Any felling or restock operations along watercourses designated as SAC will require enhanced mitigations put in place to protect water quality. • Some areas previously felled to enhance riparian zones have regenerated with Sitka spruce. • Some areas along watercourses may be difficult to access or may have forest cover which is not ready for harvesting at present.	• Identify all watercourses within the LMP area and ensure suitable riparian buffer is applied to the long term restock prescription. • Prioritise work on areas associated with River Dee SAC and try to tie in riparian restoration alongside other projects such as peat restoration to maximise environmental benefits. • Identify any areas which are likely to be difficult to manage and create more detailed plans for future operations. • Identify previously cleared riparian areas which require maintenance operations to help build a work program.
There are several scheduled monuments located within the LMP area.	• Scheduled monuments bring added interest to a forest and increase the amenity value of the associated forest block. • Potential to improve setting of scheduled monuments through felling and complimentary restocking in surrounding areas.	• There are additional restrictions and permissions required for operations being carried out in the vicinity of scheduled monuments, set out in HES guidance.	• Identify all scheduled monuments within the plan areas and ensure the necessary buffer zones for restock and felling operations are applied to the future management plans. • Look for opportunities to improve the setting and access to scheduled monuments where possible.
Large parts of the LMP area, particularly in the outlier blocks, are designated as Ancient (of semi-natural origin) or Long-Established (of plantation origin, (LEPO)).	• Areas of Ancient woodland are already partially under restoration, opportunity to continue restoration works within this plan period.	• Access to carry out felling and restocking operations in many of the LEPO designated areas is currently poor.	• Continue with PAWS restoration in relevant areas as per UKFS guidance. • Review all areas designated as LEPO to ensure suitable management prescription is

Issue	Opportunities	Constraints	Concept
	• As much of the standing timber on LEPO designated blocks is nearing maturity, there is a significant opportunity to restore these areas to productive mixed broadleaf and riparian woodland.	• Sitka spruce regeneration is likely to become an issue when converting mature spruce woodland to broadleaves. • As there is currently a large amount of felling planned within the LMP area due to Storm Arwen, we may wish to retain some mature standing crop on some designated areas past the upcoming LMP period. • Many LEPO designated areas currently have unsuitable LISS prescriptions applied.	applied and access is present, particular focus on unthinned spruce 25 years old. • Use LISS where appropriate to favour broadleaf components. • Where LISS systems are not appropriate, program for clearfell and ensure suitable, restock prescription is applied. • Phase any new clearfells to retain some age class diversity through the LMP area.
There is an ongoing issue with windblown trees causing damage to boundary fences along the south-eastern boundary of the main Durris block with the neighbouring estate.	• Opportunity to protect boundary in the future by increasing the coverage of shrubby broadleaves and open ground along the boundary and introducing buffer zone between boundary and fast growing conifers.	• Operations along the boundary fence will need to be carried out sensitively to ensure no further damage to existing fencing. • Soft ground conditions in places could make harvesting and extraction difficult and reduce options for restock species. • High prevalence of spruce regeneration in this area may require repeated interventions in near future to maintain open/broadleaf composition.	• Fell all mature standing crop adjacent to the boundary within the upcoming plan period. • Program any immature spruce crop adjacent to the boundary for early felling once it has reached a marketable size but before further seed dispersal becomes an issue. • Redesign the restock plan along the boundary to include a buffer of either managed open space, native broadleaf species or native Scots pine woodland, situated based on local site conditions. • Look for opportunities to carry out peat restoration activities in boundary areas.
There are some areas of existing open habitat in the LMP area, including areas of both lowland and upland heathland.	• Potential to protect and enhance these open habitats by carrying out regular non-native tree removal. • Potential to expand open heathland habitat into adjacent areas where potential for successful tree establishment is very poor in second rotation.	• Non-native spruce regeneration is prevalent in many of the existing open habitats and the presence of seed-dispersing trees adjacent to open areas means this is likely to continue.	• Work with environment team to ensure open areas are continually monitored and non-native regeneration removed periodically. • Look for opportunities to increase heathland habitat in suitable areas or add a buffer of native species in areas immediately adjacent.
There are many notable and priority species present within the plan area including: Red squirrels, Otter, Pine marten and various schedule one raptor species.	• Opportunity to protect or enhance suitable habitats for these species to ensure they maintain healthy populations.	• Large areas of windblow in the wake of Storm Arwen have reduced the coverage of standing mature timber to act as habitat for raptors and squirrels recently. • Although not currently an issue in this area, the threat to larch from Phytophthora	• Maximise areas managed using LISS where suitable to maintain mature forest cover and increase diversity of regenerating species. • Look for opportunities to retain larch, Norway spruce and Scots pine as Red squirrel habitat.

Issue	Opportunities	Constraints	Concept
		ramorum disease could cause a further reduction in suitable habitat for priority species in the future.	• Where practical increase percentage cover of above species and broadleaves in restock prescriptions.
Forest roads and informal trails are well used by cyclists and walkers throughout the plan area.	• Potential to maintain current recreation levels by protecting existing trails during harvesting operations or by choosing low-impact silvicultural systems in areas with high public usage.	• Some areas which were previously well used by mountain bikers have been badly affected by windblow since Storm Arwen. • An increase in felling activities in the block can have a temporary negative effect on the condition of forest roads while operations are ongoing.	• Identify areas where informal paths through standing crop are well used and, where feasible, apply LISS prescriptions to maintain forest cover. • Ensure paths and roads damaged by harvesting operations are reinstated once the operations are complete.
There are some large areas of larch within the plan area.	• Retaining mature larch provides good habitat for several priority species found within the Durris LMP area. • Retaining mature larch will also help improve the crop age class diversity.	• Larch is threatened by Phytophthora ramorum disease spreading from the south-west. If found, it is required to be felled immediately to prevent further spread.	• Ensure all stands of larch within the plan area have access in place so they can be harvested at short notice if Phytophthora ramorum is detected.

Table 9: Opportunities, constraints and concept analysis

6.2 Outcomes/Concept

See Map 4: Objectives & Concept for a graphical representation of how the concepts identified above relate to the relevant objectives where they will be applied.

7.0 Long Term Land Management Plan Proposals

7.1 Felling

7.1.1 Clearfelling

Please see **Map 5: Management** for details of which areas are due to be clearfelled within the plan period.

Areas within the LMP which have objectives more focused on commercial benefits will be managed under a clearfell management type, using conventional harvester and forwarder working. 26 coupes are scheduled for clearfell within the plan period (see section 2.2) which constitute around 12.9% of the plan area. Of these coupes, the vast majority are outstanding coupes badly affected by Storm Arwen or are in response to instability caused by the expansion of the pylon wayleave cutting through the main Durris block. The remainder of the clearfell areas are to help facilitate future peatland restoration operations.

These clearfell coupes were selected by analyzing a range of different variables. Clearfell coupes are generally programmed to be felled around the time that they reach their maximum annual increment for timber production but the impact on landscape value, recreational use, crop stability and the environment are also considered before felling coupes are designed.

Urea will be applied to stumps as standard in felling coupes which are known to have heterobasidion annosum present to help reduce infection levels.

Clearfelling provides more flexibility for restructuring and adding diversity; the coupes which are due to be felled during the plan period will be restocked using alternative conifer and broadleaf species where possible. However, for some of the felled areas, restocking with more common conifer species ie. Sitka spruce, is more likely to successfully achieve the aims of the plan due to the underlying site conditions.

Other Tree Felling in Exceptional Circumstances (November 2021)

FLS will normally seek to map and identify all planned tree felling in advance through the LMP process.

However, there are some circumstances requiring small scale tree felling where this may not be possible and where it may be impractical to apply for a separate felling permission due to the risks or impacts of delaying the felling.

Felling permission is therefore sought for the LMP approval period to cover the following circumstances:

- Individual trees, rows of trees or small groups of trees that are impacting on important infrastructure (as defined below*), either because they are now encroaching on or have been destabilised or made unsafe by wind, physical damage, or impeded drainage.

*Infrastructure includes forest roads, footpaths, access (vehicle, cycle, horse walking) routes, buildings, utilities and services, and drains.

The maximum volume of felling in exceptional circumstances covered by this approval is 75 cubic metres per Land Management Plan per calendar year.

A record of the volume felled in this way will be maintained and will be considered during the five year Land Management Plan review.

7.1.2 Thinning

Please see Map 6: Thinning Approval for details of which areas will be thinned within the plan period and see table 5 (section 2.3) for the expected volumes.

Wherever possible the region will continue to maximise the area managed through thinning. FLS policy assumes that all productive conifer crops will be thinned. The only exceptions are where:

- Thinning is likely to significantly increase the risk of windblow
- A single thinning operation is likely to require an unacceptably large initial investment in relation to the potential benefits due to access or market considerations;
- Thinning is unlikely to improve poorly stocked or poor quality crops.

There are several areas of young conifer plantation within the plan area which would benefit from thinning as soon as possible, so carrying out thinning activities throughout the area in phase 1 is a priority.

The growth rates within the blocks are good, so they have been placed on a seven year rotation, allowing two thinnings on suitable coupes within the plan period.

All thinning decisions will be guided by Operational Guidance Booklet No 9: “Managing Thinning”.

Thinning will normally be carried out at, or below, the level of marginal thinning intensity (i.e. removing no more than 70% of the maximum MAI, or YC, per year). Higher intensities (no more than 140 % of maximum MAI, or YC, per year) may be applied where thinning has been delayed, larger tree sizes are being sought or as part of a LISS prescription. Where trees need to be removed to accommodate facilities to support approved thinning and CCF, including stacking areas, ramps and access racks within adjacent management coupes, this should ideally be identified in thinning maps and thinning plans as part of the LMP submission. Where this is not the case, additional felling necessary for reasonable infrastructure can be agreed by exchange of email. In all cases work plans will define the detailed thinning prescription before work is carried out and operations will be monitored by checking pre and post thinning basal areas for the key crop components.

7.1.3 Continuous cover forestry (CCF)/LISS

LISS is defined as a silvicultural system whereby the forest canopy is maintained at one or more levels without clearfelling. Clearfelling is defined as the cutting-down of all trees on an area of more than 2.0ha.

The attraction of LISS lies in the fact that this approach is suited to an era of multi-purpose forestry where environmental, recreational, aesthetic and other objectives are as important as timber production. In particular LISS is seen as a means of reducing the impact of clearfelling and the associated changes that this produces in forest landscapes and habitats. It can also help to create a diverse forest structure which will increase its biodiversity potential. LISS also helps reduce the potential issue of soil erosion and subsequent watercourse siltation.

Within the plan area, the coupes selected for LISS management are in areas where LISS management has been shown to work already or where LISS most suits the objectives for the coupe. For example, areas which have been managed under LISS systems in the previous plan period, stable stands showing strong regeneration potential and stands in high visitor use areas.

Please see **Appendix D: LISS Prescriptions** for detailed prescriptions of the future management for the coupes shown on the below map.

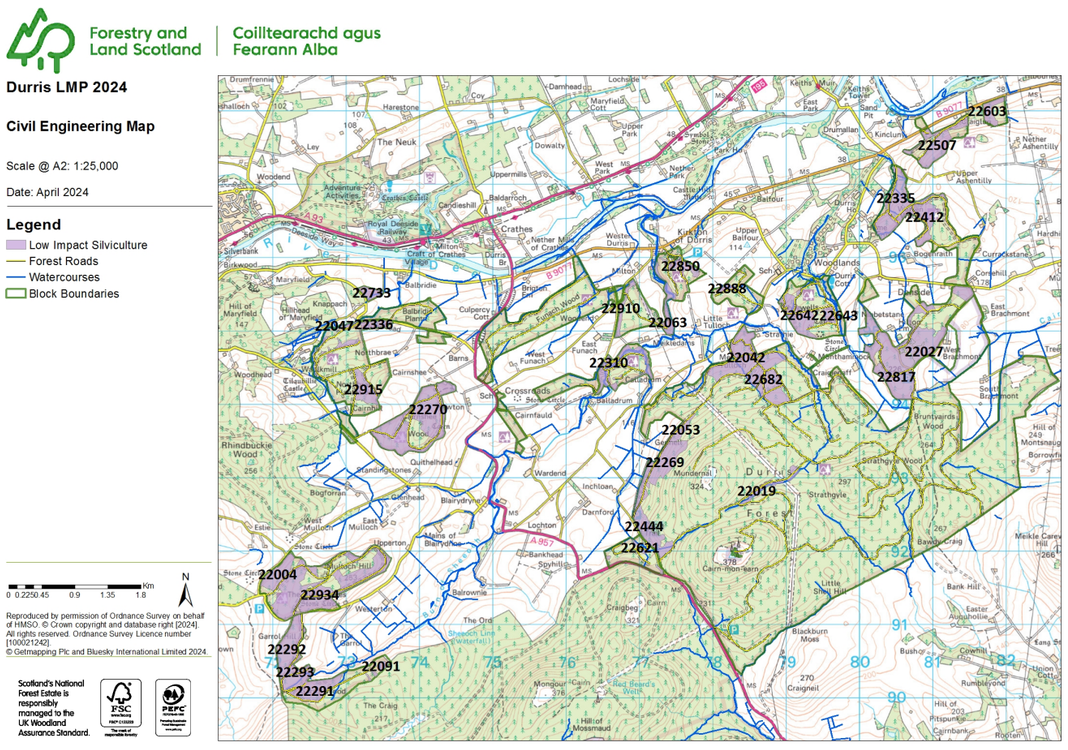

Figure 8: Map showing areas to be managed under LISS systems

7.1.4 Natural reserves

There are currently no Natural Reserves designated within the LMP area.

7.2 Restocking proposals, future habitats and species

Please see section 2.4 for tables detailing the restock plans for the plan period and Map 9: Restocking in Plan Period, showing the planned restock areas.

The restocking of felled areas is guided by the primary objectives for the plan area, which are to produce a sustainable crop of quality timber and to provide environmental benefits. In order to achieve this, conifers will be planted at a minimum of 2500 trees per hectare and broadleaves at a minimum of 1600 trees per hectare.

The choice of ground preparation for each site will be decided at the operation planning stage by the relevant establishment forester. Ground preparation techniques can vary greatly even across individual sites, so the most up to date advice will be applied at the time of the operation to ensure that soil structure and water quality is preserved whilst also providing an optimal environment for establishment depending on the species and site conditions. Forest and Water Guidelines, UK Forest Standard and UKWAS can all be used to help with the decision making process if required.

Forest Research Information Note ODW 10.01 **Forest Ground Preparation** will be referenced where necessary to help aid in the specific choice applied across any restock sites. The below table is a good indication of what ground preparation techniques will be applied, with the “Best Practice” option the target if possible. The majority of restock operations within the plan period take place on intergrade soils, with Ironpans, Podzols and Surface-water Gleys all present so a mixture of scarifying and shallow hinge or inverted mounding will be the most likely ground preparation techniques applied.

Soil Type	Objective	Best Practice	Acceptable Alternative
Brown earths	To create a weed free planting site, to avoid activating the soil seed bank, to provide frost protection especially on flat inland sites with grassy sward and to impose a discipline on the site	Shallow scarification Shallow mounding	Shallow agricultural ploughing for improved grassland Weed control only on freely draining sites
Podzols	To achieve a light surface mixing of soil and humus, to break up the compacted horizon or hardpan and provide weed suppression.	Spaced tine ploughing	Deep scarification Shallow agricultural ploughing for lowland podzols Scarification for restock sites
Ironpan soils	To aerate and mix the organic horizon and also to extensively disrupt the compacted horizon and ironpan	Mounding and ripping Spaced tine ploughing Deep scarification (if ironpan is weak or discontinuous)	Mounding or scarification (restock sites that have previously been subsoiled only)
Gley soils (inc surface water gleys and peaty gleys)	To provide a raised planting position and lower water table if possible, creating conditions for symmetrical rooting. Weed suppression and frost protection are also important	Mounding/moling for relatively stone free soils with a loamy texture Mounding/subsoiling for other soils.	Mounding alone is acceptable if slope < 3° or if a restock site **Note:** An open drainage system is usually required on these soils.
Deep peats	To provide a raised planting position and lower the water table if possible	Shallow spaced ploughing Mounding (restock sites only)	Drain mounding **Note:** An open drainage system is usually required on these soils.

Table 10: Recommended ground preparation techniques based on soil type.

For any restock operations with Drinking Water Protected Areas, ground preparation techniques will be discussed and agreed with Scottish Water before any work is carried out.

The species choice for restocking has been guided by the ESC results for this climatic area and soil types (see section II 2.1.1). This has shown that the climate and site conditions make a range of species suitable for restocking. This range will be utilised where possible, provided they will meet the objectives of the plan.

One of the aims of the restocking will be to increase the species diversity within the plan area while also retaining timber productivity. To achieve this, alternative conifer species such as Douglas fir and Norway spruce will be added and there will be in an increase in the use of productive mixtures such as Scots pine/Birch and Sitka spruce/Norway spruce. This will provide environmental benefits, increase resilience to pests and diseases, and ensure there is a sustainable crop of timber in the future.

FLS is following a chemical reduction strategy. This involves the limiting of chemical application only to occasions when they are essential. To allow this strategy to be followed the Hylobius management support system will be applied and the minimum recommended fallow period used prior to restocking. This reduced fallow period will also reduce the potential need for herbicide applications to restocked areas.

