Forestry and Land Scotland
Coilltearachd agus Fearann Alba

Land Management Plan

Loch Eck

Forestry and Land Scotland

Central Region

Loch Eck

Land Management Plan

Approval date:

Plan Reference No:

Plan Approval Date:

Plan Expiry Date:

CSM 6 Appendix 1b

FOREST AND LAND SCOTLAND - Application for Land Management Plan Approvals in Scotland

Forest and Land Scotland - Property

Region:	Central
Woodland or property name:	Loch Eck
Nearest town, village or locality:	Glenbranter
OS Grid reference:	NS140920
Local Authority district/unitary Authority:	LLTNP

Areas for approval

	Conifer	Broadleaf
Clear felling	207ha	
Selective felling		
Restocking	99ha	91ha
New planting (complete appendix 4)		

1. I apply for Land Management Plan approval for the property described above and in the enclosed Land Management Plan.
2. I apply for an opinion under the terms of the Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999 for roads, tracks and quarries as detailed in my application.
3. I confirm that the initial scoping of the plan was carried out with FLS staff on 16th January 2018.
4. I confirm that the proposals contained in this plan comply with the UK Forestry Standard.
5. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which SF agreed must be included.
6. I confirm that consultation and scoping has been carried out with all relevant stakeholders over the content of the of the land management plan. Consideration of all of the issues raised by stakeholders has been included in the process of plan preparation and the outcome recorded on the attached consultation record. I confirm that we have informed all stakeholders about the extent to which we have been able to address their concerns and, where it has not been possible to fully address their concerns, we have reminded them of the opportunity to make further comment during the public consultation process.
7. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

Signed … Signed……

Regional Manager Conservator

Region Central Conservancy…Central Scotland……

27 November 2019 **Date of Approval**……28 July 2020……

Date approval ends……28 July 2030……

Environmental Impact Assessment
Screening Opinion Request Form

Please complete this form to find out if you need consent from Forestry Commission Scotland, under the **Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017**, to carry out your proposed forestry project. Please refer to Schedule 2 Selection Criteria for Screening Forestry Projects under Applying for an opinion. If you are not sure about what information to include on this form please contact your local Conservancy office.

Proposed Work							
Please put a cross in the box to indicate the type of work you are proposing to carry out. Give the area in hectares and where appropriate the percentage of conifers and broadleaves							
Proposed Work	select	Area in hectare	% Conifer	% Broad-leaves	Propose d work	select	Area in hectares
Afforestation	☐				Forest roads	☒	4.9
Deforestation	☐				Forest quarr	☐	
Location of work		Loch Eck Land Management Plan					

Description of Forestry Project and Location
Provide details of the forestry project (size, design, use of natural resources such as soil, and the cumulative effect if relevant). Please attach map(s) showing the boundary of the proposed work and other known details.
See section 3.0 and maps M14a and M14b

Provide details on the existing land use and the environmental sensitivity of the area that is likely to be affected by the forestry project.
These are described in appendix II of the plan

Description of Likely Significant Effects
Provide details on any likely significant effects that the project will have on the environment (resulting from the project itself or the use of natural resources) and the extent of the information available to assist you with this assessment.
See section 3.0 of the plan

Include details of any consultees or stakeholders that you have contacted in order to make this assessment. Please include any relevant correspondence you have received from them.

Mitigation of Likely Significant Effects
If you believe there are likely significant effects that the project will have on the environment, provide information on the opportunities you have taken to mitigate these effects.
See section 3.0 of the plan.

Sensitive Areas	
Please indicate if any of the proposed forestry project is within a sensitive area. Choose the sensitive area from the drop down below and give the area of the proposal within it.	
Sensitive Area	Area
National Park (NP)	4.9ha
Select...	

Property Details			
Property Name:	Loch Eck		
Business Reference Number:		Main Location Code:	
Grid Reference: (e.g. NH 234 567)	NS140920	Nearest town or locality:	Glenbranter
Local Authority:		LLTNP	

Owner's Details			
Title:	Ms	Forename:	Shirley
Surname:	Leek		
Organisation:	Forestry and Land Scotland	Position:	Planning Manager
Primary Contact Number:	0131 370 5674	Alternative Contact Number:	
Email:	enquiries.central@forestryandland.gov.scot		
Address:	Forestry and Land Scotland		
Aberfoyle			
Postcode:	FK8 3UX	Country:	
Is this the correspondence address?	Yes		

Agent's Details			
Title:		Forename:	
Surname:			
Organisation:		Position:	
Primary Contact Number:		Alternative Contact Number:	
Email:			
Address:			
Postcode:		Country:	
Is this the correspondence address?	Select...		

Office Use Only	
GLS Ref number:	

Contents

Appendices

1.0: Summary

The Loch Eck Land Management Plan (LMP) area extends to 1912 Ha, and covers both the west and east shores of Loch Eck in the Cowal Peninsula (Text Map 1). The LMP area lies between Dunoon to the south and Strachur to the north and the A815 runs along the eastern shore. While there are variations in forest type, the general character and issues are similar across the plan area.

Loch Eck has both a diverse age class structure and species range and has been extensively restructured. Due to the age class of the crop a period of intensive felling activity during the 1990's and early 2000's was followed by a period of lower felling activity.

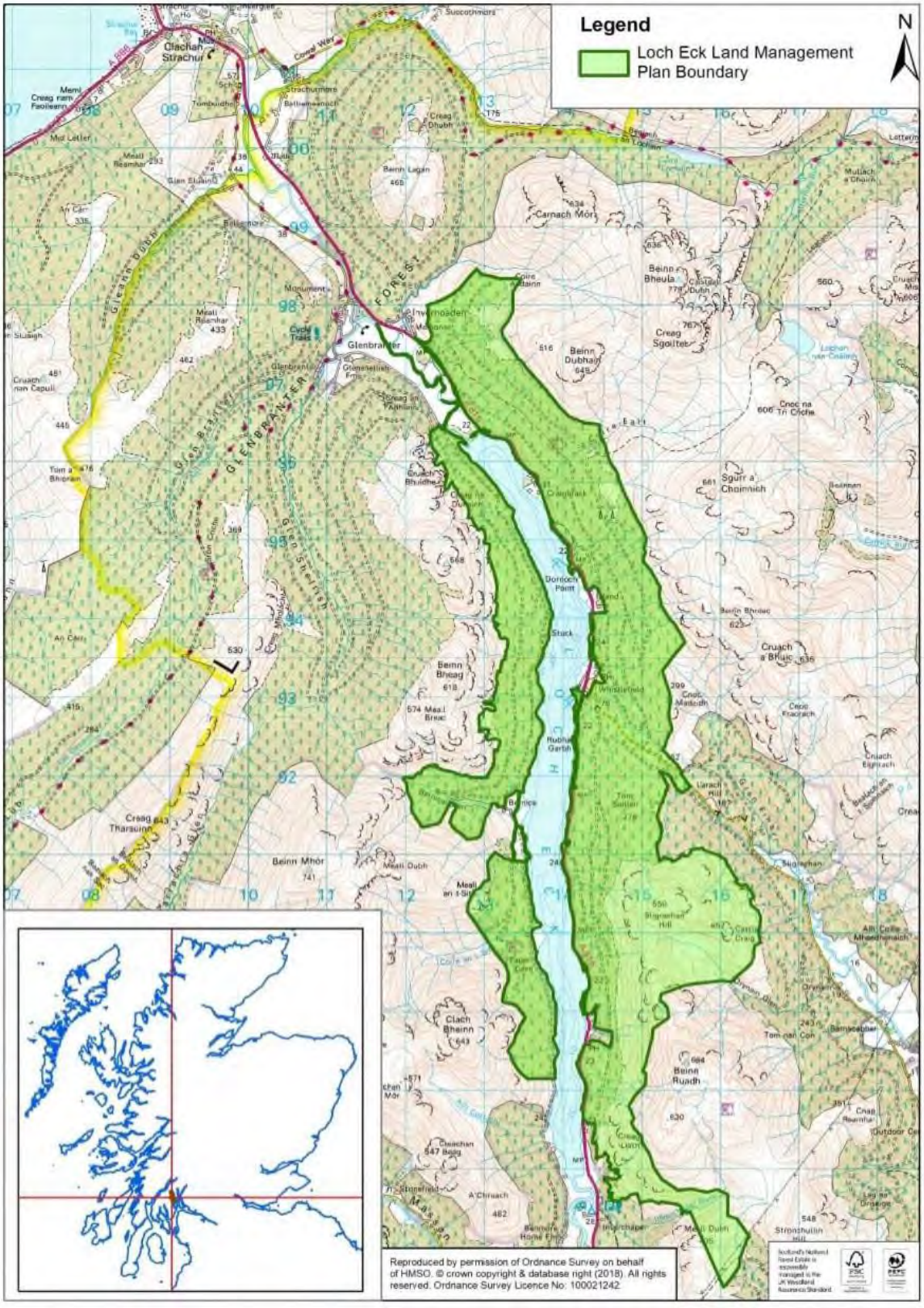
Loch Eck is located within the Loch Lomond and the Trossachs National Park (LLTNP) and has a very high visual impact with extensive mixed forest being an integral part of the landscape. The A815 which runs through the LMP area is a major transport and tourist route. The terrain and aspect of the LMP area means that in many areas the whole profile of the forest from shoreline to treeline is visible.

There are a number of important constraints on site in addition to the landscape impacts and these include the Loch Eck SSSI, public and private water supplies, Red Squirrel strongholds, and Plantation on Ancient Woodland Site (PAWS) restoration.

The steep and rocky terrain poses problems for access and harvesting and in places slope stability is an issue. The road network requires upgrading to implement the LMP felling proposals and road density and hence cost is high in relation to crop area.

The plan presents felling and replanting proposals for the first ten years (2020 to 2030) in detail. Forest road and track formation during this period are also detailed. The first ten years are important because this relates to the parts of the plan that seeks approval for specific forestry operations. These are set out in Section 2 of this plan.

The following ten years (post 2028) and beyond are also considered in the plan to indicate a direction of travel and to provide context.



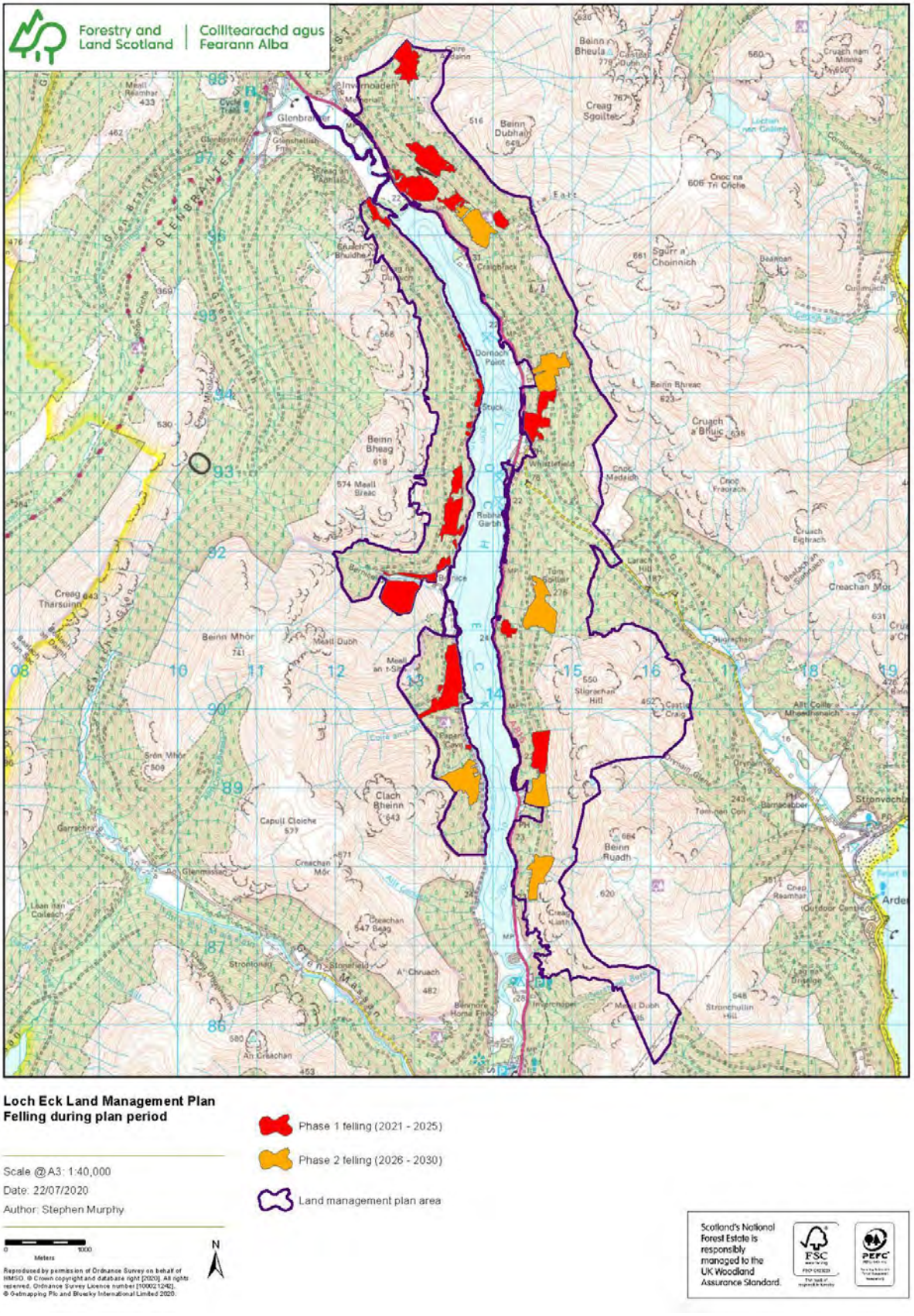
Text Map 1: Land Management Plan(LMP) Location

Objectives

The plan objective is to maintain a mixed, potentially productive woodland delivering a range of ecosystem services.

Specifically

- Protect and enhance designated conservation sites within and adjacent to the LMP area.
- Maintain a visually diverse woodland which is in keeping with the landscape character and integrated with neighbouring properties. Enhance the landscape by use of appropriate silviculture, coupe design and restocking proposals.
- Restore PAWS areas to create wider landscape scale native woodland linkages.
- Maintain a diverse range of conifer species of different ages in order to maintain the quality of Red Squirrel habitat. Consider how continuous cover forestry (CCF) and long term retentions can contribute to this objective.
- Timber production from a wide range of conifer species with the emphasis on matching species with site.
- Evaluate the PAWS restoration areas for productive broadleaves.
- Maintain and enhance the recreational infrastructure.
- Maintain and enhance water quality in relation to both private and public water supplies.
- Examine opportunities for woodland expansion.



Map 2: Felling Phases 2021 to 2030

Summary of management proposals

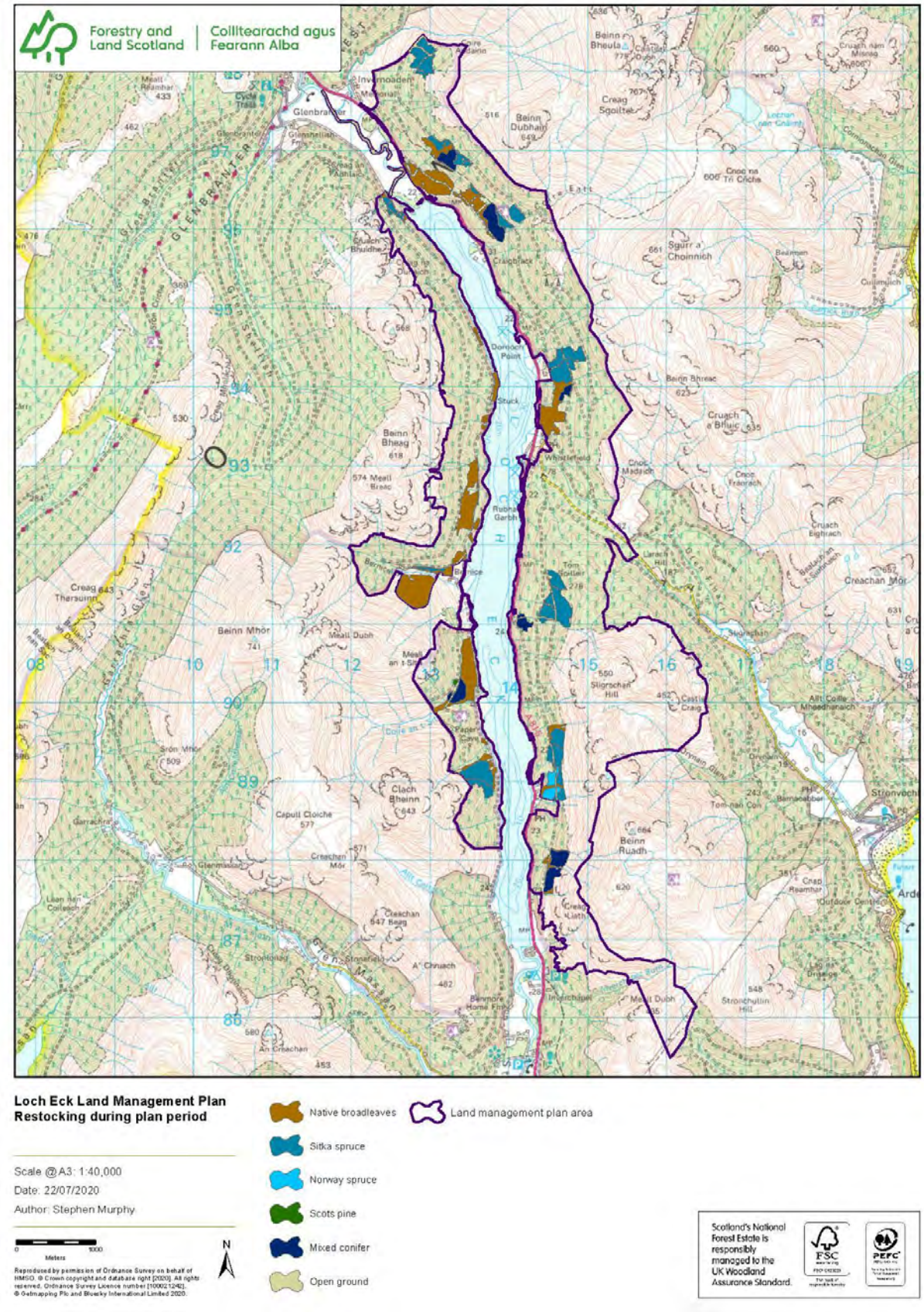
The felling proposals in the first twenty years of the plan can be summarised as follows:

Felling	Area Ha	%
Phase 1: 2021 - 2025	129	7%
Phase 2: 2026 - 2030	77	4%
Phase 3: 2031 - 2035	119	6%
Phase 4: 2036 - 2040	136	7%
Total	461	24%

See Maps M11a and 11b for felling coupe locations. The first two felling phases are shown in *Text Map 2* as these would be the approved felling areas for this plan, with subsequent felling approvals being the subject of a plan review at year 10.

The species composition over the first twenty years changes over time as follows:

Species Group	**Species Group @ 2020 Area Ha**	**Species Group @ 2020 %**	**Species Group @ 2030 Area Ha**	**Species Group @ 2030 %**	**Species Group @ 2040 Area Ha**	**Species Group @ 2040**	**% Change 2020 to 2040**
Felled	4.45	0%					
Mixed Broadleaves	145.74	8%	240.35	13%	287.8	15%	7%
Diverse Conifers	253.05	13%	240.22	13%	220.47	12%	-1%
Open Groun	675.99	35%	690.07	36%	706.77	37%	2%
Sitka Spruce	832.61	44%	741.2	39%	696.8	36%	-8%
Total	1911.84	100%	1911.84	100%	1911.84	100%	



Text Map 3: Restocking 2021 to 2030 (includes Phase 1 and 2 fellings, previously felled land, and some integral open ground)

The biggest change in species composition relates to the proposed reduction of Sitka Spruce and the increase in broadleaves as part of the PAWS restoration.

Two new roads of approximately 425m and 385m are required to access coupes on the west side of Loch Eck.

Overall, the operations planned for the forest during the period 2021 – 2030 include the following activities:

Planned operations	***2021 – 2031 plan period***
Felling	*207Ha*
Thinning	*140Ha*
Restock/Regeneration	*190Ha*
New woodland creation	*0Ha*
Road Construction	*810m*
ATV Track Construction	*16100m*
Quarry	*Existing*
New Road Access @ NS/14470/93400 to be evaluated.	*150m*

Note: Restock area includes areas already felled and awaiting restocking and areas of integral open ground planted. Areas of created open ground are excluded. Note: Road Construction and ATV Track Construction outwith the existing road/track footprint require Prior Notification and EIA screening.

Consultation and further Information

During the development of this plan we have consulted with the local community and other stakeholders. For further information on the plan please contact:

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Planning Manager

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Aberfoyle
Stirling
FK8 3UX

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t: +44 (0)131 370 5674 (Switchboard)
+44 (0) 300067 6600 (Direct)
07885592015 (Mobile)

2.0: Legal and Regulatory Requirements

The Loch Eck Land Management Plan (LMP) area covers 1912 Ha as shown on Map *M1 Location and Viewpoints*

2.1 Summary of planned operations

The operations planned for the Loch Eck LMP during the period 2021 – 2030 include the following activities:

Planned operations	***2021 – 2030 plan period***	***% of plan area***
Felling	207Ha	11
Thinning	140Ha	8
Restock and regeneration	190Ha	10
New woodland creation		
Road construction	810m	
ATV track construction	16100m	
Quarry	n/a	
Potential new access at NS14479340 (Option to be evaluated)	150m	

Note: Restock area includes areas already felled and awaiting restocking and areas of integral open ground planted. Areas of created open ground are excluded. Note: Road Construction and ATV Track Construction outwith the existing road/track footprint require Prior Notification and EIA screening.

2.2 Proposed Felling in years 2021-2030

As shown in *Text Map 2: Felling Phases 2021 to 2030*, it is proposed that 7% of the plan area will be felled between 2021 and 2025, and 4% of the plan area will be felled between 2026 and 2030. The breakdown of predicted yield is indicated below.

Operation	**Area Ha**	**Indicative Yield T**	**% of Plan Area**
Clearfell Phase 1 (2021 - 2025):	130	72000	7%
Clearfell Phase 2 (2026- 2030):	77	43000	4%
Thinning 2021 - 2030	140	9500	8%

Table showing felling areas and indicative yields from first ten years of plan

2.3 Proposed thinning in years 2021-2030

Map *M12 Thinning* illustrates the potential for thinning in the first ten years of the plan. There is potential to thin 8% of the plan area during the ten years between 2021 and 2030.

2.4 Proposed restocking in years 2021-2030

Text Map 3: Restocking 2021 to 2030 illustrates the restocking proposals in the first ten years of the plan. Species and areas proposed for restocking in this first ten years are as follows:

Proposed Restocking	Area Ha	% of restock Area
Mixed Conifer	29.9	15%
Native Broadleaves	91.4	44%
Open Ground	16.6	8%
Sitka Spruce	69.0	33%
	206.9	100%

Table showing proposed restocking area breakdown from first ten years of plan

This restocking will change the forest species composition as follows:

Species Group	Species Group @ 2020 Area Ha	Species Group @ 2020 %	Species Group @ 2030 Area Ha	Species Group @ 2030 %	% Change 2020 to 2030
Felled	4.45	0%			
Mixed Broadleaves	145.74	8%	240.35	13%	5%
Diverse Conifers	253.05	13%	240.22	13%	0%
Open Ground	675.99	35%	690.07	36%	1%
Sitka Spruce	832.61	44%	741.2	39%	-5%
Total	1911.84	100%	1911.84	100%	

Table showing proposed change in Forest Composition from 2020 to 2030

The biggest change in species composition relates to the proposed reduction of Sitka Spruce and the increase in broadleaves as part of the PAWS restoration.

Where production is the key objective conifers will be planted at densities of approximately 2700 stems per hectare (sph) and broadleaves in the region of 3500. Central Region have a Hylobius Management Support System in place, - restocking will be within two years of felling unless a longer fallow period is indicated. In the latter case planting will be carried out within five years.