Restocking and/or planting in PAWS will use native broadleaves of local origin (201/2/3) unless these cannot be sourced within the required time-frame, in which case alternative sources will be discussed with Scottish Forestry. Out with these areas, native broadleaves of local origin such as birch, aspen, oak and willow will be preferred if available. If not available then trees from an alternative origin will be used provided this origin makes them suitable to grow and thrive in the prevailing site conditions. Where Sitka spruce is to be used for restocking, we will endeavour to use improved SS transplants, provided the nursey is able to supply them in sufficient quantities. If appropriate sites present themselves, i.e. good soils, low risk of Hylobius attack and the potential of yield class 14 or higher crops, then VPSS will be used if available. Over and above this, only certified material will be used for species covered by the Forest Reproductive Material Regulations.

All areas identified for restocking by natural regeneration will be recorded and programmed for inspection on a five yearly basis. At each inspection an assessment will be made to establish whether the natural regeneration has already achieved the objectives for the site, or if it is likely to in the near future. If it is decided that the objectives are not being met, then replanting with an appropriate species will be undertaken. If natural regeneration is occurring but not yet at the required density then the option to review the site in a further five years may be taken. If after two such inspections, that is ten years following felling, it is felt appropriate to wait a further period for natural regeneration then a discussion and agreement will be reached with the Scottish Forestry woodland officer.

Enrichment planting will be used to ensure the target stocking densities of minimum 2500 stems per hectare for conifers and 1600 stems per hectare for broadleaves are achieved if, on inspection, it is thought there is insufficient natural regeneration present to achieve restocking without intervention.

7.3 Open land

The intention is that any land identified as “Open” in the plan area will managed to keep tree cover to <10%. Where the land is described as “Open/Successional”, regeneration of native species at low densities will be accepted.

At the end of the plan period, the managed open space will total 12.5% of the plan area.

There are a several small areas of Upland Heath priority habitat, the largest of which is at the summit of Cairn-mon-Earn and a significant area at the top of Mundernal Hill. There is also an area of purple moorgrass and rush pasture at Brachmont which is currently maintained via grazing.

There are large areas of deep peat and blanket bog within the plan area which will also require careful management. See Appendix E: Peat Restoration Plan for full details on areas to be restored to functioning peatland habitat.

Other areas of open land or riparian habitat with non-native conifer regeneration present at low densities will be cleared as part of the standard 7-year thinning cycle and therefore have been added to thinning permission map.

Please see **Appendix F: Peat Restoration Plan** for full details of any areas of peat restoration to be carried out within the plan period.

7.4 Scheduled Monuments

There are several scheduled monuments located within the plan area or immediately adjacent which will require considered management during any nearby forest operations. Historic Environment Scotland has been consulted as part of the LMP renewal process and provided guidance on the best management for the scheduled monuments present (see Appendix A).

Specific objectives have been set for the protection and positive management of cultural heritage within the plan area and opportunities will be sought to improve the setting of scheduled monuments, as well as maintaining or enhancing public access to these sites where feasible.

The scheduled monuments found within the plan area include:

- Clune Wood, stone circle 280m NNE of Monthammock
- Clune Wood, cairn 900m SE of Woodlands School
- Cairn-mon-Earn, cairn
- Cairnshee Wood, cairn 750m SSW of Cairnshee
- South Brachmont, mound and stone setting
- The Nine Stanes Recumbent Stone Circle

As part of the design process, additional open space has been added around several of the above monuments as a long term plan, primarily to improve sightlines between monuments and to open up views into the surrounding landscape.

Buffers of at least 20m will be maintained around all scheduled monuments, in most cases they will be significantly larger after the setting and context of the monument is considered.

Scheduled monuments will be regularly monitored by our internal teams and operations to control regenerating trees, other woody growth and bracken on and around each monument will be carried out in line with UKFS guidance. Vegetation growth around the Clune Wood stone circle has been noted as a particular issue to be addressed in the past.

Although there are not any forestry operations planned directly within any scheduled areas, it is possible that adjacent operations could have an impact on scheduled areas; any works within the scheduled area will require Scheduled Monument Consent (SMC) which will be sought as part of the operational planning process if needed.

Further consultation with Historic Environment Scotland regarding the detail of these works to reduce the risk of accidental damage or unauthorised works being carried out will also be carried out prior to any operations within or adjacent to any scheduled monuments.

7.5 Ancient Woodland and LEPO

As per **Map 2: Key Features and Issues**, the majority of the outlying blocks in the LMP area are designated as LEPO, with a small area of PAWS also present at Kirkton Wood.

The restoration of the PAWS area at Kirkton Woods has begun in sections and will continue to be restored to the relevant species where opportunities arise. There will be limited scope for felling and restocking within the designated PAWS area within this plan period but the areas which have begun to be converted will continue to be managed to ensure the desired species mix is establishing.

As part of forming a more robust approach to our management of LEPO areas and to ensure they are being managed as per guidance in the relevant section of the UKFS, we will soon be carrying out several management steps as detailed below.

All areas designated as PAWS and LEPO will be assessed using the criteria in the table below to ensure that the current LMP proposals are appropriate and any additional LEPO areas that are known but not covered in existing databases will be added.

ECOLOGICAL POTENTIAL	OLD PLANTATION FEATURES ONLY	OLD SEMI-NATURAL FEATURES INCLUDED
High		A few remarkable ancient/veteran trees/notable woodland flora and/or frequent c. 150 year old native trees and other old woodland remnants (e.g. abundant woodland specialist flora) within the plantation. And/or, in a substantial native woodland network
Medium	Frequent c. 150 year old non-native trees embedded within younger plantation	Occasional c. 150 year old native trees, occasional patches of woodland specialist flora and / or in a fragmented native woodland network. [1]
Low	Rare or occasional c. 150 year old non-native trees embedded within younger plantation [2]	No obvious signs of old semi-natural woodland and isolated from a native woodland habitat network [1, 2]

1. For Medium and Low Ecological Potential sites with native/semi-natural features, there could be old plantation features as well.
2. Those LEPO that were in the HCV sub-set and have been added to the PAWS layer, can be managed conventionally if they have Low Ecological Potential. If there are rare or occasional c.

Table 11: Ecological potential of LEPO woodlands based on features present..

After assessment, the future management is decided based on the following advice from FLS' Native Woodland Ecologist:

"There is no imperative to convert to native species if the LEPO is currently dominated by non-natives. As with PAWS restoration, there is a strong preference for LISS management to maintain woodland conditions – avoiding huge changes to light levels, loss of humidity and increase in the water table – all consequences of clear-felling. The guiding principle should be to undertake sustainable management that will protect features of interest in the long-term.

As with PAWS restoration, sites with High Ecological Potential and Critical threats are the priority for management. LEPO with High Ecological potential will include features normally associated with ancient woodland sites and an increase in native species over time will normally be appropriate to embed veteran native trees and other flora in a wider native woodland matrix. This will be best achieved by favouring interesting features in repeated thinning operations.

The Ecological Potential of LEPO with frequent non-native veteran trees and no other features of biological interest will be Medium, therefore management of these sites should not take precedence over the highest value LEPO and true PAWS with frequent semi-natural veteran trees/rare native woodland flora."

For this plan, a general assessment has been made by the regional environment teams and planning staff to ensure the LMP proposals are appropriate.

In the Durris LMP area, many of the blocks designated as LEPO have been established with Sitka spruce which has never been thinned and is now unsuitable for LISS management due to a lack of stability. Many of these areas will have to be managed under a system more akin to clearfelling with retentions in the future.

There are several clearfells planned within the LMP period in LEPO areas, primarily due to storm damage. The vast majority of LEPO within the Durris LMP has been assessed as Low Ecological Potential but any clearfells within areas with a high or medium ecological potential will be carried out sensitively to carefully protect any old features. In addition, the restock will be designed to leave plenty room around old trees and topographic features such as crags and burn-sides. Unless there are sufficient seed sources, native species will be planted around these features. Where it is appropriate for the LMP objectives to use non-native trees in the matrix between old features, benign species such as Norway spruce will be used.

Any areas of high or medium ecological potential will be assessed as part of the pre-felling checks carried out by FLS staff and any opportunities for retentions of high ecological value trees, habitats or deadwood reserves will be identified and built into the work planning process for any upcoming operations.

Restock species mixes on LEPO restock sites have been chosen with a long rotation in mind and are planned to be managed under LISS systems in the future as biodiversity values increase as woodlands mature.

7.6 Visitor zones, public access and core path

There are several visitor zones spread across the Durris LMP area, with many of the outlier blocks, as well as the main Durris block, having designated car parks. There is no plan to change the way these are managed within the plan period; all necessary maintenance will continue as normal.

There is a planned core path which will link the settlements of Kirkton of Durris and Woodlands of Durris, via two of our outlier blocks. This local community council is currently working with Aberdeenshire council to confirm this route as a core path, which would be welcomed by FLS and have little impact on planned operations in the area.

Public access will be encouraged throughout the LMP area as per the Land Reform (Scotland) Act 2003.

7.7 Operational access

The majority of the Phase 1 and 2 felling coupes can be felled and extracted using the existing internal road network but there will be the requirement for some new roadside access as well as re-opening roads and forest entrances which have been allowed to fall into disrepair.

Details of the civil engineering operations required can be found in section 2.6.

FLS is an active member of the Timber Transport Group. We will liaise with this group and the local highway authorities to ensure that during felling and timber transport operations other road users are not put at risk. This will include the use of the appropriate traffic control measures during felling operations adjacent to public roads and the erection of any necessary warning signage.

7.8 Deer management

Wild deer of the National Forest Estate are managed in accordance with the Scottish Government's strategy "Scotland's Wild Deer: A National Approach" and under the auspices of the Code of Practice on Deer Management.

The strategy and Code of Practice makes recognition of the fact that wild deer are an asset, an integral part of Scotland's biodiversity and provide healthy food and recreational opportunities. The challenge of managing wild deer originates in a need to balance the environmental, economic and deer welfare objectives of the Scottish nation with the objectives of private landowners for forestry, agriculture, sporting and other forms of land use.

The principal legislation governing the management of deer in Scotland and hence on the NFE is the Deer (Scotland) Act 1996.

It is therefore FLS deer policy to:

- Prevent adverse deer impacts on commercial tree crops and the wider habitat. In doing so to carry out deer culling in an exemplary and humane way
- Work closely with relevant organisations and neighbours to make sure that there are integrated deer management plans which seek to recognise the interests of all parties.
- Take opportunities to optimise income from venison from sporting activities where this does not conflict with our primary objective of maintaining deer impacts at an acceptable level, in line with the Quality Meat Scotland accreditation in the form of The Scottish Quality Wild Venison (SQWV) Assurance Scheme.
- Take all practicable steps to slow down the expansion of deer species into areas where they are not currently present.

All deer management will be carried out in accordance with OGB 5 – Deer Management. The aim is to manage deer density safely and humanely at a level which is consistent with acceptable impacts on forests and other habitats. This is likely to be at a density level of 5 deer per 100 hectares.

Deer cull plans are prepared for each Deer Management Unit and are the responsibility of the Wildlife Ranger Management. Deer damage assessments are carried out to evaluate the current density of the deer population and the level of cull required.

Deer fencing has been used within the LMP area in the past to help allow the successful establishment of broadleaves, the decision on future fencing requirements will be taken by the FM forester and WRM in conjunction. Fencing should not be required to establish any conifer components.

7.9 Management of invasive species

At the moment there are no significant issues with invasive species within the LMP area. Should any be identified, suitable measures will be taken to manage and remove them wherever possible.

7.10 Riparian management

Any existing riparian zones within the LMP area will be retained or improved by the introduction of native broadleaf species or management to encourage native broadleaf regeneration, including the removal of non-native conifers in riparian areas.

Riparian restoration will primarily take place as part of the standard felling, thinning and restock program in any coupes containing the relevant habitat.

Non-native conifer removal will be identified and removed periodically in a separate operation or as part of thinning operations where regeneration has reached a mature size. To ensure the relevant felling permission is in place, riparian areas which are expected to need non-native conifer removal have been added to the thinning areas map.

7.11 Deadwood management

Deadwood will be managed in accordance with the FCS Practice Guide: Managing Deadwood in forests and woodlands (Humphrey & Bailet, 2012) and supplemented by the FLS Guidance note: Deadwood Management – Summary Guidance for FLS Staff (Kortland, 2016).

Key principles applied:

- Retain and create as much deadwood as possible and create new deadwood on a continuing basis
- Retain and create as many kinds of deadwood as possible
- Favour native tree species when creating and retaining deadwood
- Favour the retention and creation of large-diameter deadwood
- Retain and create high stumps and snags (standing deadwood) within woodland and permanent open areas (but not on clear fells that will be restocked)
- Design the distribution of deadwood to maximise connectivity at the woodland management unit and coupe scale, ensuring they are not in obtrusive locations within the landscape

The following map shows the ecological deadwood potential of Durris, based on the following criteria:

Deadwood Ecological Potential (DEP) class	FES woodland management categories included in this DEP class
High	Natural reserves, ancient semi-natural woodlands, native pinewoods, riparian buffers along watercourses, PAWS with high ecological potential, wood pasture
Medium	Minimum intervention areas of broadleaved woodlands, PAWS, LEPOs, long-term retentions, LISS coupes
Low	All other stands (i.e stands where timber production is the priority)

Table 11: Description of Deadwood Ecological Potential classes

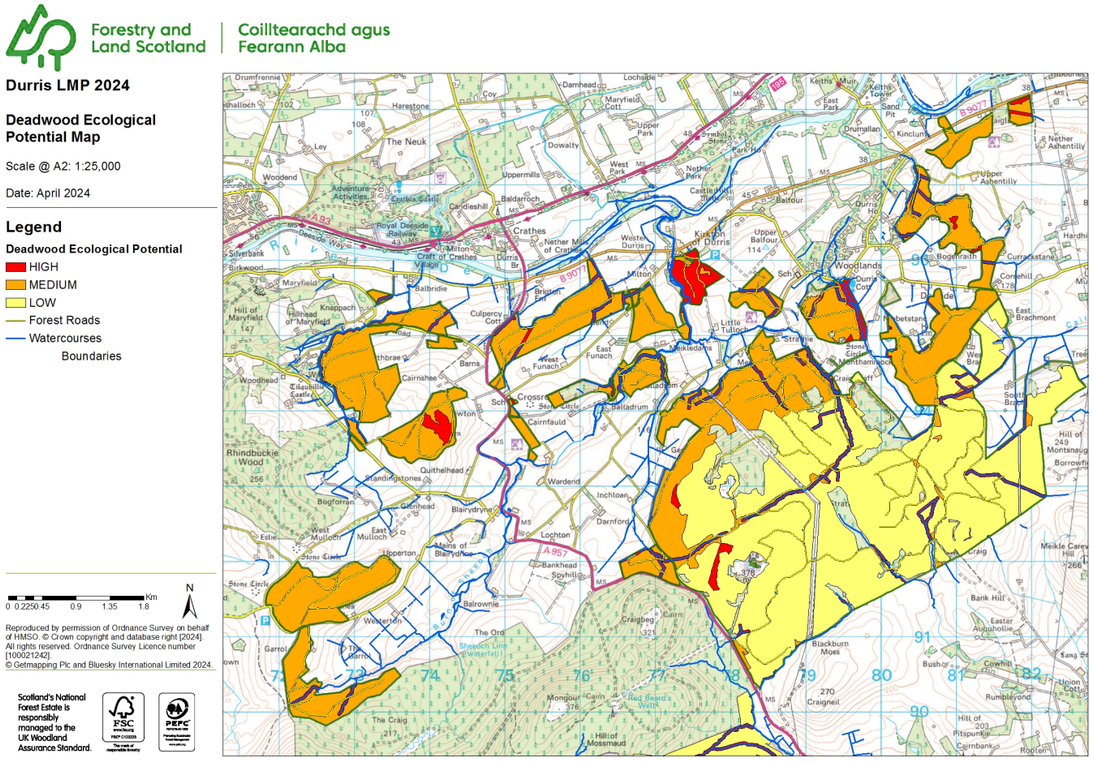

Figure 9: Map showing deadwood ecological potential of Durris

(DEP) class	Deadwood Management Prescription
High	1. Retain all existing veteran trees and deadwood apart from that which is a health and safety risk or where it would be highly obtrusive in the landscape 2. Retain all wind blow apart from that which is a health and safety risk 3. Deadwood distributed throughout the coupe 4. Seek opportunities to create particularly valuable deadwood e.g. import some large-diameter logs from nearby coupes when they are thinned or clear felled.
Medium	1. Retain all existing veteran trees and deadwood apart from that which is a health and safety risk 2. Only harvest windblow of significant value or which poses a health and safety risk 3. Seek opportunities to create particularly valuable new deadwood e,g when felling big trees, retain some large diameter logs at the edge of the coupe 4. Where windblow is harvested, retain some blown trees in a group as 'future deadwood' where not obtrusive in the landscape
Low	*During thinning* 1. Retain all existing deadwood apart from that which is a health and safety risk 2. Take obvious opportunities to create particularly valuable new deadwood e.g. when felling big trees, retain one or two large diameter logs at the edge of the coupe 3. Where wind blow is harvested, take opportunities to retain a few blown trees in a group as 'future deadwood' in a location that will not restrict future operations and that is not obtrusive in the landscape e.g. in the corner of a coupe *During clearfelling* 1. Retain all deadwood and living trees in areas that are uneconomic or too difficult to harvest (e.g. wet, steep or rocky areas) where it is not obtrusive in the landscape 2. Where an obvious opportunity arises, create new deadwood in a location that will not restrict future operations e.g. a pile of logs and brash in the corner or along the edge of a coupe. *Additional notes for Low DEP class areas* 1. Deadwood should only be retained in areas that will not restrict future operations 2. Standing deadwood (snags) should not be retained on clearfells, except in areas that will not restrict future operations and that do not pose a health and safety risk e.g. in the corner of a coupe 3. Large diameter (>20cm) deadwood logs and snags are particularly scarce in the NFE. Take opportunities to retain this kind of deadwood. When harvesting large diameter trees, seek opportunities to retain some standing deadwood, if it is safe to do so, and consider retaining a few large diameter logs on site in a location that will not restrict future operations. 4. Large diameter deadwood from native broadleaves is particularly scarce. When harvesting large diameter native broadleaves, retain standing

(DEP) class	Deadwood Management Prescription
	deadwood, if it is safe to do so, and retain some large diameter logs on site in a location that will not restrict future operations. 5. Deadwood should only be retained in areas which are not deemed to be in obtrusive locations i.e. open hillsides in landscape sensitive areas

Table 12: Description of management prescriptions for each DEP class

7.12 Phytophthora ramorum management

Up to this point, there have been no Statutory Plant Health Notices (SPHN) served within the Durris LMP area related to Phytophthora ramorum. However, as part of the planning process, areas containing larch have been identified and checked to ensure that there would be no significant issues with access or adjacency should an SPHN be served within the plan period. In particular, the need for new forest roads which may require a long lead time was investigated.

It was found that, should the need for emergency felling of larch be required, the felling and extraction of timber is feasible at short notice and should be able to be completed with an acceptable impact on landscape and adjacency.

7.13 Long Term Retentions

Please see **Map 5: Management.**

All LTR areas within the LMP fall under the following categories and will be managed as such:

- Broadleaf planting for environmental or amenity value, including riparian zones, visitor zones or where broadleaf species have been planted to increase biodiversity. These areas will managed under the standard thinning cycle where thinning is needed and are unlikely to be clearfelled in the next 50 years.
- Old growth native species which are being retained to increase the range of age classes within the block and therefore increase the resilience and biodiversity value. These areas will be monitored but should require limited management unless there is an unforeseen windthrow or disease event.
- Some areas of windblown crops to be retained as deadwood habitat and provide potential den sites for the resident Scottish wildcat population.
- Some areas of commercial crop to be retained past their MAI recommended felling date to preserve some age diversity within relevant blocks.

7.14 Peatland restoration

See **Appendix E - Peat Restoration Plan** for full peat restoration details.

7.15 Private water supplies

As part of the design process for this LMP, a concerted effort has been made to identify any private water supply sources either within the plan area or within approximately 2km of the boundaries.

This was done by setting up an indicative “private water supply screening zone” around the LMP blocks and within this area checking against all relevant water supply data currently available including:

- FLS local private water supplies data
- Data provided by the local authority
- Drinking Water Protected Area data provided by SEPA
- Using a database of addresses to identify all residents of rural properties within 2km which are not located near a water main

As part of the field visits necessary for creating the LMP, residents of properties with the potential to have a private water supply likely to impacted for forestry operations were directly engaged with to help build relationships and better understand the nature of each supply.

Where it was not possible to directly engage with residents at the property, letters were sent out to all relevant properties (roughly 80 properties in this case) as part of the consultation process, specifically requesting information regrading private water supplies as well as other general comments of the draft LMP.

Any private water supplies identified were ground truthed and added to the FLS local database before the felling and future restock design process took place. This means that all the relevant buffers are robustly designed into our future plans from the outset. Any properties which we were unable to make contact with and have not responded to the consultation have been flagged as potentially having a private supply and should be contacted in the future if any operations are planned in the vicinity of their property.

With this updated data, future operations within the vicinity of all private water supplies can be adequately planned, including using our drinking water source catchment tool to create catchments for each source, and carrying out any extra consultation necessary, to avoid any adverse affects on the drinking water supplies of neighbouring land-owners.

8.0 Critical Success Factors

- Thinning and clearfell operations to be carried out on schedule to ensure timber production targets are met and to avoid adjacency issues.
- Protect and improve water environment during all forestry works.
- Effective deer control over restock sites is imperative to ensure successful establishment.
- Forestry works carried out with protecting recreational use as a priority.
- Second EIA Screening Opinion Requests will be required for any relevant operations which are not started within five years of the plan being approved.

Appendix A: Land Management Plan Consultation Record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
NatureScot	July 2023, January 2024	August 2023	Our advice is that this proposal is likely to have a significant effect on freshwater pearl mussels and salmon. Consequently, FLS, as competent authority, is required to carry out an appropriate assessment in view of the site's conservation objectives for its qualifying interests. To help you do this we advise that based on the information given in the LMP, our conclusion is that the proposal will not adversely affect the integrity of the site. The appraisal we carried out considered the following factors: Forest operations such as felling have the potential to generate silt which may be washed into the SAC. Both freshwater pearl mussels and salmon are susceptible to the effects of siltation; fine material can smother mussel beds and salmon redds, and freshwater pearl mussels and juvenile salmon/salmon eggs may be killed by sediment deposition. However, adhering to the 'Forests and Water' elements of the UK Forestry Standard will protect water quality and ensure the proposal does not have an adverse effect on any of the interests of the SAC. We therefore advise that, in accordance with the forest and water guidelines, at an appropriate stage, an operational plan is prepared, which includes the site specific measures necessary to adequately reduce the risk of sediment entering watercourses during forest operations. In relation to otter, we advise that the proposal is unlikely to have a significant effect on this species as a feature of the SAC. However, checks for signs and holts should be carried out prior to work commencing and standard Scottish Forestry guidance in relation to otter should be followed.	All points covered by following UKFS Forests and Water guidelines and carrying out standard environmental surveys.
Aberdeenshire Council	July 2023, January 2024	August 2023, March 2024	Initial Scoping - Land within Durris block identified as reserved site as preferred location for regional mountain bike center - LEPO and PAWS areas identified, would support restoration - Suggested lee.watson@aberdeenshire.gov.uk as contact for flood works - Highlighted areas in Funach wood of high environmental value - Noted area of species rich pasture adjacent to forestry in center of Durris block - Noted Sitka spruce encroachment in open habitat areas which would benefit from removal - Noted record of some invasive species present within woods and adjacent - Noted proposed core path with strong public support linking Kirkton of Durris with entrance of Woodlands Wood Final Consultation	- Area found covering much of Mundernal Hill and Cairn-mon-earn. No major operations planned within zone aside from windblow removal. council to be contacted as part of planning process if more operations are added. - LEPO and PAWS areas already identified and are already being considered as part of design. - Contact added to consultee list. - Noted that areas highlighted had been identified for retention or conversion from conifer to broadleaf - Pasture highlighted is adjacent to potential peat restoration zone pending further investigation.

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
			"Many thanks for the opportunity to comment on this Plan. I am pleased to see that our earlier comments have largely been incorporated into the plan and have no further comments to make."	- much of Area identified already included in non-native clearance program, other Area flagged to Env team. - flagged invasive species with environment team to check they are in-hand. - Proposed core path to be discussed more with relevant teams and community council as part of planning process.
Regional Archaeologist	July 2023, February 2024	August 2023, March 2024	Initial Scoping "There are numerous historic environment features recorded on the Historic Environment Record within the LMP area which, if not already, should be incorporated into the plan. I note that the constraints table does not refer to undesignated historic environment features, although they are referenced in Secondary Objectives. Probably already in hand - Historic Environment Scotland will need to be consulted regarding Scheduled Monuments within/abutting the LMP areas." Final Consultation "Noted that the Secondary objectives includes 'Protect all scheduled monuments and other archaeological features from damage and improve setting where possible' – but does explicitly state the need to identify and manage non-designated historic environment features (just SMs), which should include check/incorporation of features recorded on the Historic Environment Record."	No resolution required, all unscheduled monuments will be picked up at work planning stage and scheduled monument permissions requested prior to any relevant operations.
Local Authority Roads	July 2023, February 2024	No response	N/A	N/A
SEPA	July 2023, February 2024	August 2023, March 2024	Initial Scoping No issue - Standard guidance attached with response. Final Consultation No issue - Standard guidance attached with response.	No response needed
Scottish Forestry	July 2023, February 2024	No response	N/A	N/A
RSPB	July 2023, February 2024	No response	N/A	N/A
Historic Environment Scotland	July 2023, February 2024	August 2023, March 2024	Initial Scoping Noted 5 Scheduled Ancient Monuments with plan area and added comment: "From the information provided, the Land Management Plan does not involve any specific works to scheduled monuments at this stage and therefore our consent is not required. However, it will be important when planning future works to avoid any damage to the monuments	Final Consultation - Additional open space added to long term restock map, this will not be achieved within this plan period but is noted for future reference.

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
			from vehicles, fences, or by the planting of felling of trees in the scheduled area. Further information on protecting scheduled monuments from accidental damage is provided in the Addendum. We would also draw your attention to the UK Forestry Standard which outlines best practice for good management of the historic environment to ensure that it is preserved for future generations and fully integrated into the forest planning process. This includes having the appropriate procedures in place to ensure that they protected from inadvertent damage during forestry works, active management of the physical condition of monuments and the protection or enhancement of their settings. I hope this is of assistance to you. Please contact us if you have any questions about this response. The officer managing this case is Luke Dale who can be contacted by phone on (07500) 585978 or by email at luke.dale@hes.scot " Final Consultation - Request for some additional future open space around Nine-Stanes scheduled monument and Clune Wood cairn. - Request that the LMP makes provision for a regular monitoring and control of other regenerating trees program - Advised that Scheduled Monument consent may be required prior to operations adjacent to Cairnshee wood cairn.	- Section added in text to add details of program of monitoring and removal of vegetation around scheduled monuments - Works should not encroach into scheduled area but advised that this will be looked at in detail during the work planning process to see if SMC is needed.
Scottish Water	July 2023, February 2024	No response	N/A	N/A
SSEN	July 2023, February 2024	March 2024	Final Consultation - Standard letter received detailing safe working distances from powerlines and FISA guides for reference	No response required
Neighbouring landowner	July 2023, February 2024	August 2023	Initial Scoping No issue - Thanked for involvement and noted that he was happy that boundary issues were being looked at, asked to be kept in contact with in future	Thanked for reply and advised I would include the estate in plans going forward.
Neighbouring landowner	July 2023, February 2024	August 2023	Initial Scoping - Highlighted high public use of Funach wood, including from those with mobility problems. - Highlighted that they have a private water supply which may originate within Funach woods	Email sent requesting further details on private water supply and request to add details to consultee list. 29/08/23 Water supply located, to be investigated on ground and watercourse highlighted as supply. 29/08/23 Visited property to investigate water supply and discuss plans for Funach wood. 13/12/23 Water supply point added to local layers.

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Neighbouring Landowner	July 2023, February 2024	September 2023	Initial Scoping - Would like to see storm arwen damage cleared in Northbrae and Balbridie - Would like to see area on north boundary felled and more suitable riparian planting established	- Advised that Northbrae roads are bing cleared imminently, with Balbridie to follow once the plan is approved - Advised that it is likely the area onlong the northern boundary associated with the watercourse will be cleared early I the next plan period but that design was still underway
Neighbouring Landowner	February 2024	February 2024	Final Consultation Advised would like to see Balbridie and Northbrae windblow coupes cleared ASAP Confirmed mains water supply	- Advised of timescales for felling of Northbrae and surrounding Arwen coupes.
Neighbouring Landowner	February 2024	February 2024	Final Consultation Advised of private water supply location and asked for further details of felling in vicinity of her property.	- Advised no clearfelling planned nearby for at least 15 years and that I would record location of her water supply for future reference.
Neighbouring Landowner	February 2024	February 2024	Final Consultation - Provided map showing location of private water supply point and pipeline - Expressed concern over increased HGV traffic related to quarry expansion	- Private water supply details added to internal layers to be highlighted at work planning stage - Advised that quarry expansion shouldn't result in significant increase of HGV traffic in area
Neighbouring Landowner	February 2024	February 2024	Final Consultation - Advised that they are on mains water supply and highlighted comms cable running along boundary	No resolution required, comms cable already in records

Table A. 1: Statutory consultee responses

Non-Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Forest Research	July 2023	August 2023	Initial Scoping "Thanks for the heads up. Our only interest is the PZ billet site which will not impact any of your future plans."	No response needed
CONFOR	July 2023	No response	N/A	N/A
Saving Wildcats	July 2023	No response	N/A	N/A
Crathes, Drumoak & Durris Community Council	July 2023, February 2024	August 2023	Initial Scoping "We have been working in the background for a number of months / years on creating a plan / community to improve the path networks and connect the communities within our area and as such would be absolutely delighted to arrange a meeting with you to discuss the plan further and see how the two could potentially link together and provide input to your plan where possible."	Meeting held 11th September 2023. Discussed provision of core path and what FLS's responsibilities would be along with several smaller issues/ideas. Not much to be added to LMP permissions wise but agreed to keep in contact with how plan develops.
Stonehaven and District Community Council	July 2023	No response	N/A	N/A
Gravitate North-East	July 2023	No response	N/A	N/A
The Mearns Leader and Kincardineshire Observer	July 2023	No response	N/A	N/A
Durris Schools (forest school areas)	July 2023	No response	N/A	N/A
Grampian Forest Rally	July 2023	No response	N/A	N/A
Midsummer Cycle Sportive	July 2023	No response	N/A	N/A
Independent ecological survey	July 2023, February 2024	August 2023, February 2024	Initial Scoping - Requested a reduction or elimination of pesticide use within the block - Recommended occasional dead or small trees left as songposts/perches - Would like to see increased diversity in habitats and tree species, including open woodland and standing water - Identified Stan Burn area as potential for re-wetting as well increasing coverage of bogs and pools throughout woodland Final Consultation - the peat restoration areas are very welcome, with the implied creation of standing water which would come with that; I would urge that the areas of restoration and standing water be as generous as possible and not hemmed in by trees; and that more ponds of any size, even very small and filled with sphagnum, be created elsewhere within the forest as opportunity exists, surrounded by small open areas; public access to the wet areas should not be too easy, to reduce disturbance to wildlife and the inadvertent contamination of the water by neonics used as anti-flea/tick medication on dogs - the use of Scots Pine and native broadleaf trees is also welcome, but I noticed that in only a few of areas did you explicitly indicate a % of open areas; open woodlands, especially as the trees mature, are particularly important habitat for a variety of wildlife and this would bring species into the area which do not like closed woods	Replied advising that I would take his comments on board during the design process, mentioned our policy of retaining deadwood, both standing and on the ground, and advised that we have already identified 40-50ha of potential peat restoration within the block.

Non-Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
			- the retention of old, standing, large trees of various species should be encouraged, as nest sites for raptors and other species, and feeding for woodpeckers and other wildlife; fallen dead wood should also be retained for its biodiversity/carbon value - the retention of song posts in areas being clear felled will similarly benefit biodiversity - explicitly stating your non-use of pesticides and herbicides would do FLS no harm	
Brook Forestry	July 2023	No response	N/A	N/A
Scottish Woodlands	July 2023	No response	N/A	N/A
Fountains Forestry	July 2023	No response	N/A	N/A

Table A.2: Non-Statutory Consultee Responses

Appendix B: Supporting Information

B/1.0 Analysis of previous plan

1.1.1 Aims of previous plan and achievements

Objectives from the previous plan were as follows:

Objectives	Assessment of objectives met during plan period
Production of a sustainable timber crop	Timber has been produced within the plan period via thinnings and clearfells. Areas have been restocked or are programmed to be restocked.
Increase area of CCF forestry	Although many areas were designated to be managed under LISS/CCF systems during the previous plan period, the majority of them were not thinned at an early enough stage and have now missed the opportunity to be managed under low impact systems.
Establish Brachmont new planting area	Site was mostly established on schedule. Ash planted suffered from Chalara infection and was replaced by other suitable native broadleaf species. A five hectare area was not established during the previous plan period.

Table B. 1: Objectives from previous plan

1.2.2 How previous plan relates to today's objectives

The objectives of the previous plan were broadly similar to those in the current LMP. The new set of objectives seek to build on and refine the objectives identified in the previous plan.

There will be much more focus on diversifying the species composition in the block and completing peat restoration in the new LMP.

There is still a small area of the Brachmont new planting area which was never established, it is the intention to complete this establishment operation within the new LMP period.

B/2.0 Background information

B/2.1 Physical site factors

2.1.1 Geology, Soils and Topography

Geology - According to the British Geological Survey Geological Map of the UK the majority of this land management plan area is underlain by the Argyll group of the Daradian supergroup with a plutonic intrusion of granitic and syenitic rocks. These both lead to the overlying soils having low nitrogen availability. However, Mulloch Wood in the west is underlain with a small area of limestone which produces soils with high nitrogen availability.

Soils – According to the Soil Survey of Scotland the majority of this design plan area in underlain with soils of the Countesswells association. Unit 115 includes humus–iron podzols with some brown forest soils and local areas of peat and gleys. 116 component soils are peaty gleys with some humic gley and peat. In 117 the soils are peaty podzols with some humus iron podzols and gleys.

The Organic soil is blanket peat. The Strichen 499 that underlies a portion of the main block is peaty podzols with peat and gleys confined to small depressions. Tarves 517 in the north west of Northbrae is brown forest soils some of which can be imperfectly drained. Finally the small area of Corby 97 in the far north is free draining podzols with peaty gleys restricted to small localized hollows and depressions.

Topography - The elevation of the design plan area runs from about 40m along the River Dee to approximately 380 meters at the top of Cairn-Mon- Earn.

Most of the outliers are located on the north facing slope running down to the River Dee while the main block is on a ridge of higher ground running south west to north east, approximately parallel to the Dee. The block covers both the north west and south east facing slopes.