Where production is not the key objective target densities for planting, or natural regeneration, of native and non-native species, will vary depending on site objectives. On planted sites and the majority of natural regeneration sites an overall density of at least 1600sph will be achieved; in transitional woodland (such as upper treelines) lower densities, of at least 1100sph, will be accepted. Natural regeneration sites will be assessed four years after felling. If it seems unlikely regeneration will become established by year 5, the site will be planted to achieve the desired stocking level at year 5.

Open areas will be allowed up to 20% tree cover. Sitka spruce regeneration will be kept within agreed tolerance limits on both open ground and in areas designated for broadleaved woodland. Small amounts of rhododendron are known to be present and appropriate measures to control this species will be put in place.

2.5 Access and roading 2021-2030

Proposed new roads and the current road layout can be found in Map *M5: Roads and Timber Transport.* Maps *M15a and M15b* show access points to the forest for timber haulage. Approximate tonnage, by felling phase, is also indicated. Both the Whistlefield and Larach access points come onto a consultation route. Local authorities will be contacted prior to using these exits and updated annually on the amount of timber coming onto all public roads.

The forest area has a good basic road layout but many areas require significant upgrading to facilitate timber transport. South of Bernice Glen, on the west shore of the loch, the lower road has a high recreational value and the upper road has a number of washouts. The upper road will need to be extended to harvest the steep southern end of this block, but this is proposed for outside the plan period. The impact of *P. ramorum* may drive future roading priorities.

The standing mature Sitka Spruce block on the south side of Bernice Glen will require a burn crossing and a short section of new road. This will require an EIA screening request and a Prior notification. Consultation with Scottish Water will be carried out to ensure there are no adverse impacts on water supplies. It is proposed to establish productive broadleaves on this area in order to spread the roading cost over the next rotation. A second new road is required to access a coupe to the south of Bernice Glen.

Roading density on site is high in relation to harvestable area due to the steep slopes and rough terrain. Sources of hard rock for running surfaces are limited and haulage distances for material can be lengthy.

ATV tracks will be required over restocked areas to facilitate deer control and restocking management and operations. A screening opinion request form is to be found at the beginning of this document and more detail in section 3.0.

The proposed Phase 1 coupe near the Whistlefield Inn could be harvested by a lengthy road upgrade, however an alternative is to open a new access at around NS/14470/93400. The access options in relation to this coupe are being evaluated. A 150m spur is required to reach the current forest track from the public road. A planning application will be submitted if this option is taken up.

2.6 Departure from UKFS Guidelines

The LMP seeks to follow the UKFS in all aspects.

2.7 Tolerance table

	Adjustment to felling period	Adjustment to felling coupe boundaries	Timing of restocking	Change to restocking species	Changes to road lines	Designed open ground	Windblow clearance
SF Approval not normally required	Felling date can be moved within 5 year period where separation or other constraints are met	Up to 10% of coupe area	Up to 2 planting seasons after felling	Change within species group e.g. evergreen conifers or 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 of roadline	Increase by up to 10% Any reduction in open ground within coupe area	Up to 5ha
Approval by formal plan amendment including map	Felling delayed into second or later period. Felling advanced into earlier 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 groups	As above, depending on sensitivity	More than 10% of coupe area Colonisation of open areas agreed as critical	More than 5ha

3.0: EIA Screening Determination

3.1 Proposed removal of woodland

There are no proposals to remove woodland.

3.2 Proposed new roads and proposed upgrading of roads

This is a request for an EIA determination for works covering construction of, roads, tracks, ramps and other facilities in Loch Eck LMP area. The request covers proposals for the full ten year period of the plan which will offer some flexibility with the work programme without the necessity of having to re-submit a determination. Any work to be carried out in the second half of the plan period will be preceded by a new EIA determination request.

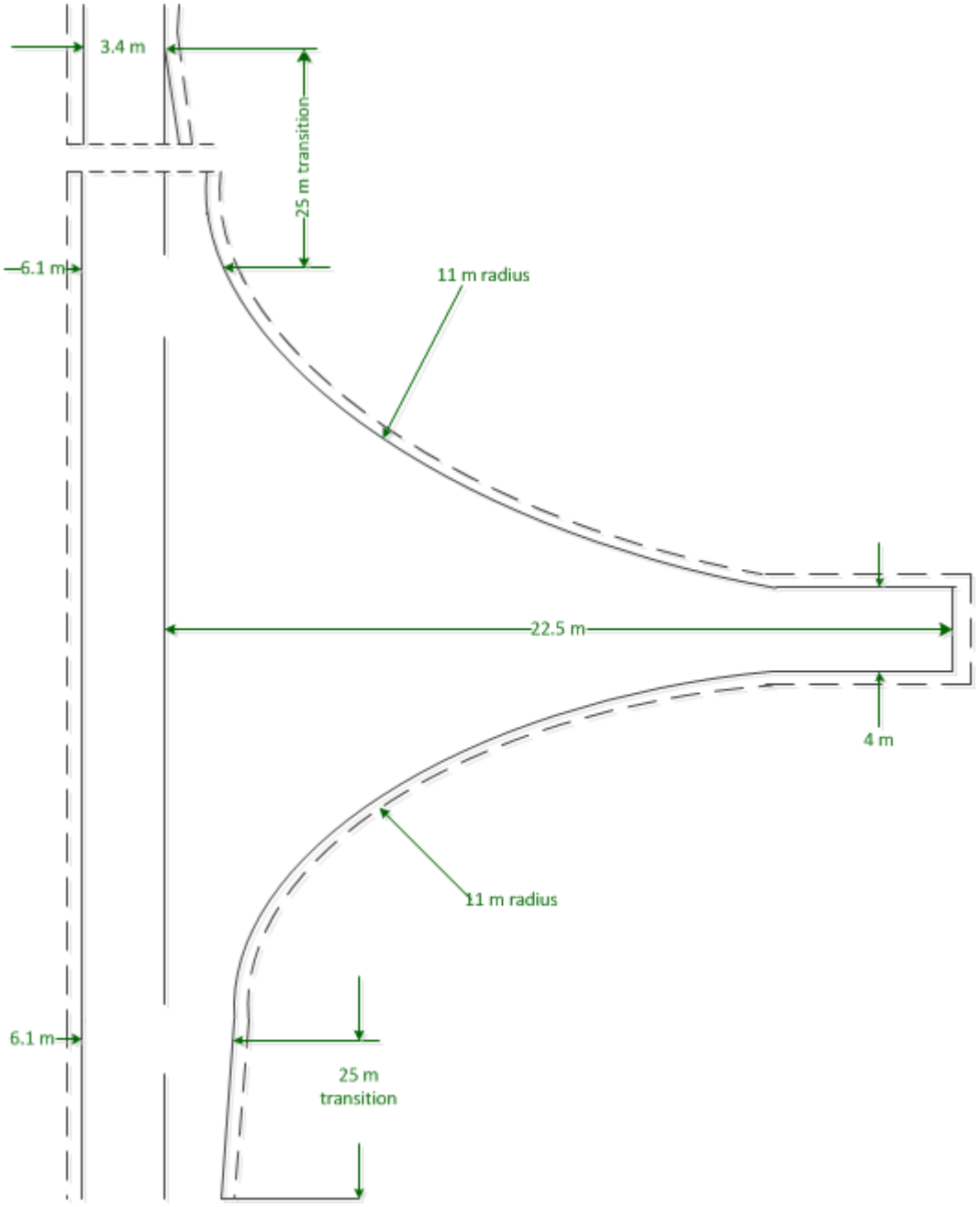
A short section of road will be required to facilitate access to the first phase harvesting coupe in Bernice Glen for machinery and timber lorries. The length is approximately 425m with a running surface of approximately 3.4m and a footprint about 7m wide. A second new section of approximately 385m is required for a second phase coupe to the south. The gross length is 810m and the nominal area about 0.6ha. The proposed roads will be of standard construction, with a waterbound surface (not tarmac), with a layby and a turning point at the end. A proportion of the materials required to construct the road may be sourced from within the excavation corridor. The remainder will come from the closest available FLS quarry.

Roads will be constructed according to standard Forestry and Land Scotland specification and be in line with principles described in the SNH guidance on Constructed Tracks in the Scottish Uplands. A detailed assessment of the line will be made prior to construction and cut and fill will be kept to a minimum. In addition batter angles will be kept to a minimum and top soil and turf will be retained for landscaping, where feasible. In general disturbed ground will be left in a condition that promotes regeneration of natural vegetation and direct seeding will be considered as an option.

Additional roading may also be required for the first phase coupe to the north of the Whistlefield Inn; this requirement is currently being evaluated. This facility would include a new access into the woodland from the unclassified public road adjacent to the coupe. The location of the new access would be at, or close to, grid reference NS144934. If this road is deemed to be necessary a full planning application will be submitted separately.

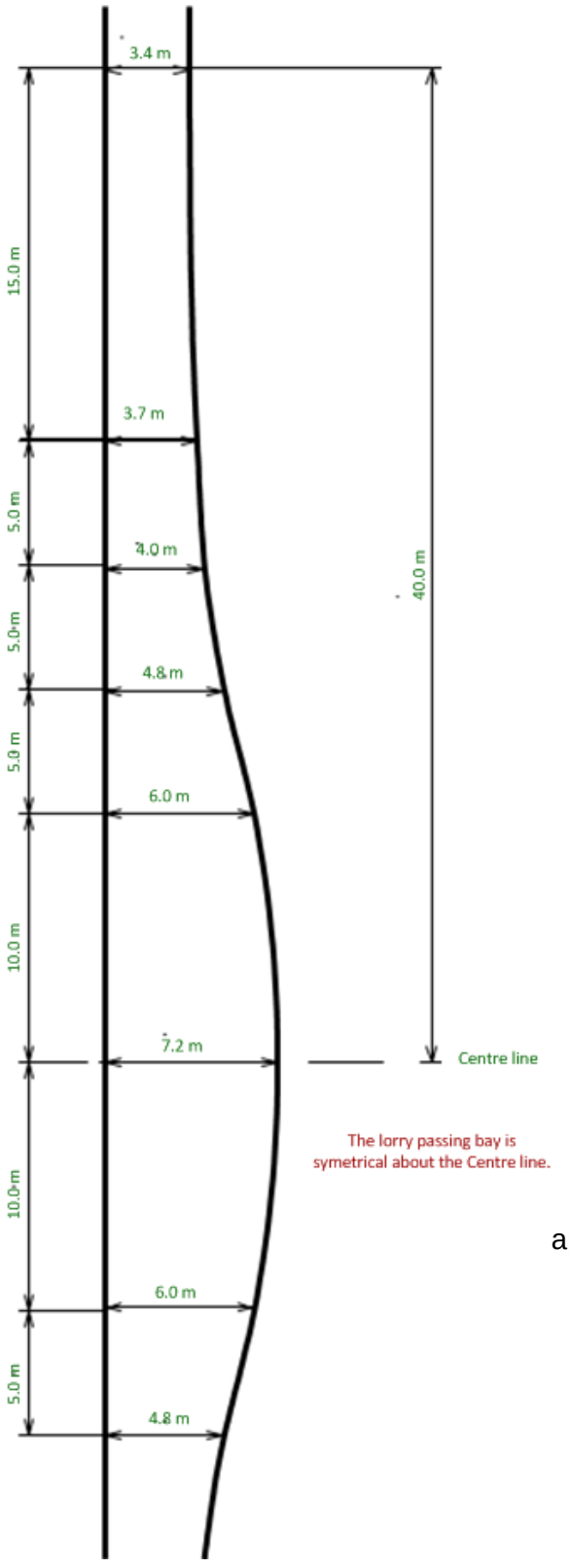
There are approximately 54km of roads in the LMP area of which 44km will require upgrade and/or maintenance. Actual requirements will be subject to assessments pre and post harvesting and there will be no increase in nominal area as a result of upgrading. A number of new turning points and passing places may be required which would result in a change to nominal area. Approximate dimensions of these are shown in figures 3.1 and 3.2. Again actual requirements

will be subject to assessment but the combined number of new facilities will not be greater than 50, with a nominal area of approximately 0.7ha. (based on approximately 10 new turning points and 40 passing places).



approximate area – 300m^3

Figure 3.1 Approximate dimensions of T shaped turning area (source: Civil Engineering Handbook 3rd ed 2016)



approximate area – 100m^3

Figure 3.1 Approximate dimensions of passing bay (source: Civil Engineering Handbook 3rd ed 2016)

In addition up to 90 ramps will be required to allow harvester/forwarder access into coupes that are to be felled during the plan period. These will be approximately 3m wide and up to 15m long. The nominal area is approximately 0.4ha. They will not be treated as permanent features. The actual number and location of ramps will be determined at time of operations but it is believed that one ramp per 100m of road/coupe interface will be sufficient. All work will be carried out in accordance with standards set out in the most up to date Timber Transport Forum Guidelines.