2.1.2 Water

The Durris LMP area is split between the River Dee and the Kincardine and Angus Coast catchment areas. All watercourses which flow through or from the woodlands in the plan area enter the River Dee except for the Cowton Burn which flows into the Cowie Water and thence to the North Sea.

The River Dee has been designated a Special Area of Conservation (SAC) due to the presence of freshwater pearl mussel, Atlantic salmon and otter. Maintenance of water quality is therefore a priority, which will be managed through the Forest & Water Guidelines and improvements to the riparian habitat.

A secondary objective included in this LMP is "Protect and improve the water environment." This will be achieved firstly by following UKFS Forest and Water Guidelines and the UK woodland assurance standard.

2.1.3 Climate

The climate data for this area has been obtained from the Ecological Site Classification System and is displayed below.

	Accumulated Temperature	Exposure (DAMS)	Moisture Deficit
Low ground	1217	10	134
High ground	1043	13	98

Table B. 2: Climate data for Durris

Accumulated Temperature is the accumulated total of the day degrees above the growth threshold temperature of 5°C, which provides a convenient measure of summer warmth. The results for accumulated temperature place these blocks in the "cool" zone.

DAMS is the Detailed Aspect Method of Scoring. This represents the amount of physically damaging wind that forest stands experience in the year. The range of DAMS is from 3 to 36 and windiness is the most likely limiting factor to tree growth at higher elevations in Britain.

Moisture Deficit reflects the balance between potential evaporation and rainfall and therefore emphasises the dryness of the growing season. These results place the blocks on the boundary of the "moist" and "wet" zones.

These results will be used to help assist in the choice of tree species for restocking in this LMP. Each tree species has tolerances for these and other factors and they can be used to identify species suitable for the site conditions.

Further information on these criteria and the application of ESC can be found in Forestry Commission Bulletin 124 - An Ecological Site Classification for Forestry in Great Britain.

B/2.2 The existing forest

2.2.1 Age structure, species and yield class

Species	Area (ha) 2024	% Cover 2024
Sitka spruce	1174.8	51.3%
Japanese larch	178.8	7.8%
Scots pine	155.5	6.8%
Birch	130.7	5.7%
Lodgepole pine	55.2	2.4%
Hybrid larch	56.4	2.5%
Norway spruce	48.4	2.1%
Mixed broadleaves	55.3	2.4%
Douglas fir	36.4	1.6%
European larch	16.2	0.7%
Beech	14.6	0.6%
Mixed conifers	11.9	0.5%
Oak	11.2	0.5%
Sycamore	6.3	0.3%
Grand fir	4	0.2%
Felled	185.2	8.1%
Open/Unplantable	149.1	6.5%
Total	**2290**	**100%**

Table B. 3: Current species coverage

Age of trees	Growth stage	% Cover
0 – 10	Establishment	9.6%
11 - 20	Thicket	11.9%
21 – 40	Pole stage	35.0%
41 – 60	Maturing high forest	10.2%
61+	Old high forest	18.7%
Open/felled	n/a	14.6%

Table B. 4: Current Age class composition

The oldest remaining standing crop within the Durris LMP was planted in the late 1930's and early 1940's, and there are still significant areas of first rotation conifer crop remaining from the expansions in the 60's and 80's, however, much of this is now subject to increasing levels of windblow. There has also been a significant amount of restocking and planting recently, with 56.5% of the forest cover being planted in the last 40 years. Please see table 4, section 2.2 (above) for further details on the current age class composition.

The current yield class composition is shown below:

Yield Class	Percentage
24	5.8%
22	4.4%
20	6.9%
18	24.1%
16	15.8%
14	12.0%
12	6.7%
10	7.3%
8	6.2%
6	9.0%
4	0.7%
2	1.1%

Table B. 5: Current Yield class composition

2.2.2 Access

Generally access within the LMP area is good, with a well-established road network allowing access into nearly all areas of the main forest blocks.

There are a few exceptions where small outlying blocks have never had access from the public road created, unfortunately some of these areas are now windblown and will require new roadside accesses created as soon as possible. There are also some coupes scheduled for felling which will require existing roads and accesses to be cleared and reinstated to facilitate the relevant operations.

Elsewhere, the existing road network should be sufficient for all timber extraction required during the plan period if standard maintenance operations are carried out.

2.2.3 LISS potential

LISS is defined as “Use of silvicultural system whereby the forest canopy is maintained at one or more levels without clearfell of areas over 2.0 ha”.

All blocks have areas suitable for LISS systems with the exception of the highest points, which have DAMS scores of up to 19, marking them as moderately exposed. Within the Durris LMP area, LISS coupes are generally focused where there is strong evidence of natural regeneration occurring at high densities currently, and where there is a well-thinned and stable crop present already.

Many areas which would seem to be suitable for LISS currently have crops which are unsuitable for conversion to LISS systems at present due to the current crop having missed first thinning windows and now being too unstable. These areas will be reassessed in the future, after clearfelling and restocking operations have been carried out.

Please see section 7.1.3 and **Appendix D: LISS Prescriptions** for further details of the areas planned to be managed under LISS systems.

2.2.4 Thinning potential

All areas within the LMP have the potential to be thinned. The exact prescription will vary between species and the objectives for each coupe.

Some parts of the block are marginal for effective thinning to be carried out and will be reliant on an timely first thinning and suitable species being planted.

B/2.3 Land use

2.3.1 Neighbouring land use

The Durris blocks are surrounded by small scale farmland and well wooded countryside to the north. There is mostly open moorland with wooded valleys to the south-east, while conifer forests, both FLS and privately owned, dominate to the south-west.

B/2.4 Biodiversity and environmental designations

2.4.1 Designations

PAWS & LEPO: The majority of the outlying blocks in the LMP area are designated as LEPO, with a small area of PAWS also present at Kirkton Wood.

Special Area of Conservation: The River Dee and may of its tributaries are designated as a special area of conservation. Several of the designated tributaries flow through or adjacent to forest blocks within this LMP area. The River Dee is designated for Atlantic Salmon, European Otter and Fresh Water Pearl Mussel.

See **Map 2: Key Features and Issues**, for further details.

2.4.2 Habitats and species

There are a few areas of Upland Heath priority habitat, the largest of which is at the summit of Cairn-mon-Earn and a significant area at the top of Mundernal Hill. There is also an area of purple moorgrass and rush pasture at Brachmont which is currently maintained via grazing.

There are large areas of deep peat and blanket bog within the plan area which will also require careful management. See Appendix E: Peat Restoration Plan for full details on areas to be restored to functioning peatland habitat.

There are a number of Scottish Biodiversity Action Plan and FLS 6 key species recorded in the Durris area, including red squirrel, pine marten, otter and numerous badger setts are recorded. A number of forest raptors are also recorded within the block.

The region maintains a database of all known species (flora and fauna) in the forest, made up from sightings and previous surveys. In addition FLS has access to public biological records and datasets from both statutory conservation bodies and NGO’s such as the Botanical Society of the British Isles. These records and sightings are used along with pre-operational site checks to ensure mitigation or habitat improvement is written into the region’s work plans and budgets. Where necessary, operations can be scheduled to take place outside the relevant breeding season or, in the case of protected species, carried out under license conditions from SNH.

2.4.3 Riparian habitat

Many of the Durris blocks are upstream of a number of floodpoints , primarily associated with the River Dee.

The Burn of Sheeoch, March Burn and Burn of Durris are in good ecological condition and the maintenance and further enhancement of the associated riparian habitat will be a priority for the new LMP.

There is currently only a limited amount of valuable riparian habitat within the LMP area, the LMP includes plans to add and improve riparian habitat going forward.

2.4.4 Invasive species

No invasive species present

2.4.5 Pests and diseases

Although heavily affected by DNB and the associated felling in the previous plan period, DNB is not as pertinent an issue going forward although planting pure stands of susceptible species such and Corsican and Lodgepole pines will be avoided as a precaution.

There is an ongoing DNB tree health survey which covers all areas containing a large pine component. These coupes are surveyed every 3 years and the data collected is used to inform the felling program if there is a significant decline in tree health detected.

Phytophthora ramorum has not yet become an issue within the Durris LMP area, however, as a precautionary measure, this LMP seeks to ensure that all areas of larch are accessible for felling operations at short notice if needed.

There is Peridernim pini present in without the woods although not at problematic levels. Any pine which show symptoms of this disease will be identified at the initial felling survey and felled during standard thinning operations

B/2.5 Landscape

2.5.1 Landscape character

Under the NatureScot Landscape Character Assessment, the main Durris block and western outliers fall into the Summits and Plateaux – Aberdeenshire landscape character type and the majority of the remaining outlier blocks fall within the Broad Wooded and Farmed Valley type.

The **Summits and Plateaux - Aberdeenshire** character type lies at the transition between the high mountains of the Cairngorms and the low farmland of the north-east coastlands in Aberdeenshire. It comprises a series of moorland spurs that extend from the central massif of the Cairngorms into the farmed landscape of Garioch and Formartine, forming prominent areas of high ground. The Key characteristics of this area are described below:

- Long and often narrow undulating ridges, punctuated with occasional pronounced hills, which stand proud of surrounding low-lying farmland.
- Distinctive and recognisable profiles of occasional dramatic outcrops of rock, creating local landmarks which are visible and ever-present across wide expanses of Aberdeenshire.
- Extensive tracts of coniferous woodland covered slopes, these interspersed to varying degrees with heather moorland.
- Green fields of pasture cover often gently folded lower slopes and this merges gradually with more intensively managed lowland farmland.
- Communication masts and windfarms are dominant features on parts of these outlying ridges.
- Important prehistoric and cultural heritage.
- Spectacular views across the surrounding lowlands of Aberdeenshire from these promontories of higher ground.
- Strong visual relationship with wider Cairngorm massif.
- Relatively remote and wild landscape character.

The eastern stretches of the River Dee in Aberdeenshire lie in a well-defined strath, forming the **Broad Wooded and Farmed Valley Landscape** character type, this is the area where many of the northern outlier blocks sit. This part of the valley extends from Crathes in the west to Kincorth, within Aberdeen in the east. Upstream, Deeside continues as the Broad Wooded Valley with Estates Landscape Character Type. Downstream it's eastern half it forms the southern side of the Dee valley; the northern bank is within the River Valley Landscape Character Type in Aberdeen City. The key characteristics of this area are described below:

- A large-scale valley landform in which the valley sides form a series of rolling terraces patterned with bands of birch and pine, interspersed with walled pastures.
- Pastoral areas of green fields and shady woods. Greater proportion of open farmland occurs further east and along some tributaries in contrast with the more densely wooded valley in Landscape Character Types further west.
- Sparkling shallow river that meanders across the valley floor, its course divided by several wooded islets.
- Frequent settlement in a series of separate villages and groups of houses. Also estates with fine buildings, grand gatehouses, and stone boundary walls.
- Main road corridor with a sequence of settlements spaced along the valley, mostly on the northern side, interspersed with steadings and frequent groups of houses.
- Views along the strath and out to the higher ground beyond give a sense of scale.
- A well-settled, prosperous, often traditional character.
- A focus for a range of recreational activities.
- Long views contrast with sudden enclosures by woodland

2.5.2 Landscape designations

The Durris LMP area is not located within any nationally designated landscape areas.

2.5.3 Visibility

The north-western face of Mundernal Hill is very visible to traffic travelling south on the A957, Slug Road, so the potential for impact on the landscape from operations will be a key concern here.

Many of the northern outlier blocks are also visible from the Deeside way, which is a well used walking and cycle route.

The nature of the forest blocks nestled on higher ground amongst a network of agricultural fields means that they are generally visible in the landscape from the surround area.

B/2.6 Social factors

2.6.1 Recreation

The majority of the Durris blocks are widely used by the local population with various equestrian, mountain biking and running clubs using the forests regularly.

There is a new core path being planned to link the Kirkton and School Wood outlier blocks which is currently with the local authority to confirm.

To service visitors, there are many designated car parks as well as informal parking at forest entrances. There are currently no formal waymarked FLS routes through the Durris LMP area.

2.6.2 Community

The main communities making use of Durris are the residents of the surrounding villages, including Kirkton of Durris, Woodlands of Durris and Denside and scattered areas of housing and farms.
The larger conurbations on the north side of the River Dee such as Banchory, Drumoak and Peterculter are also known to use the LMP area for recreation as well as visitors from the wider Aberdeen City and Aberdeenshire area.

2.6.3 Heritage

There are a number of scheduled monuments within the Durris LMP area:

- Clune Wood, stone circle 280m NNE of Monthammock
- Clune Wood, cairn 900m SE of Woodlands School
- Cairn-mon-Earn, cairn
- Cairnshee Wood, cairn 750m SSW of Cairnshee
- South Brachmont, mound and stone setting
- The Nine Stanes Recumbent Stone Circle

In addition, there are a number of unscheduled sites including farmsteads and enclosures depicted on the 1st edition maps, cairnfields and hut circles at Brachmont and Newlands, and various other features.

All of these features appear on the FLS database, which is updated regularly at a national level, and will be protected during any forest operations.

Any new findings will be reported to the regional archaeologist as standard.

B/2.7 Statutory requirements and key external policies

The legal status of the land is purchased.

The forest plan is in accordance with the guidance supplied in:

- UK Forestry Standard
- UK Woodland Assurance Scheme
- Scotland's Forest Strategy 2019-2029
- FLS Corporate Strategy

Appendix C: Tolerance Table

	Adjustment to Felling period	Adjustment to felling coupe boundaries	Timing of restocking	Change to species	Changes to roadlines	Designed open space	Windblow Clearance
FC Approval not normally required	Fell date can be moved within 5 year period and between phase 1 and phase 2 felling periods where separation or other constraints are met	Up to 10 % of coupe area	Normally up to 2 planting seasons after felling. Where hylobius levels are high up to four planting seasons after felling subject to the wider forest and habitat structure not being significantly compromised.	Change within species group e.g. conifers, broadleaves.		Increase by up to 5% of coupe area	
Approval by exchange of letters and map		Up to 15 % of coupe area	Between 2 and 5 planting seasons after felling subject to the wider forest and habitat structure not being significantly compromised.		Additional felling of trees not agreed in plan Departures of more than 60m in either direction from centre line of road.	Increase by up to 10%. Any reduction in open ground within coupe area.	Up to 5 ha
Approval by formal plan amendment may be required	Advanced felling (phase 3 or beyond) into current or 2nd 5 year period	More than 15% of coupe area	More than 5 planting seasons after felling subject to the wider forest and habitat structure not being significantly compromised.	Change from specified native species. Change between species group.	As above depending on sensitivity.	More than 10% of coupe area. Colonisation of open areas agreed as critical.	More than 5 ha

Appendix D: LISS Prescriptions

Coupe ref.	Management Type and area	Management objective/Reason for selection	Long-term structure and desirable species	Regeneration and ground flora	Observations (e.g. likely barriers to achieving objective)	Next treatment required
22004	Uniform shelterwood 10.2ha	Previously thinned Sitka crop on gentle slope with easy access	Multi-storey Sitka crop with minor BL components	Sitka regen noted, ground flora very bare due to lack of light at present	Although stable at the moment, will need to be monitored as local area known for windblow.	Standard thin
22019	Group selection 5.5ha	Selection of groups of non-native species regeneration along riparian zone, shading established broadleaves	Open aspect riparian zone with retained broadleaves	Sitka regen threatening existing BL species	May need more than one intervention in future to keep Sitka regen down.	Selective fell of Sitka regen
22027	Irregular shelterwood 4.8ha	Combination of mixed conifer both planted and regenerated at different stages.	Existing mixed conifers with regenerating broadleaf understory	Well established regeneration of multiple species	Some areas of wet ground may impede access.	Selective fell of overstory areas where successful regeneration is observed
22042	Group selection 23.7ha	Last remaining mature crop in this area, small groups of blown crops already appearing with regen present	Continue to fell small groups and clear blown areas to maintain diverse conifer structure	Mixed conifer and broadleaf regeneration observed in open areas	Some unstable areas may not require felling of groups as patches are opening naturally	Clearance of recent blown patches, additional group fellings added where appropriate.
22047	Group selection 0.8ha	Majority broadleaf coupe in riparian zone with non-native conifer regeneration	Removal of non-native groups to produce native BL riparian corridor	Mixed broadleaf regeneration alongside non-native conifers	Sensitive area alongside tributary to River Dee	Group selection of spruce regen, retaining native broadleaves.
22053	Group shelterwood 4.58ha	Stable and mature larch and Sitka crop, suitable for group fellings where regen noted	Sitka/larch productive crop achieved via regen in felled groups	Larch and Sitka regen observed in open areas	Narrow area, may develop stability issues if groups are too large.	Small groups felled during next thinning cycle.
22063	Irregular shelterwood 7.22ha	PAWS restoration area with mixture of native BL regen and non-native conifers	Long-term conversion to native broadleaf.	Successful broadleaf regeneration on previously felled areas	Awkward access, proximity to watercourse	Continue felling of non-native groups to facilitate PAWS restoration
22091	Uniform shelterwood 2.04ha	Areas of mixed native broadleaves which could be thinned or non-natives removed	Maintain majority broadleaf composition for biodiversity gain	Broadleaf regeneration noted	Requires access to be re-opened	Thinning to target any non-native conifers within coupe.
22269	Group selection 17.2ha	Stable and mature larch and Sitka crop, previously thinned, suitable for group fellings	Sitka/larch productive crop achieved via regen in felled groups	Larch and Sitka regen observed in open areas	No significant barriers	Small groups felled during next thinning cycle.
22270	Irregular shelterwood 47.8ha	Mature mixed conifer stand, designated as LEPO	Retain patches of mature crop and veteran trees, small patches of unstable or poor quality crop can be targeted to create gappy structure for mixed regen to colonise.	Mixed conifer, birch and minor BL species noted throughout.	Road maintenance required to facilitate harvesting and extraction	Standard thinning throughout mixed conifer areas with small areas of unstable crop removed

Coupe ref.	Management Type and area	Management objective/Reason for selection	Long-term structure and desirable species	Regeneration and ground flora	Observations (e.g. likely barriers to achieving objective)	Next treatment required
22291	Uniform shelterwood 13.5ha	Mature, stable mixed conifers with regen noted	Maintain productive conifer composition via understory regeneration	SS, SP and JL regeneration noted in more open areas	No significant barriers	Standard thinning
22292	Group shelterwood 20.4ha	Mature Scots pine crop with larch boundary.	Maintain Scots pine and larch composition with birch and rowan component expected	SP and larch regen noted at edges and open areas	Some ground disturbance during group fellings would help establish SP regen	Felling of 0.2ha groups throughout crop
22293	Group selection 8.1ha	Mature mixed conifer area with watercourse present	Fellings along watercourse boundary to help aid conversion to broadleaf riparian zone.	Multi species regen noted throughout	Some steep sides into watercourse gully	Focus groups along riparian zone to transition to native broadleaf prescription
22310	Group shelterwood 14.7ha	Well established riparian zone around River Dee SAC	Maintain and improve riparian corridor through targeted fellings of any groups of undesirable species.	Native broadleaf regeneration noted throughout	Majority of coupe within riparian gully	Target any undesirable species at next thinning
22335	Group shelterwood 15.3ha	Mature area of diverse conifer species with small open areas evident	Continue small group felling to encourage diverse understory	Multiple species but Hemlock becoming abundant.	Hemlock in danger of taking over understory	Small group fellings of unstable trees where regeneration is abundant.
22336	Uniform shelterwood 7.2ha	Broadleaf coupes of various ages and densities, LEPO area	Maintain broadleaf composition through standard thinning and targeting of any non-native conifers	Birch and beech most abundant species	Dense birch may not thin too well	Standard thin, target non-native conifers if present
22412	Uniform shelterwood 20.9ha	Predominantly broadleaf woodland with mixed conifers present.	Maintain broad age-class range of diverse species through standard thinnings	Mixed conifer and broadleaf abundant	Much of area already thinned	Standard thin
22444	Group shelterwood 16.4ha	Mature larch and Scots pine in landscape sensitive area	Maintain mature crop while increasing age diversity by felling small groups to encourage regeneration	Larch and SP regen present on boundaries and open patches	Public road adjacent to coupe	0.2ha groups felled during next thinning cycle.
22507	Group shelterwood 16.9ha	Mature larch and Scots pine in landscape sensitive area. LEPO	Maintain mature crop while increasing age diversity by felling small groups to encourage regeneration	Larch and SP regen present on boundaries and open patches	Reliant on access from public road being re-opened	0.2ha groups felled during next thinning cycle if crop deemed stable enough
22603	Uniform shelterwood 5ha	Mixed conifer stand with birch throughout, LEPO area.	Thin plantation conifers to encourage diverse regeneration, retaining veteran trees and broadleaves	Mixed regeneration throughout	Reliant on new public road access	Standard thinning, targeting 1980s conifers
22621	Single tree selection 1.8ha	Riparian planting and existing mature broadleaves withing conifer plantation.	Maintain desirable broadleaf composition in these areas by removing non-native conifers	Some conifer regeneration beginning to proliferate	Large scale felling of surrounding crop scheduled.	Clear individual regenerated conifers where present
22642	Group shelterwood 15.4ha	Mature coupe of mixed conifers, separate Scots pine, larch and Douglas fir zones. LEPO	Maintain mature crop while increasing age diversity by felling small groups to encourage regeneration, retaining veteran trees	Mixed conifer regen present in areas suffering small scall windblow	No significant barriers	0.2ha groups felled or existing windblown groups cleared during next thinning

Coupe ref.	Management Type and area	Management objective/Reason for selection	Long-term structure and desirable species	Regeneration and ground flora	Observations (e.g. likely barriers to achieving objective)	Next treatment required
22643	Uniform shelterwood 3.4ha	Douglas fir stand with equal parts birch regen	Mature Douglas fir crop with understory of regenerating Douglas fir and birch.	Birch regen abundant, DF present in open/blown patches	Some instability noted in places	Standard thin, targeting unstable conifers
22682	Uniform shelterwood 24.2ha	Thinned Sitka spruce and Douglas fir commercial crop	Maintain commercial crop through gradual thinning to establish understory	Sitka regen present throughout	Currently stable but windblow noted in surrounding area	Standard thin
22733	Uniform shelterwood 3.6ha	Isolated block of mature Scots pine with birch and rowan understory developing	Maintain mature SP and veteran trees to develop Scots pine/birch native woodland composition	Native broadleaves and SP noted	Isolated block without proper transfer point.	Light thin of poor form/crowded conifers
22817	Uniform shelterwood 60.1ha	Large areas of plantation conifers at various stages, LEPO area	Maintain commercial crop but thin to encourage regeneration and diverse age range	Conifer regeneration noted where light levels presently allow	Some soil types present are not optimal for species present	Standard thin
22850	Uniform shelterwood 5.5ha	Combination of dense birch and mature larch which would benefit from thinning	Larch areas to develop birch/larch understory and birch areas to be thinned and allow to mature	Birch regen abundant	Birch areas particularly dense in places.	Standard thin
22888	Uniform shelterwood 1.9ha	Broadleaf coupe, majority birch	Birch woodland thinned to allow more diverse species to flourish	Mixed native broadleaves present	Spruce encroachment from surrounding area possible	Standard thin
22910	Irregular shelterwood 3.9ha	Strip of majority broadleaf woodland with spruce encroachments	Well spaced broadleaf coupe with diverse age range created by removing overstory of areas with successful regeneration	Birch regen is major component	Coupe to be accessed through standing conifer crop adjacent	Standard thin, target conifers.

Appendix E – Peat Restoration Plan

The purpose of this Appendix is to provide supplementary information to support the EIA screening determination (see 3.1) for deforestation as part of the Durris LMP submission for the purpose of initiating peatland restoration across the block.

This Appendix demonstrates alignment with the 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[1]
- Forestry Commission Scotland (2015). Deciding future management operations for afforested deep peatland[2]
- Forest Research (2000). Forests and Peatland Habitats [3]
- Forestry Commission (2017). UK Forestry Standard[4]
- Scottish Government (2015). Biodiversity Strategy: Route Map to 2020[5]

E/1.1 Location and Context

The are seven distinct areas identified as suitable for peat restoration operations within this plan period which are all focused in the eastern side of the main Durris block, as shown in the adjacent map.

The total area of peat restoration identified is 88.9ha. Of this total area, 83.3ha currently has some form of forest cover, or an existing requirement to restock, which will require transition to open space prior to restoration being completed. The areas with no restock prescription currently attached fall within an existing wayleave. All areas for deforestation are covered within the phase 1 and 2 felling coupes detailed in Map 5: Management and section 2.2 of the LMP.

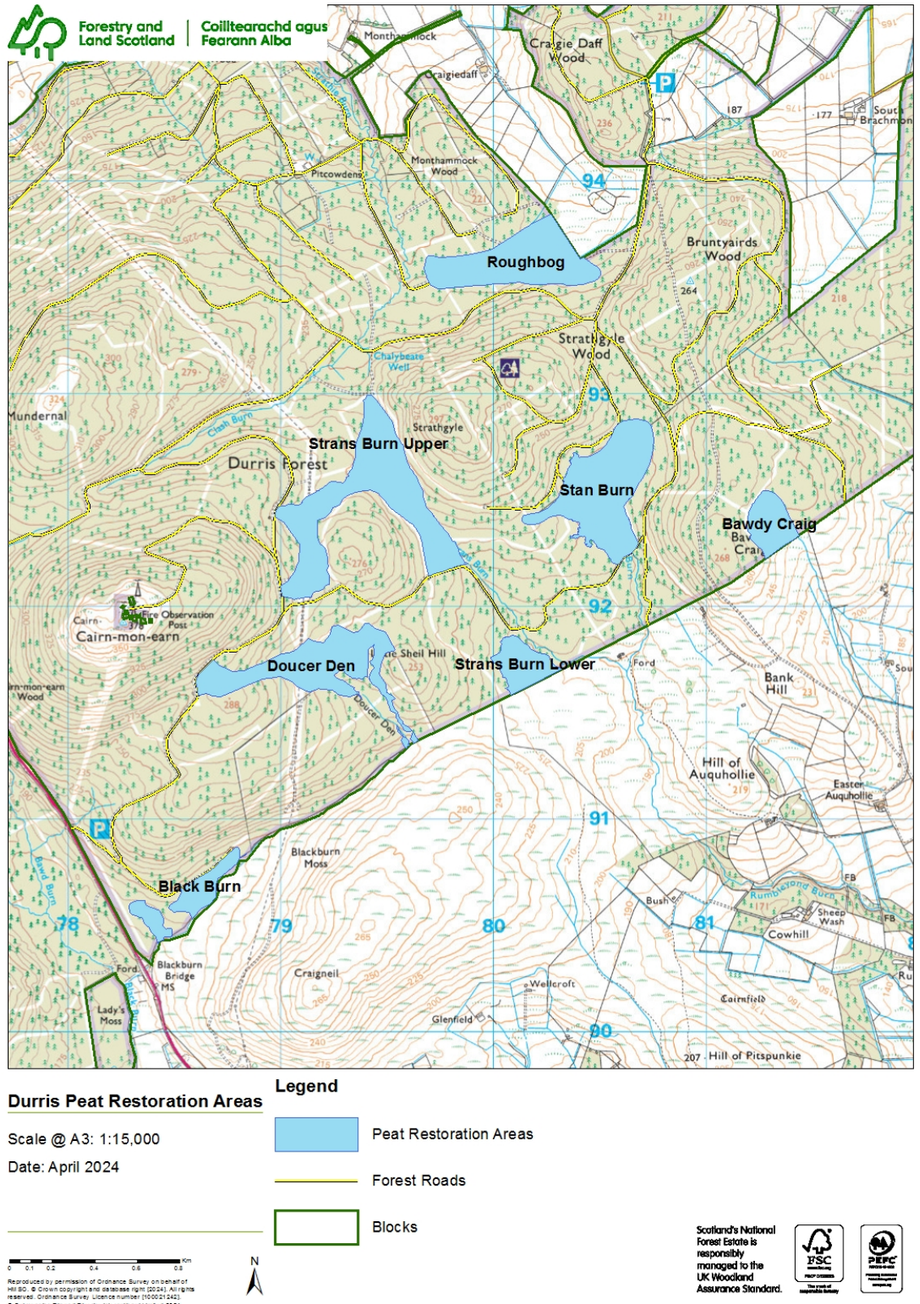

Figure E.1: Areas to be restored to peatland within plan period

[1] https://forestry.gov.scot/publications/349-scottish-government-s-policy-on-control-of-woodland-removal-implementation-guidance/viewdocument/349
[2] https://forestry.gov.scot/publications/1-deciding-future-management-options-for-afforested-deep-peatland
[3] https://www.forestresearch.gov.uk/documents/2549/fcgn1.pdf
[4] https://www.forestresearch.gov.uk/tools-and-resources/fthr/uk-forestry-standard/
[5] https://www.gov.scot/publications/scotlands-biodiversity-route-map-2020/

E/1.2 Long term vision

The long term vision for the project is to restore the sites identified to their previous conditions as Upland Sphagnum Bog, Calluna, Eriophorum vaginatum Blanket Bog and Juncus effusus Bog through the sensitive removal of conifer plantation and a program of peatland restoration. The aim is to allow the key peat forming species, such as Sphagnum Mosses and Cotton Grass, to become the dominant ground flora and allow the associated biodiversity to thrive in the priority habitat whilst returning these areas to their pre-forestry roles as significant carbon sinks. Riparian native woodland will complement the surrounding habitat and further increase the biodiversity value of the restored areas.

E/1.3 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. Recover the existing timber from the current conifer crop while balancing this with the primary objective of peatland habitat restoration.
3. Protect the existing bog habitat, future peatland areas and acid grassland areas, by the removal of regeneration of non-native conifers.

E/1.4 Critical success factors

- Utilise appropriate harvesting techniques to minimise ground impacts and so protect to 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.
- Utilise low impact forwarding methods to extract products to minimise ground damage.
- Apply current best practice and expertise in peatland restoration operations and use suitably experienced contractors with the appropriate machinery.
- Maintain a level of deer browsing conducive to native broadleaf regeneration by culling and fencing where appropriate.

E/1.5 Management of afforested deep peat

E/1.5.1 Summary

- All areas identified for peat restoration are comprised of Upland Sphagnum Bog, Calluna, Eriophorum vaginatum Blanket Bog and Juncus effusus Bog soil types and are therefore a priority for restoration on ecological grounds.
- Afforestation is listed as one of the key threats to Blanket Bog having a significant impact on their conservation status at a national level (Control of Woodland Removal Policy – Annex 3: woodland removal without a requirement for compensatory planting).
- Restoration of Blanket Bog is a key action of the Scottish Biodiversity Strategy. FLS as a Scottish Government agency has a duty to further the protection and enhancement of these habitats under the Nature Conservation Scotland Act (2004).
- The Blanket Bog areas in Durris are part of a wider landscape of upland habitats which provide connectivity with the surrounding landscape via watercourses and planned riparian expansion in the future.
- Remnant bog vegetation is abundant on the rides and open spaces within afforested areas indicating that the site has good potential for successful restoration.
- Forest to bog restoration techniques have advanced over the last few years and FLS is regarded as one of the leading organisations in developing best practice and delivering positive restoration programmes. Using current best practice we anticipate a more rapid recovery of the water table and successful establishment of bog vegetation on restoration sites than has been experienced previously.
- The Sitka spruce and Lodgepole pine crops which have regenerated on previously felled afforested peat areas are showing clear signs of check with very poor rates of tree growth on surviving conifers. The habitat in its current condition will be acting as a carbon source.
- Recent advances in restoration techniques indicate that the site has very good potential for restoration thus turning this carbon source into a moderate carbon sink with long term secure carbon storage.

E/1.5.2 FLS approach to peatland management

Restoration of Blanket Bog is a key action from the Scottish Biodiversity Strategy, the habitat is recorded 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[6].

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

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

contributing to climate change and so society would be disadvantaged or threatened based on current scientific information.

The restoration potential of the identified areas in Durris is considered to be high due to the very wet ground conditions and abundant remnant bog vegetation that persists in rides and other open areas. FLS are committed to a long-term restoration program of Blanket Bog and Upland Heath, priority habitats. Objectives for the restoration of the Durris sites are:

- Expand the area of peatland habitat by applying restoration treatments, restoring it to a functioning peatland within 30 years.
- Protect the storage of carbon within the soil (peats).
- Maximise the sequestration of carbon by the peatland in the future.
- Improve the water quality leaving the site and help regulate its flow.
- Monitor the impacts of treatments on the water quality to establish if it been improved over the long term.

The following tables present future management of afforested peatlands for the Durris forest block.

Table E.1: Summary of afforested deep peatland, existing open habitat on deep peat, associated ground to be restored in this plan period

Area statistics	Hectares (Ha)	Comments
Current management of peatlands in LMP		
Afforested deep peatland	83.3ha	Total area size of afforested peatlands based on analysis of aerial images and site surveys. This includes the wider hydrological unit to be restored and areas previously felled but which have a current restocking requirement from the previous plan period.
Existing open habitat on deep peat	5.6ha	Total area of open peatland (ha).
TOTAL - All deep peat soils	88.9ha	Total area size (ha) of deep peat soils to be restored within the forest block area based on the soils data, including hydrological unit of areas to be restored. 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.
Future management of afforested peatlands		
'Presumption to restore' peatlands. **Forest-to-bog restoration of afforested peatlands including the hydrological catchment**	34.1ha	Only includes afforested peatlands which lie next to open existing peatlands, or Scenario A peatland types, as per the SF Practice Guide. The area of their hydrological units is also included. All of these areas have been resurveyed recently by FLS staff to establish accurate boundaries and confirm peat depths present where existing soils data appeared inaccurate. Areas which fall under this designation in this plan are: - **Stan Burn** - **Roughbog**
'Assessed' peatlands. **Forest-to-bog restoration to secure carbon store and sequestration, and maximize ecosystem services.**	54.8ha	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. All of these areas have been resurveyed recently by FLS staff to establish accurate boundaries and confirm peat depths present where existing soils data appeared inaccurate. Areas which fall under this designation in this plan are: - **Black Burn** - **Doucer Den** - **Strans Burn Upper** - **Strans Burn Lower** - **Bawdy Craig**
Peatland to be restocked	72.9ha	Total area of 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.