Approximately 16100m of ATV tracks will be required to facilitate silvicultural and deer management operations. Tracks will be about 2m wide and the nominal area amounts to 3.2ha. ATV tracks will be constructed in line with the principles described in the SNH guidance on Constructed Tracks in the Scottish Uplands. Construction will also conform to the Forests and Water Guidelines (Fifth Edition). During construction ground disturbance will be kept to a minimum. ATV tracks will not be treated as permanent features; once operations are complete tracks will be allowed to grass over and the running surface and side batters will be left in a condition that will promote vegetation regeneration. Tracks will be constructed with a top-side drain and will have regular drainage cut-offs to prevent erosion of the trackside drain. No water from the trackside drains will discharge directly into any watercourse.

Indicative positions of the roads and tracks are shown on the screening opinion request (SOR) maps (M14 a and b) and final positions will be within ± 60m of these. The actual lines will be planned to minimise landscape impact and ground disturbance, reflecting existing topography, avoiding steep gradients where possible and avoiding sensitive habitats. Other facilities such as laybys, turning areas and ramps will be along routes to and adjacent to the first and second phase coupes shown on this map.

1. **Landscape** The high level road crossing the Allt Coire an t-Searbhaid is visible from the east shore of Loch Eck. Measures will be put in place to mitigate landscape impacts. There are no other major landscape issues with either roads, tracks or ramps.
2. **Watercourses** All work will conform to the 5th edition of the UK Forestry Standard Guidelines "Forests and Water".
3. **Archaeology** Where archaeological features are known to occur these will avoided. Care will be taken to avoid damage to any new features discovered during operations.
4. **Biodiversity** Work carried out will be sensitive to permanent and temporary features of conservation value (e.g. spawning frogs and toads in roadside drains).
5. **Access** There are no major access issues.
6. **Recreation** Construction will not impact on the informal use of existing roads and tracks.
7. **Material** ATV tracks will use material from on site. Material suitable for roads and ramps will be sourced from local FES quarries.

3.3 Proposed quarries

Quarries already operational, no EIA required.

3.4 Proposed woodland creation

Opportunities for woodland creation are limited. It is proposed to adjust the area of some integral open ground for landscape and other reasons, and this will involve both the creation of new open ground and woodland expansion on some other areas of existing open ground. Natural regeneration on the upper margins is likely to progressively extend the forest area. An EIA screening request is currently not required for these modifications to forest area.

4.0: Introduction

4.1 The existing land holding

Dornoch Point Car Park and Picnic area on Loch Eck

The Loch Eck Land Management Plan (LMP) area covers 1912 Ha, and comprises 3 blocks which share similar characteristics. The Forest lies on both shores of Loch Eck and is characterised by steep slopes with

broadleaves along the Loch shore, mixed conifers on the mid slopes giving way to open ground and natural regeneration on the upper slopes. This structure give the appearance of a natural alpine style forest.

The area has been restructured to give a diverse age class and species mix, and activity is correlated with ease of road access. Good road infrastructure at a relatively high density is essential for management of the forest.

The site is generally very productive with the potential for a wide range of conifer species. Slope steepness and terrain roughness are the major practical constraints on site. At higher elevations species choice becomes more restricted with Sitka Spruce being the optimal commercial species.

There are extensive areas of existing broadleaves which have a high ecological value as well as delivering ecosystem services as protection forest areas to reduce landslips and enhance water quality. There is some scope for productive broadleaves in the proximity of road margins, but thinning options are limited by steep and rocky slopes.

The LMP area has a very high visual impact, particularly the western shoreline when viewed from the A815.

View from the A815 looking south.

Loch Eck and the shoreline area is an SSSI and the Loch is a public water supply. The steep and rocky slopes are unstable in places, so water and riparian management are important considerations.

PAWS restoration linked to the SSSI has been an ongoing priority but has been tempered, in the case of mature Norway spruce and Douglas Fir stands, by the need to maintain Red Squirrel habitat and specific Raptor nest sites. The forest is a Red Squirrel stronghold.

Invasive species pose a number of challenges for management with Western Hemlock and Rhododendron being the most significant invasive species. The presence of these species creates a complex management environment for Continuous Cover Forestry (CCF) and PAWS restoration where increased light levels and difficult access can facilitate the spread of these species.

Recreationally the forest is important visually and there are two well used car parks/picnic sites along the eastern shore and the A815. The road network provides a range of circular routes including the Loch Eck Loop and the Paper Cave and other bouldering features add points of interest.

Maps M4 to M9 show the location of many of the above features.

More detail on the existing physical characteristics and background to the site which has informed this LMP can be found in Appendix II.

The information required to inform the regulation of forestry activities over the next ten years, including the SOR, is set out in detail in Sections 2 and 3 above.

Management for the following ten years (post 2028) and beyond are also considered in the plan to indicate a direction of travel and to provide context.

4.2 Setting and context

The LMP area occupies both shores of Loch Eck on the Cowal Peninsula. Cowal has a forest cover of around 50% with the bulk of the lower slopes afforested and the upper hill open. Much of the open hill was retained for sheep grazing with downfalls retained to facilitate management. While commercial forestry has limited potential for expansion on the upper slopes, the general decline in agriculture across the area has led to an expansion of natural regeneration above the treeline, with Sitka Spruce being a significant proportion of the regeneration.

The surrounding area falls within the Loch Lomond and the Trossachs National Park (LLTNP) and mature mixed woodland is an integral part of the landscape character.

Looking North from the minor road above the Whistlefield Inn showing extensive Birch regeneration, Scots Pine established without deer fencing and the existing matrix of lochside broadleaves and productive conifers on the upper slopes..

5.0: Plan Objectives

Following the review of the previous plan (See Appendix I), an analysis of the scoping responses (see Appendix III), and the challenges identified in each management zone, the following management objectives were identified for the whole plan area, the objectives identified in the 2009 Forest plan are largely still relevant to this Land Management Plan:

5.1 Whole plan management objectives

Objective 1: Protect and enhance designated conservation sites within and adjacent to the LMP area.

The Loch Eck SSSI is primarily significant for its fish assemblage. Many of the fish species breed in feeder burns and the health of the ecosystem is dependent on water quality which is a function of the surrounding

catchment. The riparian woodland plays a key role in maintaining and enhancing water quality, and this has the additional benefit of having the same positive impact on public and private water supplies. The Oak/Birch woodland at Meall an t-Sith is important for Atlantic bryophytes and ensuring the continuity and resilience for this area is an important management consideration.

Objective 2: Maintain a visually diverse woodland which is in keeping with the landscape character and integrated with neighbouring properties. Enhance the landscape by use of appropriate silviculture, coupe design and restocking proposals.

The existing diverse forest structure, with a strong productive conifer element, is a key element defining the landscape character of the area. The matrix of broadleaved and conifer woodland with the naturalised upper margin and sporadic natural regeneration creates a natural "alpine forest" feel to the landscape. Coupe design is constrained by practical harvesting constraints caused by steep and rocky slopes. The visual impacts are high both in terms of distant and close up views.

Objective 3: Restore PAWS areas to create wider landscape scale native woodland linkages.

Restoring PAWS woodland can be linked to work undertaken to protect and enhance the SSSI. Western Hemlock and Rhododendron are potential threats to PAWS restoration, particularly where natural regeneration is the regeneration method.

Objective 4: Maintain a diverse range of conifer species of different ages in order to maintain the quality of Red Squirrel habitat. Consider how CCF and Long term retentions can contribute to this objective.

Maintaining conifer diversity both in age class and species is the key consideration in maintaining/enhancing Red Squirrel habitat, and this approach provides benefits for wider ecological and economic resilience.

Objective 5: Timber production from a wide range of conifer species with the emphasis on matching species with site.

The current forest was established with timber production as a primary objective and this remains an important element of the multi-purpose forestry approach. Productive forestry can deliver both economic output and other ecosystem services and can facilitate active management of the site. Active management can enhance the control of Invasive species and facilitate the provision of recreational access. With an altitudinal range across the site of 20 to 320m and generally good well drained soils, the range of species capable of growing is wide on the lower slopes, but narrows on the upper slopes, with Sitka spruce being the most suitable species here.

Objective 6: Evaluate the PAWS restoration areas for productive broadleaves.

Productive broadleaves grown on PAWS area offers the potential to actively manage the site and control undesirable invasives and to achieve an economic output from the forest. Management access is important for productive broadleaves so steep and rocky slopes are not conducive to this approach. Areas with potential are limited within the LMP area.

Objective 7: Maintain and enhance the recreational infrastructure.

Car parking provision along the Lochside provides opportunities for recreational enjoyment and appreciation of the views. Much of the recreational access is taken along the existing forest road network which provides a range of routes. The road following the Loch shore on the west side offers a level cycle route away from traffic and with fine views across the Loch. This route can be linked with higher level roads on the east shore to provide a challenging circular route of 21miles in length, and this is a promoted route known as the Lock Eck Loop.

Objective 8: Maintain and enhance water quality in relation to both private and public water supplies.

High water quality is essential for both ecosystem and human health. Areas of the catchment are vulnerable to landslip and these can have a detrimental impact on water quality. Riparian woodland and protection forest can reduce both the incidence and impacts of landslips.

Objective 9: Examine opportunities for woodland expansion.

Opportunities for planned formal woodland expansion are limited; however regeneration of mixed species along the woodland margin offers the potential to enhance the landscape fit of the forest and to improve the edge habitat. Sporadic conifer regeneration is likely to have the overall effect of increasing biodiversity and the occurrence of prey species for Golden Eagles; however dense conifer regen could have a detrimental impact of open habitats. The section of open hill at the SE corner of the LMP area (just north of Inverchapel) is beginning to develop as Birch woodland and this natural ecological succession is welcome.

6.0: Analysis and Concept

The delivery of each of the whole plan objectives has been analysed in terms of the opportunities and constraints in the table below. This in turn has influenced the design concept and subsequent management proposals in each zone as relevant.

Objective	Opportunities	Constraints	Concept
Objective 1: Protect and enhance designated conservation sites within and adjacent to the LMP area.	Measures taken in relation to this objective also deliver other objectives including PAWS restoration and enhancing/maintaining water quality. The SSSI boundary is clearly defined by the forest road for much of its length, and this provides a useful demarcation for management operations including the control of invasive species and conversion to native broadleaves (NBL). Forest cover can have a positive impact on reducing landslips which can maintain water quality. Site enhancement work is already well underway via an agreed management plan with SNH.	Many of the forest areas falling within designated sites or adjacent to them are productive conifer sites. Ongoing management and control of deer and invasives is also costly with no revenue generated. Enhanced linkages can also facilitate the movement of pathogens and invasive species. The control of Western Hemlock is costly and in some areas may be impractical due to budgetary constraints.	The approach in the plan is to continue to restore PAWS within the SSSI and to control Rhododendron, Sitka Spruce and Western Hemlock within the SSSI. There are small areas of mature Norway Spruce and Douglas Fir within the SSSI which support raptor nest sites and provide ideal Red Squirrel habitat. These areas will be retained with the long term objective of conversion to Native Woodland. These species have limited invasive ability and will have no adverse impacts on the integrity of the site or the ecological succession. The wider expansion of NBL areas linking to the SSSI NBL cover (often via riparian zones) will enhance ecological linkages and resilience.
Objective 2: Maintain a visually diverse woodland which is in keeping with the landscape character and integrated with neighbouring properties. Enhance the landscape by use of appropriate silviculture, coupe design and restocking proposals.	The existing woodland structure enhances the current landscape. Its strengths include: varied species and age structure; interlocked NBL and conifer areas reflecting landform; mature mixed conifer enhancing the roadside and pathside environments; a phased transition to the open ground. The forest has been restructured and a road network is in place. The design of coupe shapes has a significant landscape impact in most areas of the forest. CCF and long term retentions can play an important role in the landscape while also contributing to economic and ecological diversity.	Restructuring has been determined by the extent and quality of the road network with interventions in badly roaded areas being limited. Windfirm edges are limited and often follow linear features such as roads and watercourses. Harvesting is problematic on steep slopes and rocky ground and this constrains coupe design. Growth rates are inversely related to altitude and this leads to a tiering effect which is exacerbated by the above factors. Some areas of Larch are defined by edges that are in conflict with landform. Many of the potential CCF areas are difficult to manage in terms of access and the succession/regeneration of the stands.	Larger scale coupes are often the only option in the absence of windfirm edges and offer the advantage of making road improvements/extensions more cost effective. Seek to avoid tiering of coupes by extending coupes across roadlines where practicable. Seek to retain areas of mature diverse conifers where they have the highest impact along the A815 and path network. At restocking build in future green coupe boundaries that are sympathetic to landform and are practicable in terms of future harvesting. Increase interlock of NBL and conifers and use NBL corridors as future coupe boundaries. Assess potential CCF stands and Long Term Retentions in terms of practical constraints such as regeneration and vulnerability to colonisation by invasive species.