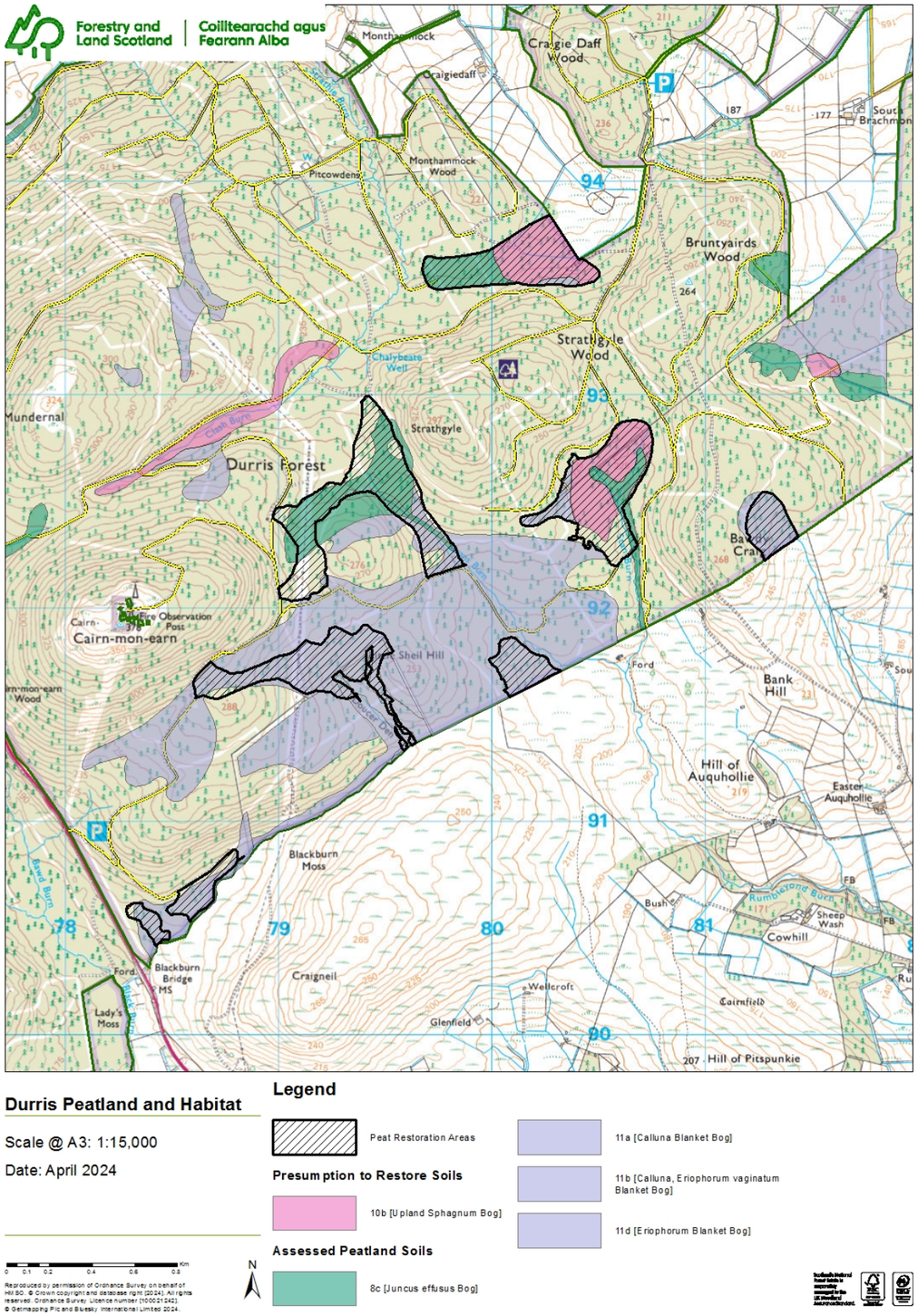

Figure E.2: Peatland and Habitats Map

Table E.2 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

	Description	Location of described attribute (peat types, part of the forest)
Description of any designated sites, priority peatland habitats needing to be protected and enhanced.	**Stan Burn**: An area of Upland Sphagnum Bog **Roughbog**: An area of Upland Sphagnum Bog	Illustrated by Figures E.4 and E.5 Stan Burn and Roughbog presumption to restore
Description of the Scenario peat types present in the forest (all will be restored), and any characteristics of interest.	**Stan Burn:** 10b Upland Sphagnum Bog covers the majority of the restoration area with the remainder of the restorable hydrological unit covered by 11a and 8c, peaty soils. **Roughbog**: 10b Upland Sphagnum bog covers the majority of the restoration area with remainder of the site covered by an 8c Juncus effusus bog and 10b Upland Sphagnum bog mixture. There is also a small patch of 11a Calluna blanket bog included in the restorable hydrological unit.	Illustrated by Figures E.4 and E.5 Stan Burn and Roughbog presumption to restore
Description of hydrological units, extent, relation to peatlands to be restored and the topography.	**Stan Burn:** The Upland Sphagnum bog occurs in a natural hollow, gently sloping towards Stan Burn which originates within the restorable area. A large area of the hydrological unit has previously been felled with widespread drainage evident and peat depths of a minimum of 1m across the site. The hydrological unit extends outside of the deep peat area which will be felled in the second phase of this plan to allow restoration or suitable restock of the entire unit. **Roughbog:** The main area of Upland Sphagnum bog occurs in the eastern half of the site, previously felled but now showing widespread, low yield class conifer regeneration. On the remainder of the site, the Sphagnum bog occurs in a mix with Calluna blanket bog and has standing Sitka spruce crop present at around age 35 years old. The hydrological unit sits in a natural basin and peat depth surveys have confirmed a minimum of 50cm peat depth across the restorable area. The remainder of the hydrological unit will be restocked with suitable species to provide a buffer around the restored area.	Illustrated by Figures E.4 and E.5 Stan Burn and Roughbog presumption to restore
State any points of note from survey	NA	NA

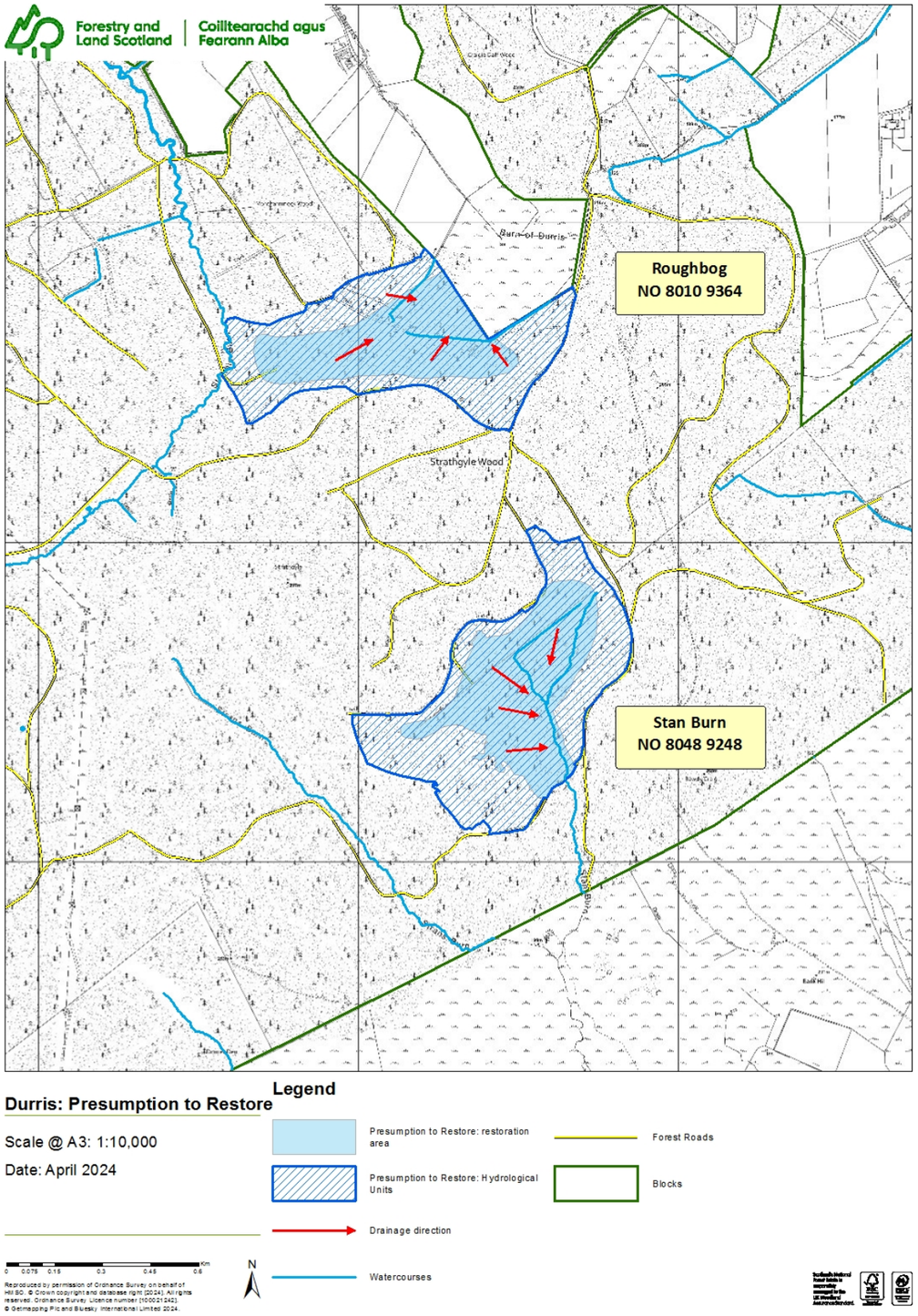

Figure E.3: Presumption to restore areas

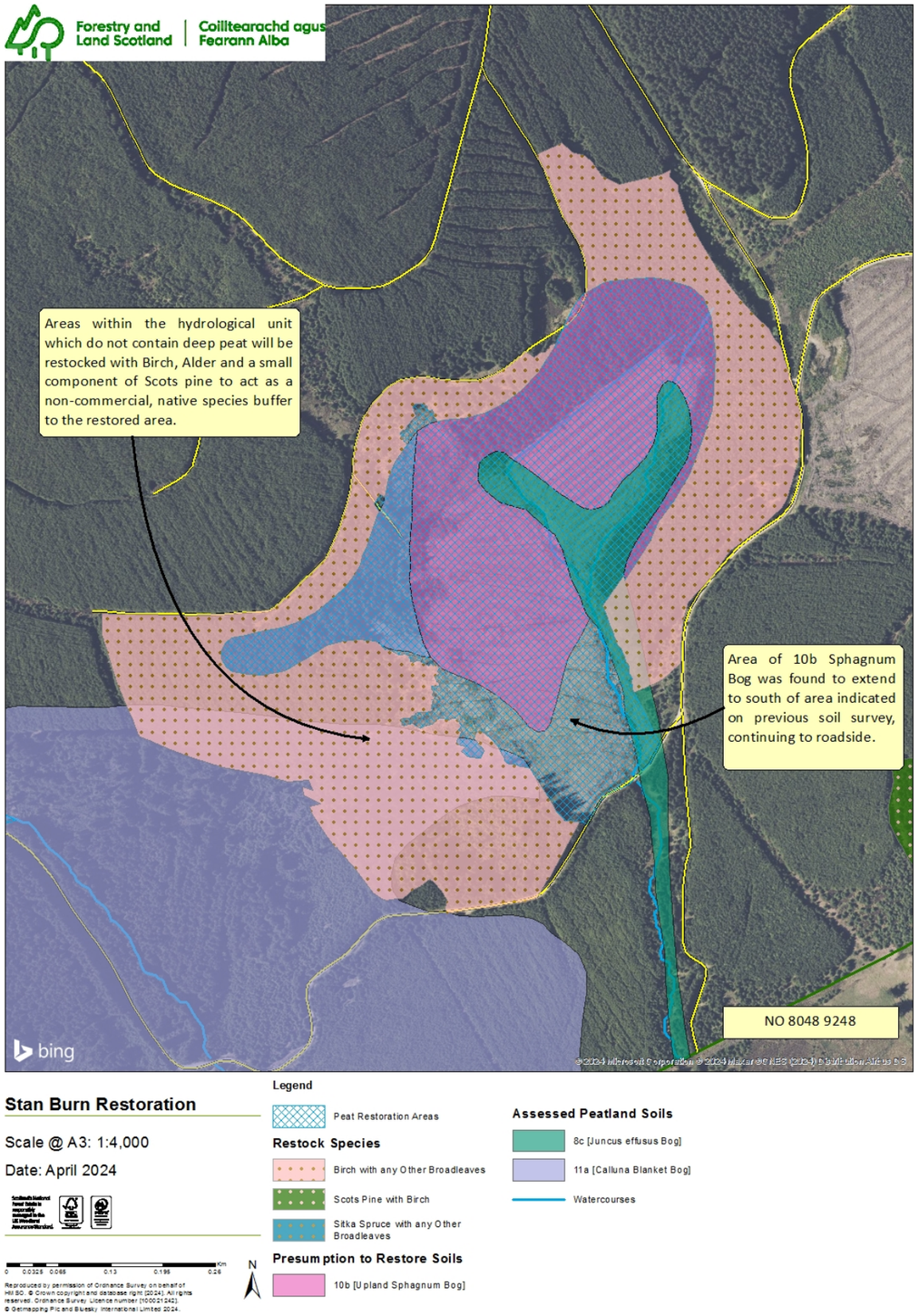

Figure E.4: Stan Burn presumption to restore

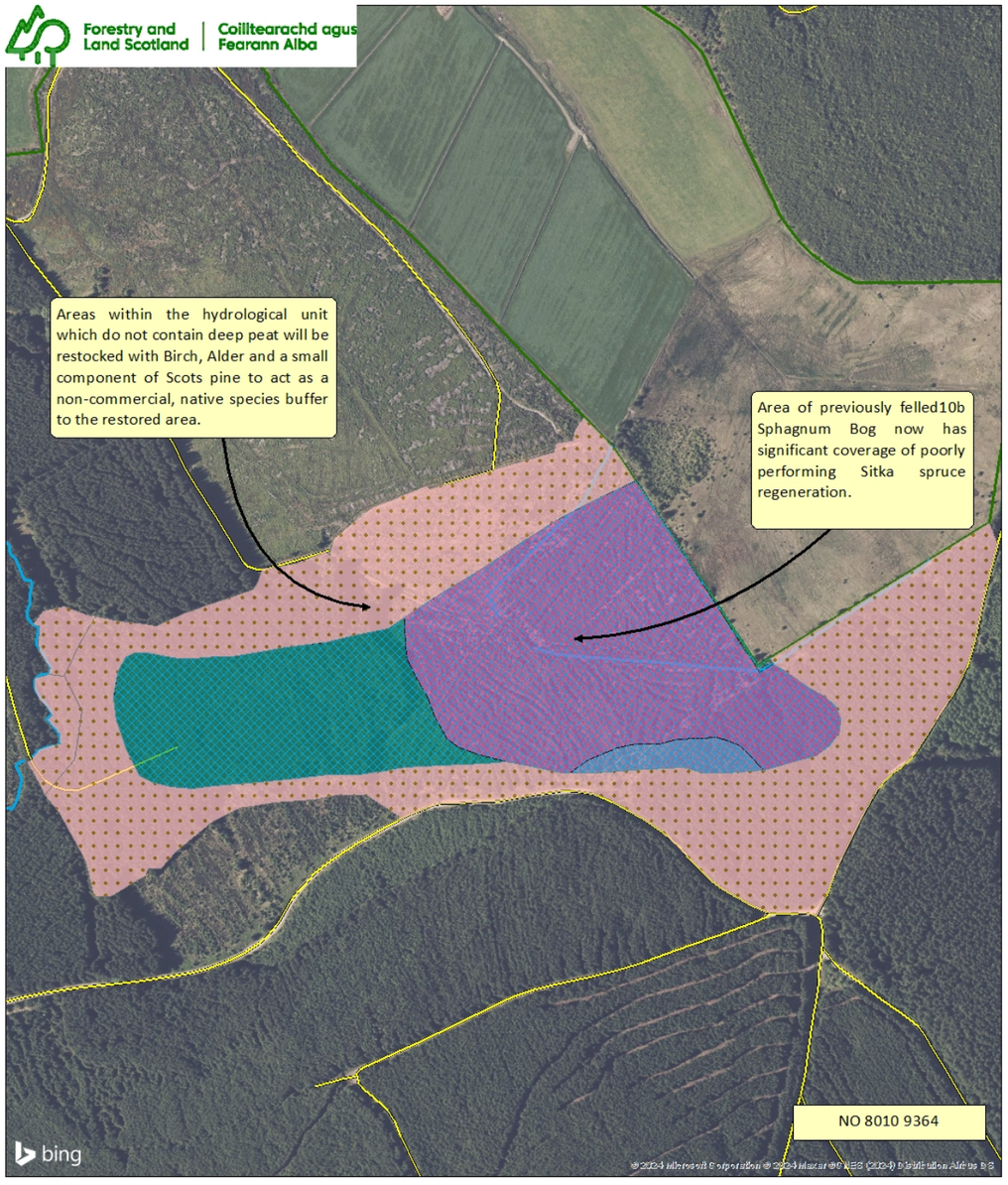

Figure E.5: Roughbog presumption to restore

Table G.3: Assessed peatland areas chosen for restoration. Describes the assessment criteria used when assessing the chosen sites for suitability for peat restoration.