Objective	Opportunities	Constraints	Concept
Objective 3: Restore PAWS areas to create wider landscape scale native woodland linkages.	PAWS restoration is underway across many areas of the forest and in many places enhances the SSSI and its environs. The establishment of non-intervention native woodland can create protection forest on areas with difficult access and these can contribute to slope stability and water quality.	Much of the productive area that can accommodate a wide range of diverse conifers is located on PAWS sites and this reduces site diversity. In contrast much of the area outwith PAWS zones has a more limited range of species options, with Sitka Spruce being the only productive option in many areas. Restoring PAWS areas by natural regeneration in areas with high levels of Rhododendron and Western Hemlock can be difficult and expensive. This difficulty is exacerbated by steep and rocky slopes which makes access and monitoring difficult.	Continue PAWS restoration with the emphasis on the SSSI area and adjoining areas in terms of Rhododendron and Western Hemlock regeneration control. Assess areas for potential productive broadleaved management, and consider planting where this is an option.
Objective 4: Maintain a diverse range of conifer species of different ages in order to maintain the quality of Red Squirrel habitat. Consider how CCF and Long term retentions can contribute to this objective.	There are a diverse range of conifer species and age classes across sites with many areas suitable for long term retentions. These retentions can deliver a range of other benefits.	The removal of Larch as a restocking option and the policy of bringing forward Larch fellings to reduce the impacts of P. ramorum will have adverse impacts on conifer diversity and age class range. Many of the mature conifer areas are located within the SSSI and PAWS areas and are targeted for conversion to NBL. Western Hemlock makes a limited contribution to Red Squirrel habitat due to the low feed value of its cones/seeds. Many older stands of Norway Spruce (NS) are vulnerable to colonisation by more aggressive conifers and rhododendron and this limits the extent of CCF that can be applied to the LMP area.	Maintain conifer species diversity for Red Squirrel habitat, landscape, ecological and resilience reasons. Retain areas of mature mixed conifer where these are stable and regeneration is in line with wider objectives. Seek replacement species for Larch which contribute to Red Squirrel habitat and landscape. These may include Scots Pine, Norway Spruce, Douglas Fir and Aspen.

Objective	Opportunities	Constraints	Concept
Objective 5: Timber production from a wide range of conifer species with the emphasis on matching species with site.	Much of the site is capable of growing a wide range of productive conifer species, with the best locations often being situated where they might have the highest landscape and aesthetic impact. There is a wide range of species of mixed age already contributing to a productive economically viable forest. Growth rates across the forest for many species are potentially high, with Sitka Spruce being the best adapted species for the upper slopes. In terms of productive silviculture CCF options are constrained by steep and rough slopes.	Diverse conifers are more difficult to establish and often require expensive deer fencing to ensure establishment. Growth rates of diverse conifers are generally slower than Sitka Spruce and market demand is currently lower. CCF tends to result in the dominance of hardy aggressive species such as SS and WH which can narrow species diversity over time.	Maintain core areas of productive conifers across the site to provide a timber/wood resource and to spread roading costs across a second rotation. Use active management and clearfell sites to control invasives and buffer more sensitive sites by using the competitive ability of SS to supress undesirable invasives. With many areas being converted to unproductive NBL, species/provenance choice and management on the remaining productive areas should focus on maximising production to compensate for lost productive areas. Focus CCF stands on areas where they can be practically managed and have the highest impact on landscape/amenity. Productive broadleaves should be targeted on areas where access for harvesting and management is good such as in Bernice Glen.
Objective 6: Evaluate the PAWS restoration areas for productive broadleaves.	Productive broadleaves can deliver ecological and landscape benefits and long rotations can increase forest stability and resilience. The active management facilitated by a productive element can enable problem species such as Rhododendron and Western Hemlock to be more effectively controlled and can help to justify the cost of deer fencing. Birch regenerates well across the LMP area and many areas undergoing restoration to NBL could be thinned to produce revenue in the medium term, this process may also encourage secondary successional species such as Oak to become established.	In ecological terms, and all other factors being equal, where good seed sources of appropriate native stock exist then natural regeneration is desirable. Stands regenerated by natural regeneration can be managed as productive stands (as per Oak in Normandy) however establishment can be slow, stocking uncertain and respacing costs high. Much of the native timber seed source has often been inversely selected for timber quality. Access is essential for management of productive broadleaves so areas with potential within the LMP area are limited.	The proposed NBL restock area in Bernice Glen is not a PAWS site and this represents the most appropriate area for productive broadleaves. Many other areas with good Birch regeneration and proximity to the road have the potential to be manged productively, but this is best considered on an ad hoc/reactive basis as the stands develop, rather than strategically as natural regeneration can be unpredictable. Commercial thinning of broadleaves along the roadsides can enhance the recreational environment and increase biodiversity.

Objective	Opportunities	Constraints	Concept
Objective 7: Maintain and enhance the recreational infrastructure.	Landscape management (Objective 2) plays a key role in delivering the recreational backdrop particularly for users of the A815. Established parking and picnic areas along the Loch offer a high quality recreational experience for users of all abilities. The forest road network offers a range of routes of varying lengths, with options for circular walks or cycle trips. The location of these routes often fits well with the location of tourism features outwith the LMP area.	The use of forest roads for recreation can pose problems for the management of timber harvesting operations. Recreational infrastructure requires a high standard of maintenance and is costly.	Maintain the existing infrastructure subject to budget availability. Seek external funding and collaborative ventures to develop new or upgraded infrastructure where demand can be demonstrated. Use silvicultural management and good landscaping principles to enhance the appearance of the forest both in long views and along road path edges where close up views and individual trees are important. The creation of transient viewpoints as clearfelling and restocking progresses opens up new vistas which add greatly to the recreational experience at no cost.
Objective 8: Maintain and enhance water quality in relation to both private and public water supplies.	The current water quality is good with many of the riparian zones already carrying established NBL which has a positive stabilising and buffering role. Forest cover generally can reduce the incidence and extent of landslips. Flood risk can also be reduced by forest cover. There is synergy between PAWS restoration and enhancement of the riparian environment. Dense Western Hemlock (WH) regeneration and inaccessible windblown timber can help to bind slopes and prevent debris reaching the Loch. There is potential in the longer term to convert areas to non-intervention protection forests where harvesting access is difficult and slopes are steep. This conversion process could be achieved by harvesting and restocking with appropriate species or natural regen or by non intervention to create a matrix of standing and fallen timber acting as physical barriers to slippage and regeneration providing further binding of the soil.	Steep slopes and the rocky terrain limit the potential for Continuous Cover Forestry (CCF) on site. As a result clearfelling is the preferred silvicultural approach on many areas, but this brings with it an increased risk of soil movement into the riparian environment and slippage down the slope. Non intervention areas are by definition unproductive in terms of timber output, but may deliver other significant ecosystem service benefits.	While tiering of felling coupe location can have adverse landscape impacts, the concept of varying coupes and age classes across the profile of the slope offers considerable potential to reduce the scale and impact of landslips. Felling coupe design and phasing will therefore seek to create buffer zones of varying crop age and structure across the slope to reduce the risks of landslips gaining momentum down the slope. Strengthening the non intervention NBL riparian buffer zones will also deliver multiple benefits. Operationally following the Forest and Water UKFS Guidelines will help to minimise impacts. The most southerly section of the LMP area on the west shore has been designated as a long term retention due to access issues and this should be reviewed at the next ten year review. Leaving this area as a non intervention area may deliver more ecosystem service benefits than attempting to access and harvest this area.

Objective	Opportunities	Constraints	Concept
Objective 9: Examine opportunities for woodland expansion.	The LMP area includes significant open ground with abundant seed sources for regeneration. Natural regeneration can create an enhanced woodland margin benefiting landscape and ecology.	Most of the open ground has been excluded from past planting due to its site limitations for forestry. Regeneration of NBL may be more constrained by deer and SS regeneration may become dominant.	Monitor the progress on woodland expansion by natural regeneration. Control deer across the LMP area to increase the diversity of regenerating species.

7.0: LMP Proposals

See maps *M2a and b* which show the current species in the north and south of the LMP area respectively. Maps *M3a and b* show the current age class in north and south of the LMP area respectively.

7.1 Issues

- PAWS Restoration.
- Protection of designated sites.
- Control of Invasives, mainly Rhododendron and Western Hemlock
- Timber production.
- Road construction, upgrade and maintenance linked to harvesting programme.
- CCF areas play a role in landscape and slope stability, but options are limited by steep, rocky slopes, poor access and the presence of strong regeneration of undesirable species.
- Recreation and high visual impacts within the National Park.
- Public and Private water supplies.
- Deer management
- Archaeology
- Control of non native regeneration in the SSSI is a priority but tolerance thresholds need to reflect the practicalities of control and the impossibility of achieving zero non native species regeneration.

7.2 Key challenges

- Managing PAWS restoration using natural regeneration over a prolonged time period. This is complicated by selective deer browsing and the presence of vigorous Rhododendron and Western Hemlock across wide areas.
- Monitoring and control of sites generally in relation to species composition and invasive challenges. Management and operational access is constrained in places.
- A high roading density is required to manage and harvest the forest due to the steep, rocky and uneven slopes. PAWS restoration transfers productive timber areas into non productive areas (although these areas deliver significant ecosystem services), and this further increases the road cost in relation to harvestable area.
- Harvesting maturing Larch in line with *P.ramorum* policy and finding replacement restock species with a similar landscape impact and resilience to deer pressure.

- Maintaining conifer diversity in terms of age class and species.
- Landscape management to remove stocked areas at odds with landform and to design coupes of a scale and shape that makes a positive impact on the landscape. This process is complicated by limited amount of windfirm edges that are sympathetic to landform.
- Deer control and management of fencing costs in an area where finding a workable fenceline can be difficult.
- Control of slope stability on areas unsuitable for CCF and where clearfelling is the only silvicultural option.
- Implementing challenging productive broadleaved silviculture in an environment where experience, culture and markets are orientated towards softwood silviculture and marketing.

Tree cover can play an important role in reducing landslips by binding the soil, and acting as a physical barrier to rockfall.