Attribute described	Description	Location of described attribute
ESC statement, respective to peat types (range)	**Black Burn**: 11a Calluna Blanket Bog **Doucer Den**: 11a, Calluna Blanket Bog, 11b Calluna, Eriophorum vaginatum Blanket Bog **Strans Burn Upper**: 11a, Calluna Blanket Bog, 8c, Juncus effusus Bog **Strans Burn Lower**: 11a, Calluna Blanket Bog **Bawdy Craig**: 11a, Calluna Blanket Bog	See figures E7 – E11, Assessed Peatland maps for further details.
Accumulated Annual Temperature (range)	**Black Burn**: 1457 **Doucer Den**: 1361 **Strans Burn Upper**: 1381 **Strans Burn Lower**: 1426 **Bawdy Craig**: 1384	Taken from central point of each restoration area
DAMs score (range)	**Black Burn**: 11 **Doucer Den**: 13 **Strans Burn Upper**: 13 **Strans Burn Lower**: 12 **Bawdy Craig**: 14	Taken from central point of each restoration area
Crop deficiencies (needles, colour, leader length)	**Black Burn**: Sitka regen in peat areas displaying very short needles, yellow colouring and short leaders. **Doucer Den**: Sitka regen in felled peat areas displaying very short needles, yellow colouring and short leaders. Standing crop on restoration area largely windblown with marked reduction in top height visible. **Strans Burn Upper**: Sitka regen in felled peat areas displaying very short needles, yellow colouring and short leaders. Sitka regen in older felled area surveyed recently and returned average yield class of 6. Standing crop within peat restoration area, markedly lower top height, yellowing and short leaders indicating much lower yield class achieved even with intensive ground preparation and fertilization. **Strans Burn Lower**: Standing crop largely blown on waterlogged site. Only Yield class 12 achieved using intensive ground preparation and fertilization. **Bawdy Craig**: Standing crop largely blown and continuing to progress on peaty site. Sitka regen on previously open or windblown peat areas displaying very short needles, yellow colouring and short leaders.	Across each restoration site. See figures E7 – E11, Assessed Peatland maps for further details.

Location and extent, proportion of healthy crops (no signs of deficiencies) and reason	**Black Burn**: Raised, drier knolls showing more healthy regeneration, likely to achieve productive future crop. **Doucer Den**: Majority of surrounding area, although identified as Assessed Peatland, show acceptable growth rates. The peat in these areas is severely degraded and shallow with little prospect of restoration and would be more productive if restocked with suitable species. **Strans Burn Upper**: Healthy conifer crops surround the peat restoration area on slopes where, although designated as Assessed Peatland, peat depths are minimal and there are drier ground conditions. **Strans Burn Lower**: Mediocre Yield Class 12 recent restock in area to west of site in raised, drier conditions. Area along watercourse to east likely to support native riparian planting. **Bawdy Craig**: Moderately successful conifer crop present on drier areas on slopes adjacent to restoration site.	All areas where woodland establishment is likely to be successful have been removed from peatland restoration zones and suitable species chosen to restock with. See figures E7 – E11, Assessed Peatland maps for further details.
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)	**Black Burn**: Restoration areas are in flushed hollows with poor nutrient availability. Sphagnum moss present in drains, high water table. Any spruce regeneration showing very poor rates of growth and overall health. **Doucer Den**: Area identified for restoration is flushed, heavily drained and connected to permanently flushed area showing no tree establishment despite being surrounded by spruce crop. Water table on surface across much of area, ground vegetation predominately mosses. **Strans Burn Upper**: Widespread heather growth on raised deep peat of wayleave. Drains carrying large amounts of water in waterlogged areas. Restoration area badly affected by windblow. Heather and bog grasses establishing on other peat areas. Unsuitable for ground preparation or fertilization using today's standards **Strans Burn Lower**: Flushed and with areas of standing water across the site, contributing to poor growth rates and crop instability. Area can only be accessed in dry, summer conditions, sphagnum moss widespread in pools where drains are at capacity. Heavily drained and fertilized current crop has achieved YC 12. **Bawdy Craig**: High water table, extensive drainage, ridge and furrow system present with sphagnum moss establishing in permanently flushed areas and blocked drains.	Across each restoration site. See figures E7 – E11, Assessed Peatland maps for further details.
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.	**Black Burn**: Partial re-wetting required, water table is visible at surface across some of the site but affect of drains and furrows is lowering water table elsewhere. Drain blocking likely to be all that is required here. **Doucer Den**: Partial re-wetting required, water table is visible at surface across some of the site but affect of drains and furrows is lowering water table elsewhere. Dense drainage present in some areas to be blocked. Ridge and furrows to be smoothed. **Strans Burn Upper**: Partial re-wetting required, water table is visible at surface across some of the site but affect of drains and furrows is lowering water table elsewhere. Smoothing of ridge and furrows required in some areas. Mulching of regenerated Sitka crop required across eastern portion of restoration area. **Strans Burn Lower**: Re-wetting in form of drain blocking and ground smoothing required. Water table is visible at surface across some of the site but affect of drains and furrows is lowering water table elsewhere. **Bawdy Craig**: Re-wetting in form of drain blocking and ground smoothing required. Water table is visible at surface across some of the site but affect of drains and furrows is lowering water table elsewhere.	Across each restoration site. See figures E7 – E11, Assessed Peatland maps for further details.
Where Peat Edge Woodland is proposed, confirm and explain why restoration of deep peatland is not possible	No Peat Edge Woodland is proposed on deep peat in any of the restoration sites. Non-commercial native woodland is proposed adjacent to some peat restoration sites where investigation found that the peaty soils were not of sufficient depth or quality to be restored.	See figures E7 – E11, Assessed Peatland maps for further details of restock plans adjacent to peat restoration schemes.