7.3 Felling and CCF proposals

7.3.1 Clear felling

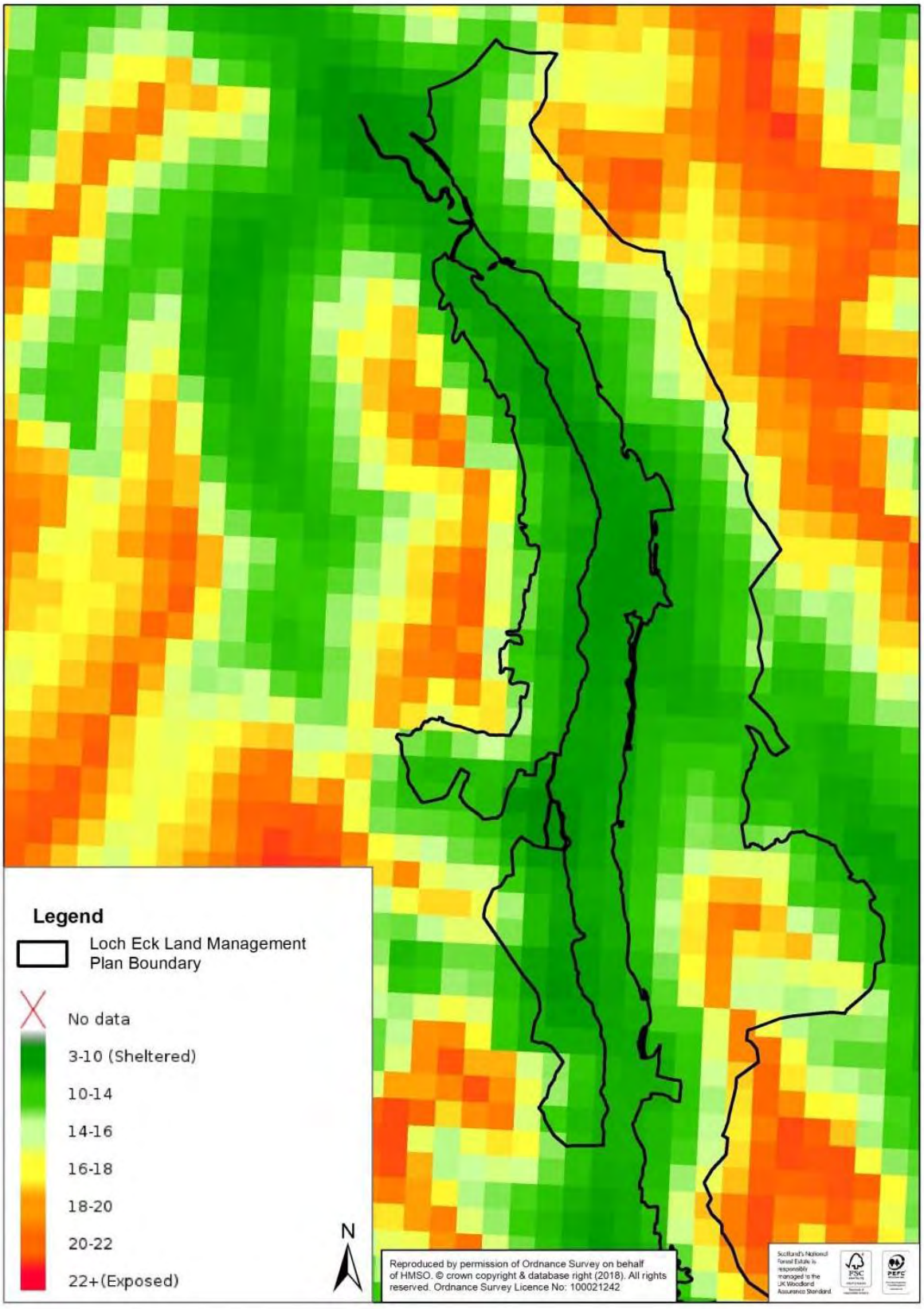
Opportunities to manage the forest through clear fell have been identified and are included on Map *M11a and b Management (north and south)*. Felling coupes are influenced by past restructuring and crop characteristics. Areas of Larch will be prioritised for felling as soon as the normal rotation length is approached. Access to Larch areas is problematic in some areas, although road upgrades required to harvest timber over the next ten years will reduce the area of landlocked Larch.
Mature WH stands within or close by the SSSI have been prioritised for removal.

The felling proposals and roading programme have been considered in tandem. While general established principles of smaller coupes on the lower slopes and larger coupes on the upper slopes as landscape scale have been applied, the narrow width of the forest in places and practical harvesting considerations (such as slope and access to roads) mean that larger scale coupes on the lower slopes are sometimes essential, particularly where there are no windfirm edges to work to.

Larger coupes also offer advantages in terms of reduced deer damage and better control opportunities, more cost effective marketing/working and better scaled restructuring options. Coupe design has retained, wherever possible, buffer areas across the slope to limit landslip impacts.

7.3.2 Thinning

Opportunities to thin existing woodland have been identified and are included on Map *M12a and b Thinning (north and south)*. Proposed thinning areas are mainly located on the less severe slopes and well roaded areas where crop age and species are conducive to thinning. Steep slopes and access issues limit thinning potential. The site is generally sheltered (*Text map 4*) although localised funnelling and vortex effects can lead to high wind speeds in apparently sheltered areas.



Text Map 4: DAMS (measure of exposure) for LMP area

7.3.3 Continuous Cover Forestry (CCF)

Opportunities to manage existing crops through CCF have been identified and are included on the Map *M11 (a and b) Management (north and south)*.

As mentioned in the thinning section above, steep, uneven and rocky slopes reduce the areas that can be worked effectively under CCF, and the high maintenance cost and extent of the road network is another limiting factor. Conversely the soils and shelter available on site are well suited to a CCF system.

In terms of species and age class there are many areas of mixed conifer that have been well thinned and would seem to be ideal candidates for CCF, however many of these areas are under threat from Rhododendron colonisation and the conifer regen is dominated by SS and WH. These are often very productive areas but due to the complicating factors alluded to, CCF on these sites is likely to lead to high maintenance costs and a low productivity. The significant PAWS area converted to NBL means that production in the conifer areas should be optimised to maintain a balanced and economically viable forest.

CCF can have a very positive impact on slope stability compared with clearfell systems, however on very steep sites with the danger of rockfall and landslips, then non-intervention protection forest may be more appropriate as this has lower running costs yet has the potential to deliver important ecosystem services more effectively.

The approach in the plan has therefore been to limit CCF to areas of mixed conifers that have a high landscape and amenity value, and which can be worked. This includes some areas of younger crop. The vision is that these areas develop into stands of specimen trees with a high landscape value. These areas also have a high ecological value for species such as Red Squirrel and as raptor nest sites.

The problematic thinned Mixed Conifer areas as mentioned above will be clearfelled in a phased manner with restocking orientated towards productive conifer or PAWS restoration as appropriate.

There are also significant areas on the steepest and most inaccessible areas that realistically cannot be harvested. These by default non-intervention areas are often already diverse and will develop by natural processes. Fallen timber in these areas opens gaps for regen and can stabilise slopes as well as providing a deadwood reserve.

The areas proposed for CCF should be reviewed after ten years as upcoming young crops, markets, technology and environmental factors all affect the viability of the CCF option significantly, and wider application of CCF has the potential to deliver many benefits on this site if circumstances change.

7.4 Future habitats and species

Future habitats and species proposals are included on Map *M13 (a and b).*

The proposal is to expand the NBL area significantly. Riparian and other PAWS areas will be converted to NBL to widen the linkages and increase the resilience of the SSSI.

Paws Restoration site within the SSSI showing extensive NBL regeneration.

Mixed conifer species will be targeted on Long Established (woodland) of Plantation Origin (LEPO) areas and on the better soils. Sitka Spruce will become a more significant species outwith the PAWS restoration areas, and this will mitigate to a small extent the loss of productive capacity arising from PAWS restoration.

The increased rate of Larch removal and the targeted removal of WH means that expanding the area of diverse conifer is difficult. An expansion of the NBL area including a significant area of productive NBL in Bernice Glen will increase site diversity generally to compensate for a marginal decrease in the Mixed Conifer area over 20 years.

The desire to expand/maintain the area of diverse conifers is constrained by deer control and high fencing cost issues. Larch with its very high landscape impact is not now a restocking option, and Western Hemlock is not a welcome species in many parts of the site, this limits species choice to species that have a low landscape impact (and are indistinguishable from SS for most of the viewing public) and are sensitive to deer browsing. Aspen/Norway Spruce mixtures may offer an alternative option for highlighting landform and creating diversity, and low density Scots Pine on rocky knolls has the potential to create landscape impacts. These and a variety of other species will be considered for planting, especially in landscape sensitive areas of the plan.

Control of Rhododendron on clearfell sites either before harvesting or immediately post harvesting is desirable in order to avoid increased light levels encouraging Rhododendron establishment and increased vigour.

Conifer removal to favour Birch regeneration south of Whistlefield

7.5 Management of open land

Open ground is fairly limited on much of the site with the forest margin coming up against the march in many places. Above this areas of open ground outwith the LMP area are impacted by the forest margin in terms of regeneration of conifers and broadleaved species across the upper margin. The impacts here are generally positive in terms of ecology and landscape, although should SS regeneration become more dominant then this may have adverse impacts on open ground habitat.

There are extensive areas of open ground on the upper slopes in the south east section of the LMP area around Sligrachan Hill. The open ground running to the south along the loch shore is regenerating with Birch up to around the 300m mark and this process is likely to continue. The upper parts of the Drynain Glen contain remnant NBL areas and with deer and grazing control these areas have the potential to expand naturally. Much of the open hill is exposed and rocky and has a high value as open ground habitat. The management of deer grazing and feral sheep are the only management tools available. A reduction in grazing pressure is likely to lead to the development of a natural ecosystem with NBL in the sheltered burns and open ground across the rocky exposed areas with thinner soils. However this situation is complicated by the potential for rhododendron and Sitka Spruce to colonise the area, particularly where grazing is reduced.

Natural conifer regeneration playing a positive role in softening the upper margin and enhancing the landscape.

7.6 Other proposals

Road maintenance will proceed as and when necessary during the plan period. This might include removal of roadside vegetation including occasional trees in excess of 10cm dbh. Similarly management associated with wayleaves and other facilities may include removal of some larger individuals or groups of trees. The volumes involved will not amount to more than 40m^3 per annum and a log of volume removed will be maintained..

8.0: Critical Success Factors

The main critical success factors within the ten years of this plan are:

- Road construction, upgrade and maintenance linked to the felling programme.
- Clearance of windblown areas in high value crop areas.
- Maintain a critical mass of productive conifers over the next rotation in order to justify high roading costs.
- Deer control and fencing in relation to PAWS restoration and establishment of softer conifer species.
- Control of invasives with the emphasis on Rhododendron and WH. This is particularly relevant to clearfell sites either pre-cutting or immediately after felling. This factor is directly linked to deer control as rapid establishment of desirable species reduces the impact of invasives and reduces control costs.
- Management of future P.ramorum outbreaks and accessing the Larch areas. Establishing diverse species with an impact on the landscape akin to Larch.
- Retain water quality within the public water supply catchment, and in relation to private water supplies.
- Retain and enhance slope stability by phased felling, buffer retention and the retention of non intervention areas.

9.0: Management Prescriptions

9.1 Forest Management Types

Clearfelling

This harvesting approach will be utilised where economics, access or soil conditions preclude Continuous Cover Forestry. Coupe design will seek to work with the landform and scale will vary with larger coupes on the upper slopes scaling to smaller coupes on the lower slopes. Building on the current age class diversity will be an objective, however the fast growth rates associated with the dominant SS cover may limit the options for retaining crops past the standard 30 to 50 year rotation length.

The presumption is that no felling will take place until the neighbouring restock areas have reached 2m.

Clearfelling is used as a management approach to remove Larch species where there is P.ramorum infection, and to salvage windblow.

Clearfelling provides more flexibility for restructuring. Large coupes can be restructured with more diverse species and new internal windfirm boundaries to provide an enhanced landscape in the second rotation and more coupe options. Large clearfells also offers an enhanced area for deer control and the potential to establish deer sensitive species without fencing.

In each coupe control of Rhododendron or WH around the harvesting period before it responds to increased light levels is the most cost effective approach to strategic control.

Continuous Cover Forestry (CCF)

Irregular shelterwood is the preferred CCF method. Areas of younger crop coming into CCF management will be line thinned to facilitate access with intermediate thinning between the racks. Older crops will be managed via selective low intensity thinning with the intention of retaining specimen trees as long as possible to deliver multiple benefits for landscape and ecology.

The CCF approach of increasing light levels on the forest floor runs the risk of encouraging the germination of undesirable species and Rhododendron, and this factor should be monitored. Where the CCF stand is not progressing in a desirable direction then reversion to clearfelling may be appropriate, and may provide a more cost effective solution than expensive interventions for an indeterminate time.