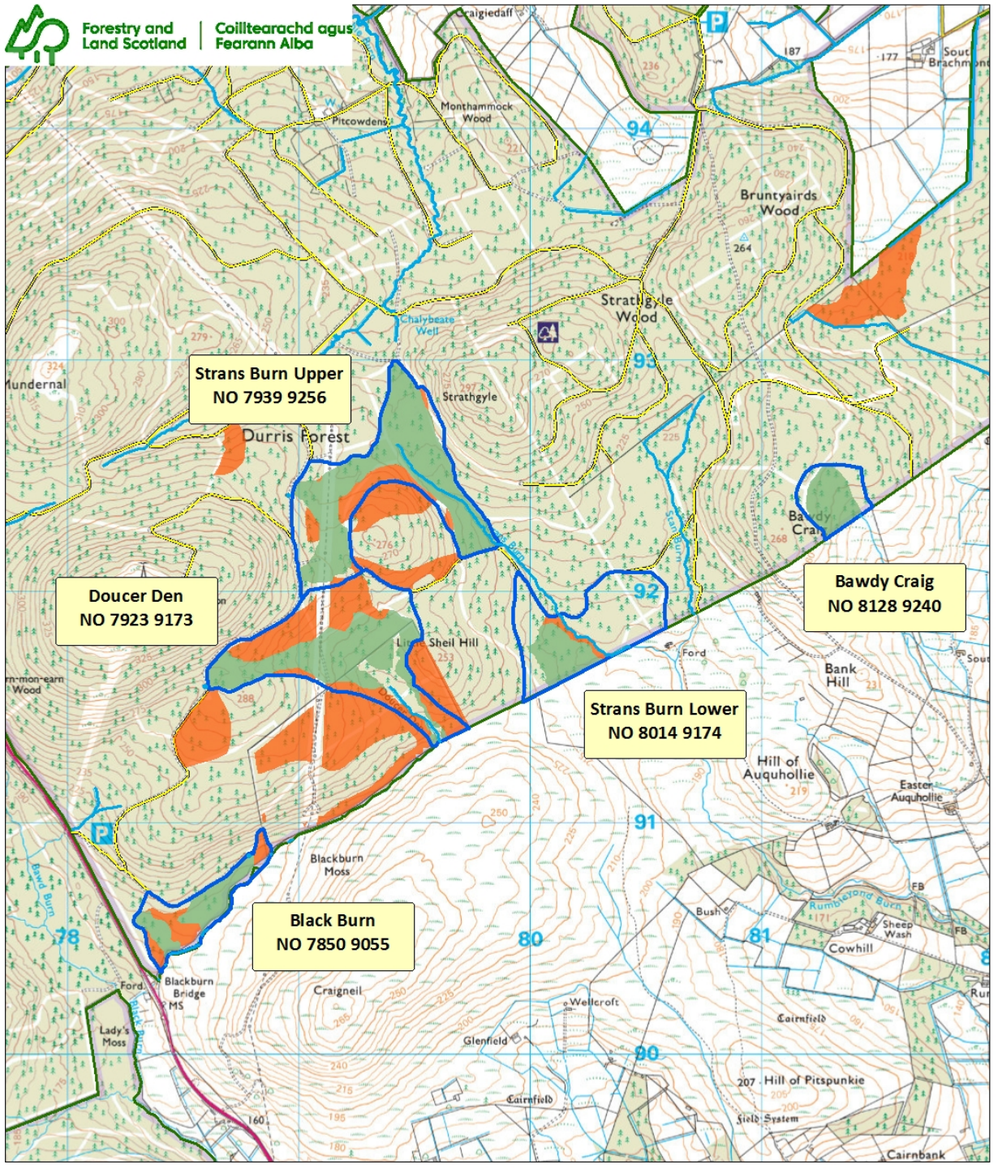

Figure E.6: Assessed Peatland Restore and Restock Map

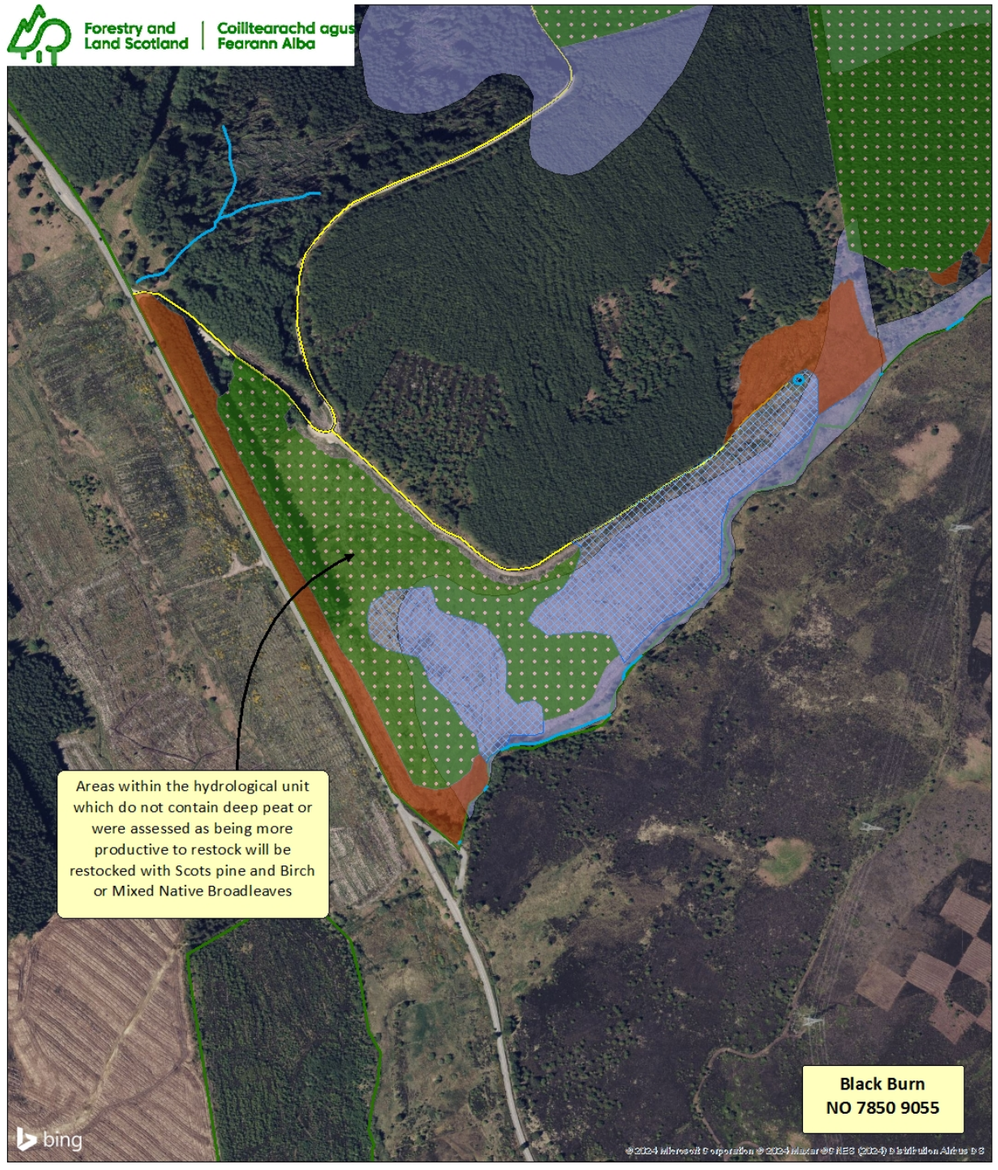

Figure E.7: Black Burn Assessed Peatland

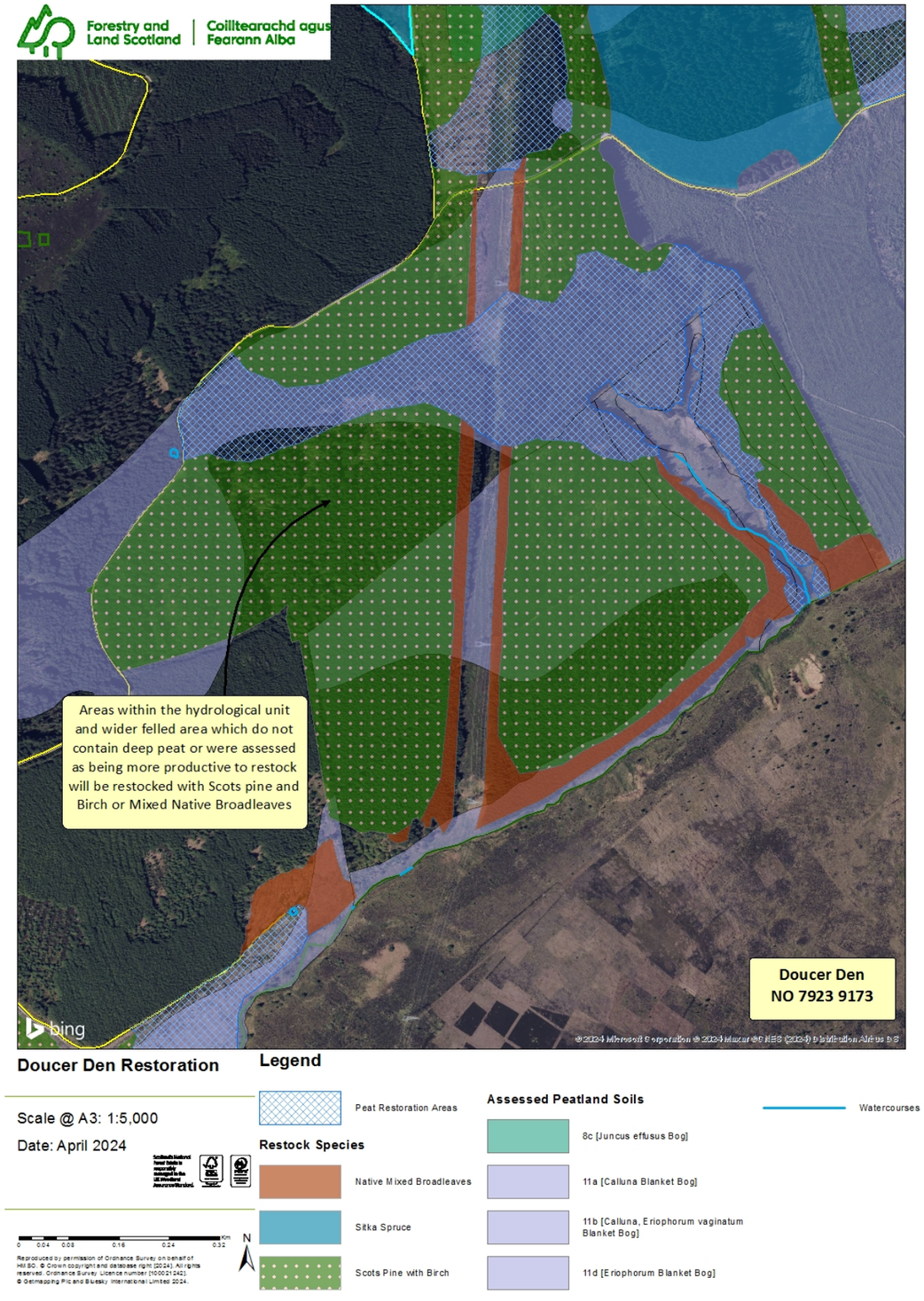

Figure E.8: Doucer Den Assessed Peatland

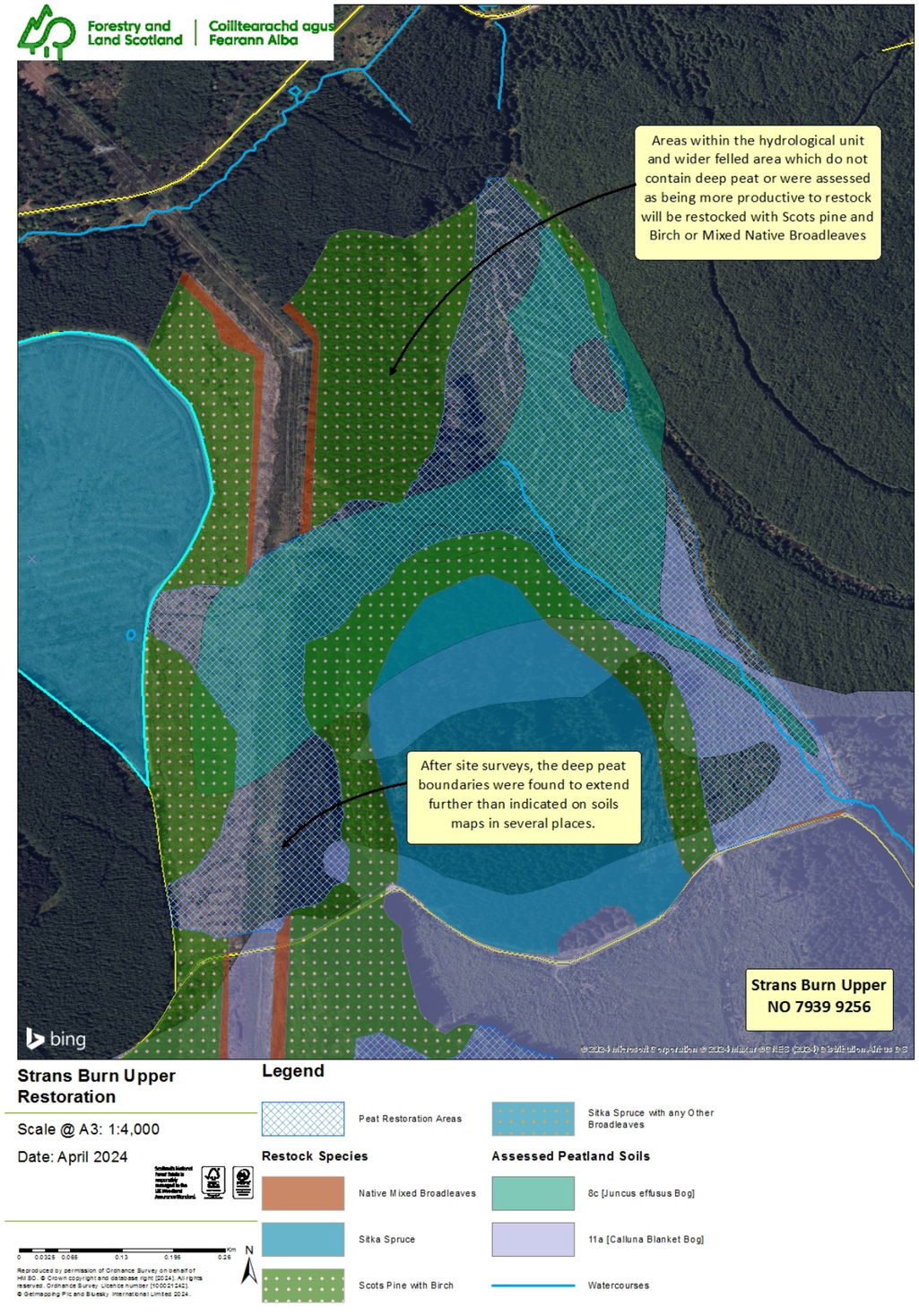

Figure E.9: Strans Burn Upper Assessed Peatland

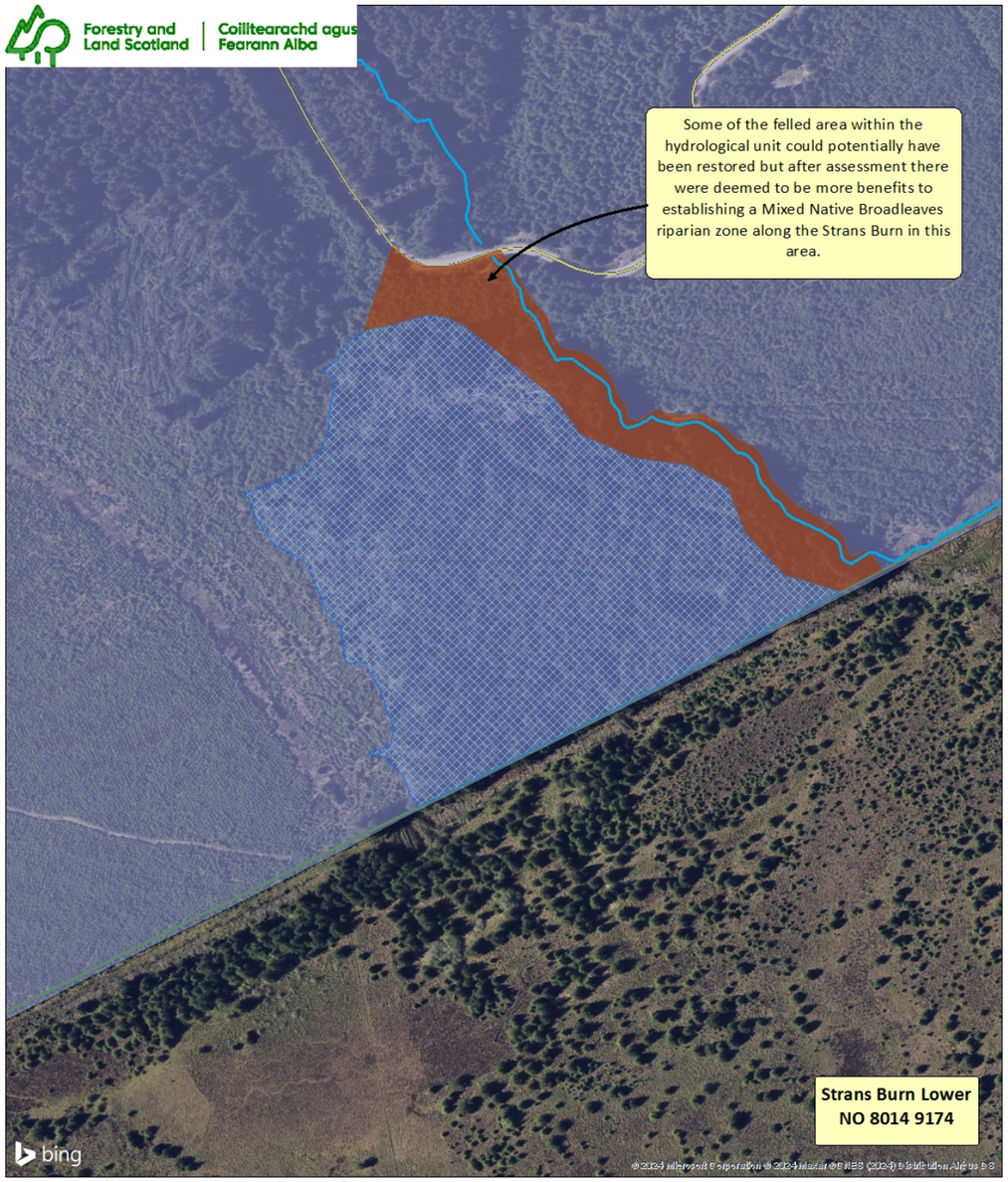

Figure E.10: Strans Burn Lower Assessed Peatland

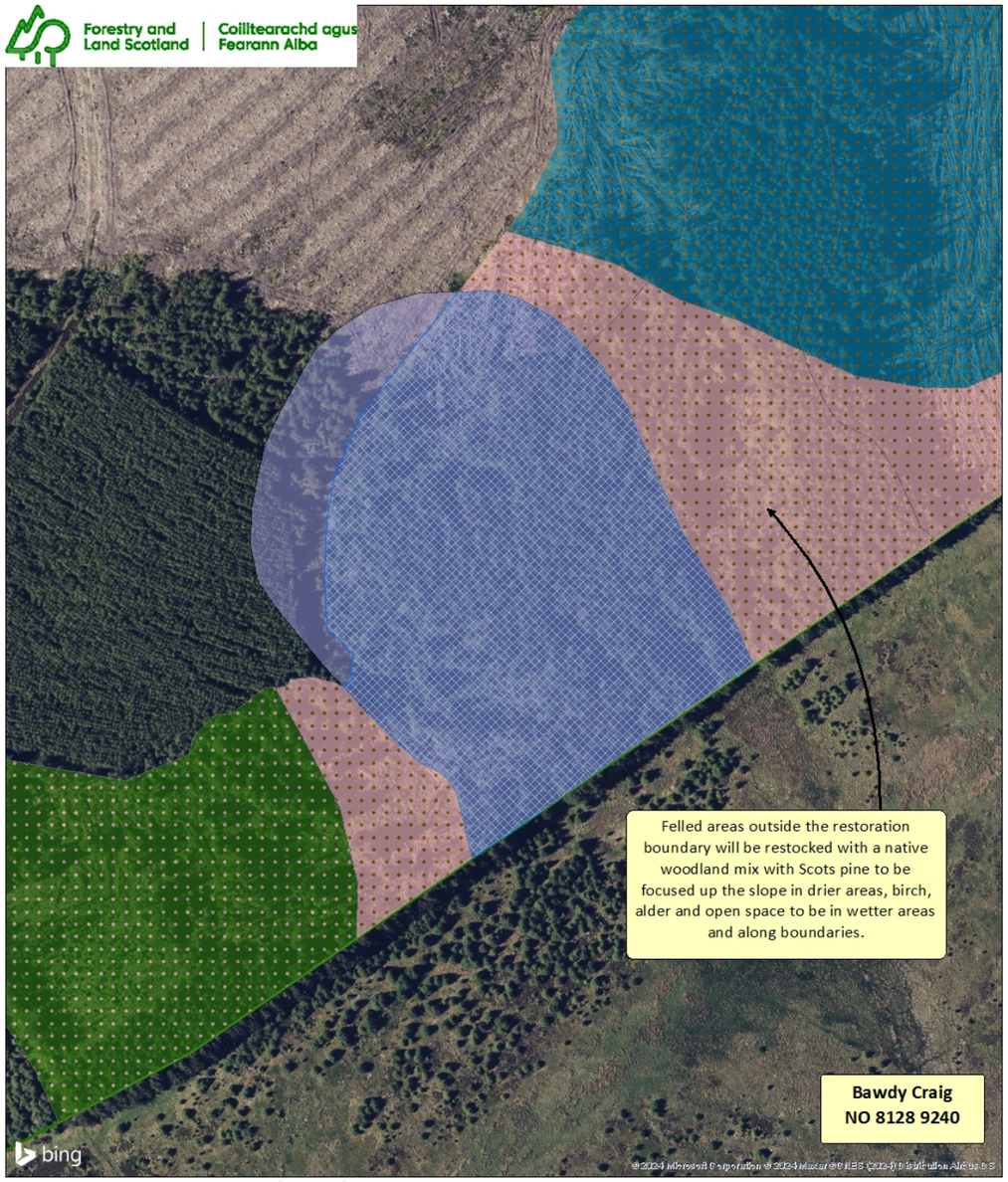

Figure E.11: Bawdy Craig Assessed Peatland

Table E.4: Restoration proposals. Describes the restoration techniques to be applied to the proposed restoration areas.

Attribute described	Description	Location of described attribute (peat types, part of the forest)
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.	All afforested sites
Treatments used to counter-act peat cracking or other modifications caused by the afforestation of the peatland	No peat cracking noted	N/A

E/1.5.3 Environmental Impact Assessment risk assessment

Please see separate **Appendix F: Deforestation Environmental Impact Assessment Screening Opinion Request** for the screening opinion request form and relevant maps.

Forest-to-bog peatland restoration is classified as a forestry project under the Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017. To obtain consent from Scottish Forestry, an assessment of potential environmental risks as a result of the proposed forestry project is required to allow the determination of whether it is likely to have significant effects on the environment.

Below map and table gives a brief outline of the areas to be deforested for peat restoration and a summary of the likely effects on the environment.

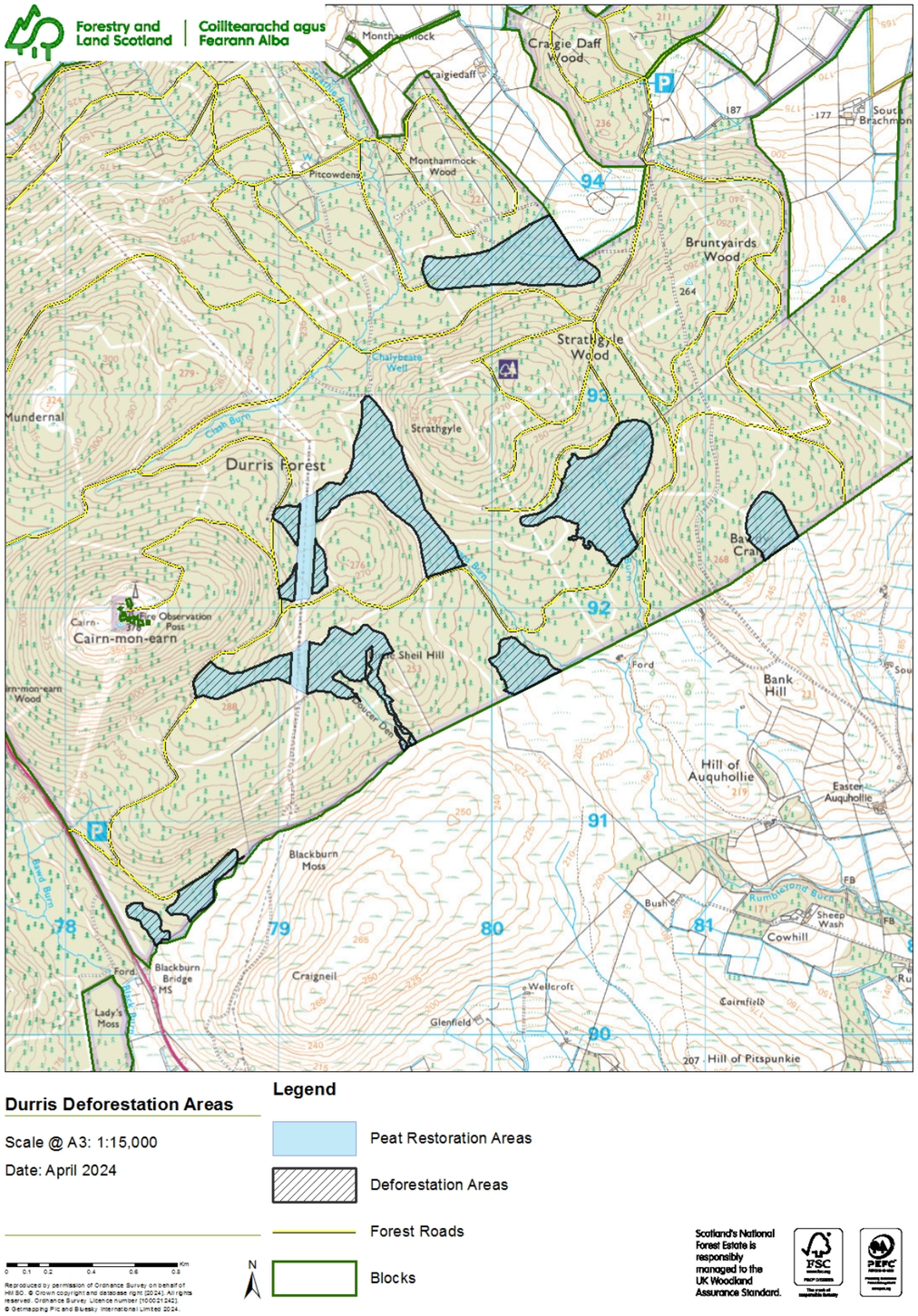

Figure E.12: All deforestation areas

Table E.5: Summary of main risks associated with forest-to-bog peatland restoration

Main risks to assess	Impact assessment
Population and Human Health	Positive impact. This area is widely used by members of the public. The increase in diversity in the landscape and species present will make this an attractive area to visit and increase recreational value. There are no public/private water supplies within the proposed area.
Biodiversity (habitats, species)	Positive. Restoration of a degraded peatland will restore a priority open habitat (Blanket Bog) and compliment adjacent upland heath, benefitting both habitat and its associated species. Pre-operational surveys will identify any protected or breeding species to ensure suitable mitigation is in place to avoid any disturbance.
Land	No impact. Where the restoration project is adjacent to agricultural land, boundary drains will not be blocked to ensure neighbouring land is not compromised by re-wetting and increased potential to flooding.
Soil – and geology, geomorphology	Positive. Re-wetting the site will benefit the peat soils as forestry modifications will be reversed to stop oxidisation and further degradation and erosion of the peat.
Water	Positive. Re-wetting techniques have shown to have no significant adverse effect on water quality. Ultimately, the water quality of the local area will be improved by reducing run-off from the exposed peat and degraded peatland. Any water courses will be suitably protected and buffered as per the UKFS Guidelines.
Air	No impact.
Climate	Positive. Afforested peatlands have the potential to emit more Green House Gas (GHG) emissions than can be absorbed by a woodland. Restoration of afforested peatlands, especially 'presumption to restore' peatlands, will prevent the significant net release of GHGs, ultimately benefitting the local climate.
Material Assets	No impact.
Cultural Heritage	No impact. Pre-operational surveys will identify any cultural heritage features to ensure suitable mitigation is in place to avoid any disturbance.
Landscape	Positive. Peatland restoration will create more open space within the forest blocks and their local area. This will add more diversity to the forest structure by creating open and associated native woodland habitats.

E/1.5.4 Monitoring

All peat restoration will be monitored on a regular basis to assess the change in surface vegetation (also a proxy indicator of water table level) and to check for non-native regeneration. It is envisaged that more monitoring will be undertaken by drone-based aerial photography at least bi-yearly. A full review of the peatland restoration will take place 5 years after completion and at the LMP mid-term review.

FLS continues to work closely with Forest Research on the effects of peatland restoration on water quality and will follow the best practice recommendations made in a recent publication by Shah and Nisbett based on 10 years of data collected from Flanders Moss. More details can be found at https://www.forestresearch.gov.uk/research/the-effects-of-peatland-restoration-on-water-quality/