Long Term Retentions (LTR)

Some areas of crop have been identified as areas of Long Term Retention (LTR). These are often areas with severe access issues or where it is environmentally beneficial to retain these areas. Subsequent plan reviews may move these areas into CCF management or integrate future felling with the surrounding crop as appropriate.

These areas can provide important areas for Red Squirrel and nesting birds and can help to stabilise slopes. There is the potential for these areas to be very diverse and to regenerate naturally, with masses of windblown timber providing cover for wildlife, a deadwood reserve and protection of regeneration from browsing. This effect is already occurring in many areas, however the regeneration is often dominated by WH. While this outcome has slope stability benefits it is probably less optimal in terms of biodiversity.

Steep slopes limit management options.

9.2 Thinning

Thinning areas are limited across the site due to forest structure and access.

Thinning can increase tree resilience and create microsite climatic conditions that are less beneficial to a range of pathogens.

Increased light levels and soil disturbance post thinning together with deer control may increase the amount of NBL regeneration, which is a desirable outcome, but it may alternatively increase the amount of aggressive conifer regeneration or increase the risk of invasive species colonising the site. Monitoring from thinning outcomes should inform the progress and extent of the final thinning programme. Thinning and continuous cover systems based on SS may still deliver many benefits in terms of slope stability and economic output.

9.3 Future Habitats and Species

Permanent native woodland habitats creation is proposed throughout the woodland to link the current NBL resource, PAWS restoration areas, and designated sites. The W17 NVC type would reflect the climax ecology of the locality. Although natural regeneration would normally be preferred, given the size of many coupes and the limited seed source, planting will be the main method of establishment. Natural regeneration will be used where seed source is thought to be sufficient.

Areas of mixed conifer will be targeted on suitable sites which can be protected from deer impacts. Norway Spruce, Scots Pine and Douglas Fir will be the dominant diverse conifer species proposed, but post felling site appraisal will inform the final species choice. Aspen in mixture or as small pure stands may have a role in highlighting landform and increasing landscape diversity.

ESC (Ecological Site Classification) indicates that a wide range of species are potentially suitable for the site on the lower and mid slopes, however species choice on much of the upper slopes is largely limited to Sitka Spruce.

As indicated above, the ESC data suggests that there are a wide range of species potentially suitable for the lower slopes of the site, and this remains fairly constant under climate change models. Species range declines with altitude.

Climate change models suggest that the general trend will be towards a significantly warmer climate with higher winter rainfall and lower rainfall in the summer leading to a partial soil moisture deficit during the summer months. Increased rainfall and sudden heavy downpours may exacerbate the potential for slope instability in vulnerable areas, and future forest cover and species choice will take this into account.

In terms of the more general species choices for the next rotation the climate change models have limited impact on species choice according to ESC models. However this level of climatic change is likely to interact in the longer term with soil characteristics and this may have a positive impact on soil structure and widen the range of species potentially suitable for the site. There are also threats to the suitability of SS as a timber species if severe summer droughts become the norm. Suggested species provenance is summarised in the table overleaf.

A number of other factors have been considered in addition to ESC data, and these include:

- Current actual growth rates.
- Economic value and physical volume production.
- Landscape.
- Ecology and linkages.

The impact of tree diseases has guided species choice. *Phytophthora ramorum* in Larch; Dothistroma needle blight (DNB) and Ash Dieback have all had an impact on species choice and crop management across the UK. Within the LMP area Larch and Ash would have played a key role in both landscape and production, but these species are currently unavailable as restocking options. This situation should be reviewed at intervals in light of prevailing guidance.

9.4 Operational Access

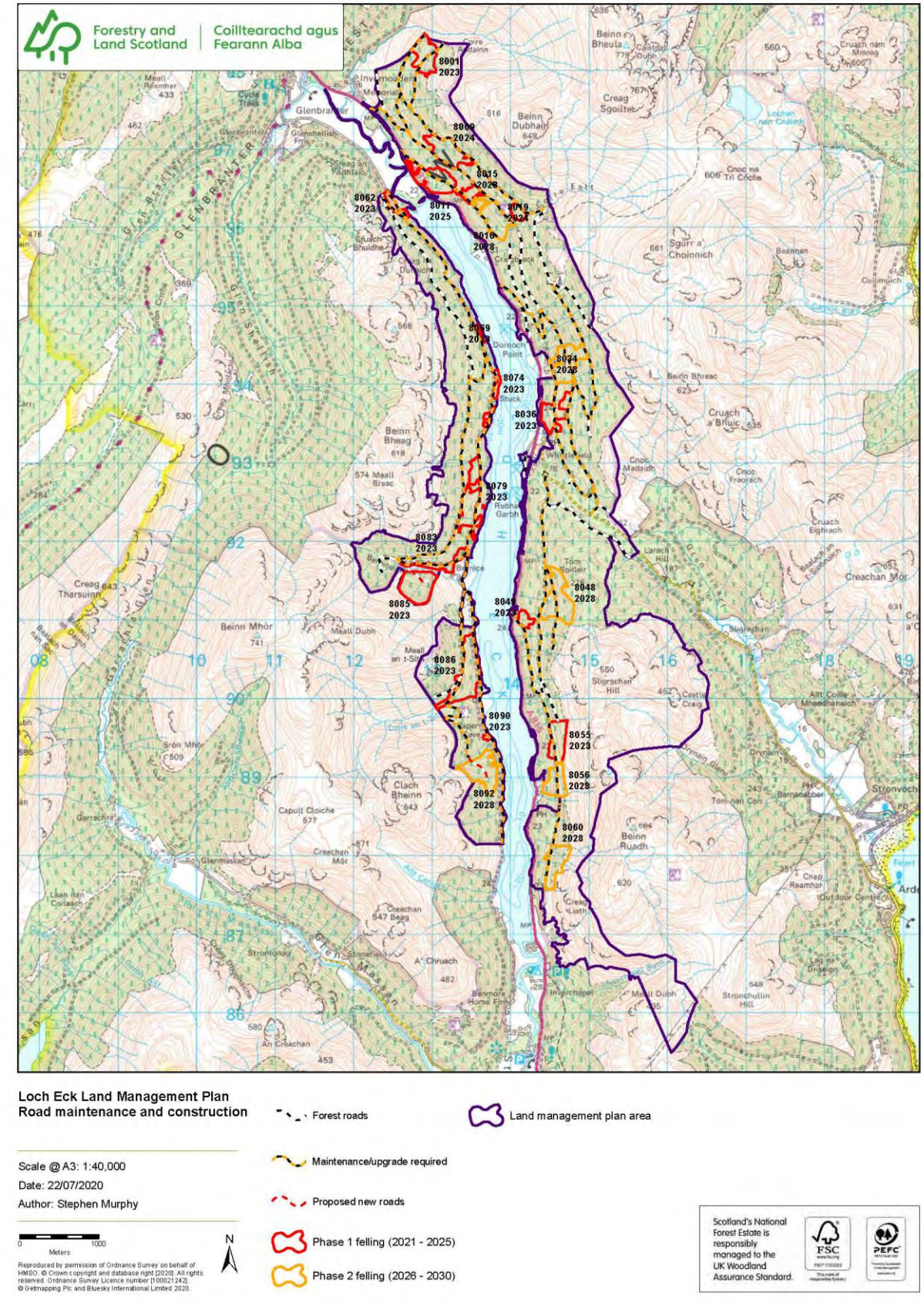
See map *M5 Roads and Transport*. The forest is well roaded generally, although many sections require upgrading (16100m see *Text Map 5* below). For Phase 1 harvesting, a new road section of 425m and bridge is proposed to reach the mature timber stand on the south side of Bernice Glen. Establishing productive broadleaves on this area post felling will make the best use of the investment in new roading and fencing of this block is straightforward in comparison with most of the plan area. For Phase 2 harvesting a 382m section of road is proposed to access the SW block.

Access tracks are required to facilitate restocking on sites across the plan area. The detailed layout and extent of these tracks will be determined post felling following a full operational site survey. A number of ramps will be required to enable harvesting machinery to access felling coupes from the forest road. The precise location of these will be determined during operational planning but the expectation is that there will be up to one ramp per 100m of road/coupe interface. Ramps will be approximately 3m wide and up to 15m long; they will not be treated as permanent features and will be removed when no longer needed.

Slopes are a constraint in many places with winch working and cable cranes being required to work areas effectively and safely. The relatively dense road network facilitates winch or cable crane harvesting. In some limited areas crops are practically inaccessible with even hand cutting being constrained by health and concerns.

LMP provenance guidance chart

Species	Guidance
SS	Improved QSS standard throughout
VPSS	Limited use in best locations
SP	High rainfall type specified as standard. W20
NSP	From the nearest appropriate zone near CFR areas
LP	Only ALP being used in mixture with SS on poorer sites
DF	Seed stand or coastal origin
ESF	Czech or central European
NF	Registered seed stands
GF	Scottish registered seed stands
WH	Registered seed stands with low fluting
WRC	Scottish seed stands
NS	Seed stands, Eastern European or Harz
JCR	Northern Japanese range
NBL	Region of Provenance 10, Native Seed Zone 106
XC	PSSB will advise on any other minor species
Notes: PSSB can provide the most up to date guidance on provenance selection including advice on best suited seed stands. Virtually all seed supplied by PSSB comes from registered seed stands and is based on geographic area compatibility. Use of VPSS has declined as seed orchard QSS improves and this also has a wider genetic base for resilience purposes.	



Text Map 5: Roading operations during the plan period

9.5 Deer Management

See Appendix V: Deer Management Plan.

Reducing deer numbers and associated negative impacts is vital in order to deliver a range of plan objectives.

Deer often seek shelter in woodland in heavy weather, and consequently the upper forest margins are often areas with high levels of deer activity in all circumstances. When control efforts are intensified, then deer use of dense cover increases and nocturnal behaviour becomes the norm, and this again intensifies the grazing/browsing pressure on the woodland fringe.

Restocks of vulnerable species are currently deer fenced, and it is proposed to continue with this approach.

Effective deer control involves committing resources in terms of personnel and equipment in a strategic way. The provision of good access for stalking and carcass extraction means that this commitment of resources is put to the best use. Ranger tracks can facilitate control and extraction on restock site which are otherwise very hard to manage from a deer perspective.

Deer glades across the site may be of limited value and would probably represent a poorer investment in terms of resources than improving access. In the longer term deer glades within the larger NBL areas would be beneficial.

The proposed extensions to the road network and restructuring will also improve the deer control environment and allow the deer management resource to be more efficiently used.

When deer control intensifies the law of diminishing marginal returns quickly comes into play, with escalating resources being required to control a declining number of deer. Deer are also very responsive to hunting pressure, and a strategic grouping of vulnerable restocks combined with a focused control effort on these areas during establishment, has the potential to deliver adequate protection, cost effectively.

Large scale felling coupes and a reasonable number of similarly phased fellings across the Forest can help to reduce deer impacts on restocks. Conversely large areas of thicket stage conifers can make deer control more problematic. In these circumstances moving deer in a coordinated manner can be the only effective control option.

9.6 Open Ground Management

Deer control is currently the main tool available for open ground management. Feral and marauding sheep are also a factor.

In terms of recreation, open ground along paths and at key viewpoints is important and these need to be considered in operational recreation plans. Clearfelling also creates transient open ground along recreation routes which can provide a range of novel and dynamic viewpoints.

Spread of Sitka spruce onto open hill ground is occurring in places. Consideration will be given to removing this if it threatens sensitive habitats.

9.7 Public Access and Core Paths

An integrated approach is required between the larger scale operations determined by the LMP and the smaller scale recreational plans required for managing the significant number of high value recreational assets within the LMP area. In addition the wider landscape quality is a key consideration and this is determined by large scale forest management activity. This integrated approach is partly facilitated by communication, having structures in place to encourage communication and involving the Communities, Recreation and Tourism (CRT) section in the LMP process.

Path closures will be minimised and diversions used. Clearfells can have a positive impact by opening up transient open views from elevated paths.

9.8 Heritage Features

There are a number of unscheduled sites and these are identified on the District GIS Layer, and these will be protected during operations in line with the UKFS. If new sites are found these will be mapped and recorded and protected from operations. New features will be reported to Historic Environment Scotland and West of Scotland Archaeological Society.

9.9 PAWS Restoration

There are a number of areas across the site where there are records existing on the Ancient Woodland Inventory. Ancient of Semi Natural origin (category 1a and 2a) woodlands will be restored as felling progresses.

Within the areas identified as Long Established of Plantation origin (1b, 2b and 3), the proposal is to establish or maintain mixed conifers with a NBL element.

PAWS restoration is a theme of the LMP and this issue has been considered throughout the LMP.

9.10 New Woodland Creation

Some adjustments to integral open ground areas are proposed, but these are minor in extent and would not constitute woodland creation.

Appendix I: Assessment of success of previous plan

Previous Plan Objective	Assessment of progress
Producing wood and marketable timber	Of the 115ha approved for felling 27ha have been felled. The phase 1 area in Bernice Glen was the largest being the largest coupe. Some of the areas along the Loch were deferred due to Red Squirrel and nesting raptor issues.
Managing or regenerating Forests or Woodland	Felled areas have been effectively restocked and regeneration is developing on the PAWS areas. Respacing and removal of WH regeneration has taken place to promote the NBL regen. Areas of SS and SP have been established.
Landscape Enhancement	Coupe design and restocking has been in line with the Forest Plan and has generally worked to enhance the landscape.

Maintaining and Creating Wildlife Habitats	The initiation of the PAWS restoration process has been a significant step and very positive from an ecological perspective. Removal of Rhododendron, WH and SS regen and respacing of BI across significant areas of the site has helped to promote the development of Native Woodland using Natural Regeneration. Many areas of dense WH regen and Rhododendron remain and targeting control on the SSSI may be the best use of scarce resources.
Recreation	Recreational facilities have been maintained and forest restructuring has created an interesting and diverse recreational environment with path margins enhanced by respacing and PAWS restoration work.
Conserving Archaeology	Archaeology has been located mapped and taken into account operationally in terms of felling the restocking. The setting of features has also been enhanced.
Water	Water supplies have been protected during operations, and enhancements to riparian zones will create long term benefits in terms of water quality and resilience to adverse impacts.

Apart from the felling programme, the Plan objectives have been largely met, and are still relevant. They have informed the objectives identified for this new plan, alongside additional information obtained during the scoping exercise.

Appendix II: Background information

The majority of the land that lies within the Loch Eck LMP has been managed by the Forestry Commission since 1952.

II/1.0 Physical site factors

1.1 Geology, soils and landform

The solid geology underlying the site is composed largely of psammite and pelite. There are only limited areas of superficial deposits comprising glacial diamicton till.

The soils range from brown earths to ironpans with some podzols. Peaty ironpans occur on the upper slopes. Areas of deep peat are very limited and are reflected in poorer growth and checked crops.

The landform of the LMP area is dominated by Glacial features, with the main Glen being broken by short side Glens often with rocky cliffs on the cirques. Terraces of rocky cliffs occur across the slopes with the western sides being generally steeper and more rocky. Soil movement and rockfall are a feature of the site. The broad sweep of the Glen is a large scale landscape feature, however the scale is broken up by numerous distinctive small scale rock outcrops which are prominent in the landscape.

1.2 Climate [1]

Mean annual temperatures in this region are about 9 degrees centigrade, with February the coldest month and July the warmest month. West Scotland is one of the more exposed areas of the UK, with strong winds being associated with the passage of deep depressions. While the glens and lower slopes are sheltered to a great extent by terrain, this region is characterised by the strong gale force winds that are more frequent on exposed hill tops and elevated slopes. Eddying winds and funnelling can lead to very high wind speeds even in apparently sheltered sites depending on wind direction. The average annual rainfall for western Scotland varies between 1000mm and 3500mm, considerably wetter than the east coast of Scotland. The continentality is classed as Oceanic.

Therefore, while the forest is generally accessible all year round, both thinning and felling programmes need to take into account the generally high rainfall levels as well as storm rains associated with sudden cloudburst.

[1] Summarised using data from the Met Office Regional Climate site for Western Scotland: http://www.metoffice.gov.uk/climate/uk/ws/

1.3 Water

There are 12 private water supply points within the forest.

Loch Eck which is the main water supply for the Dunoon area.

When felling and restocking are carried out, the UKFS Forest and Water Guidelines will be strictly adhered to. Timber extraction will normally avoid crossing burns or main drains, but, where necessary, each crossing point will be piped or bridged.

All felling and restocking will comply with the Controlled Activities Regulations (CAR) 2011 General Binding Rules with respect to appropriate buffer strips between any new planting and the watercourses and water bodies.

Site assessment prior to forest operations will identify recommended actions to meet these requirements. Particular care will be exercised in the vicinity of private water supplies. The locations of these will be shown in constraints maps at the operational planning stage. During operations supplies will be protected and alternative sources put in place if necessary. At restocking appropriate buffers will be established around them.

The status of the water body in the LMP area is "Good".

II/2.0 Current land management

2.1 The existing forest

2.1.1 Species, age structure and yield class

The LMP covers an area of 1912 Ha, comprising 253 Ha (13%) of mixed conifer forest (incl. felled area), Sitka Spruce 833Ha (44%), 146 Ha (8%) of Broadleaves and 676 Ha (35%) of open ground. Felled areas total 5Ha (0%) and these were former conifer areas.

Sitka Spruce is currently the largest component of the forest. The broadleaves are mainly native with Oak and Birch being the dominant species.

The broadleaves are scattered across the plan area but tend to be located mainly along the Loch shore and in the steep burns. Regeneration of NBL is strong although it can be checked by deer browsing.

Norway Spruce , Douglas Fir and Larch are the most common diverse conifers across the LMP area.

2.1.2 Access and Roading

The forest is generally well roaded in terms of layout, however many of the roads require significant upgrade and maintenance costs can be high due to slope instability. New roading and road upgrades required over the next ten years are shown in section 9.4

2.1.3 Continuous Cover Forestry (CCF) Potential

CCF can play a very useful role in slope stabilisation, however slope steepness, profile and rockiness are severe constraints to CCF management. In many areas of the LMP, particularly on the south eastern section areas of well thinned NS are on the face of it ideal candidates for CCF. However the regeneration of desirable species in these areas is negligible while the Rhododendron, in response to higher light levels at the forest floor, is thriving. Dealing with the Rhododendron is complicated by steep rough slopes and the forest cover. A continued CCF approach in these areas will lead to a steady buildup of Rhododendron or necessitate a very expensive ongoing and indeterminate control programme. In these areas clearfelling offers the opportunity to deal with the Rhododendron and to secure the establishment of the next rotation rapidly. This rapid establishment of productive conifers at a high density shortens the Rhododendron control period as the shading from the conifer crop will supress the Rhododendron. In a typical CCF context, even when it is developing as planned, there will always be a diverse matrix of open ground through the stand which allows Rhododendron to perpetuate itself.

Areas of mature mixed conifers with a high landscape and amenity value (associated with the road and lower slopes) have the potential to be managed as CCF, and some areas of younger conifers on the more gentle slopes could also be brought into CCF.

The proposed productive broadleaved woodland area in Bernice Glen could be managed as CCF, and areas of accessible NBL throughout the forest may have CCF potential, which should be evaluated as they mature.

2.2 Biodiversity

2.2.1 Habitats and species

Red Squirrel, Pine Marten, Wild Cat, Badgers, Bats and Otters are present in the forest. Scheduled birds nest within the forest and will be considered in line with the law and best practice in relation to any operations.

The LMP area features significant areas of mature native woodland of high conservation value however much of this is fragmented.

2.2.2 Riparian habitat

The current native woodland cover is focussed on the Loch shore and steep burnsides which has a positive impact on water quality.

Strengthening these riparian woodlands and creating better linkages would increase the resilience and ecological value of these fragments.

2.2.3 Invasive species

Rhododendron is present across the site with the focus on the lower slopes. Past control efforts have been effective but ongoing control and monitoring is required.

Western Hemlock (WH) is widespread with dense regeneration across parts of the SSSI and immediately adjacent to the site boundary. Control of WH in this setting requires an intensive use of resources for an indeterminate time.

2.2.4 Potential pests and diseases

There is one active P ramorum site in the LMP area at the time of writing, being dealt with by means of an SPHN. In line with policy Larch is being prioritised for felling as it approaches rotation length.

Ash dieback is widespread across the area and will impact negatively on landscape and biodiversity.

2.3 Landscape, landscape designations and visibility

The LMP lies within the Loch Lomond and the Trossachs National Park and has a very high landscape impact from the A815 and a wide range of walking/cycling routes and recreational vantage points.

2.3.1 Landscape character

The dominant Landscape Character Type is classed as "Forested Glen Sides". Opportunities for landscape change are described as follows:

When opportunities arise through forest felling and restructuring processes:

- Create graded naturalistic transitions that respond to topographic features, between upper and edge forest margins and the surrounding open landscapes.
- Create more naturalistic , preferably continuous cover forests (CCF), or convert plantations to native wood land, preferably with a high proportion of open ground .
- Reinstate PAWS through forest restructuring .
- Restructure forests and open ground around way-leaves and forest roads to soften geometric lines in the landscape.
- Enhance recreational routes through the Forested Glen Sides from lower glens to upper slopes, with opening up of new routes and restructuring of forests around existing roads and paths, incorporating irregular sequences of open space and opening up viewpoints.

2.3.2 Visibility and Viewpoints

See map M1 Location and Viewpoints.

Views from the A815 offer a sustained visual experience of intermittent distant views of the far Lochside broken by roadside tree cover. The roadside margin is diverse with mixed conifer and broadleaves contributing to a landscape scale forestry experience. The combination of water hills and large scale diverse forestry creates a high quality landscape and the parking/picnic places offer an ideal vantage point to appreciate the landscape from.

Views from the road network are also important for recreational users, and felling offers the opportunity to create transient new viewpoints as users travel the roads.

2.4 Social factors

2.4.1 Recreation

The forest provides and forms the backdrop for a wide range of recreational activity, with the landscape playing a key role in peoples enjoyment.

Recreational users fall into three general groups: passive users passing by on the A815 and utilising parking and picnic spots; active users using the forests roads and paths for cycling and walking, and users both passive and active who are using facilities around the Loch including the Caravan Park and associated water sports and the activity centre.

The forest also provides part of the context and setting for journeys to and from Benmore Gardens and Pucks Glen.

2.4.2 Community

The Forestry Commission has played a key role in the rural development of the area for nearly 100 years. Glenbranter and the settlements around Benmore have a strong forestry and farming connection, and tourism is an important employer in the area. The surrounding communities are therefore diverse but a strong forestry culture is still prevalent.

2.4.3 Heritage

When felling and restocking are carried out, the Forests and Historic Environment Guidelines (2011) will be strictly adhered to. Site assessment prior to forest operations will identify potential areas of archaeological interest and detail recommended actions to ensure that the Guidelines are implemented.

Archaeological sites encountered during forest operations will be built into the network of open spaces defined in the restocking plan, and contribute to the habitat network as open glades. These additional sites not yet identified will require amendments to the restocking plan to accommodate the additional open space.

2.5 Statutory requirements and key external policies

The following official designations exist in the plan area:-

- Wayleaves.
- Ancient woodland sites.
- Private Water Supply Catchments
- Loch Eck SSSI
- Core Path Policy
- Loch Lomond National Park

Appendix III: Consultation record

Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Scottish Water	11/1/2018	06/2/2018	The LMP area falls within a Drinking Water Protected Area associated with a Scottish Water abstraction point. Protecting water supply quantity and quality are vital. All forestry activities to follow "Guidance on Forestry Activities near SW Assets". There are also pipelines and infrastructure within the LMP area which need to be taken into account in the planning process. Pipelines are along the A815 and verges so only new road openings would have any impact on this infrastructure.	SW guidance will be followed in addition to the UKFS Water and Forest guidelines. The plan will seek to maintain and strengthen riparian broadleaved buffers, and to manage landslip risk by retentions and varying coupe layout to provide a range of age classes (and hence buffering) up and down the slope.
SNH	11/1/2018	24/1/2018	Woodland at Meall an t'Sith within the SSSI hosts a Nationally important range of lower plant communities. A detailed 5 year management plan (2017 – 2022) is in place detailing operations to benefit the Bryophyte assemblage by control of Rhododendron, WH, SS and controlling grazing pressure. Forestry operations have the	The 5 year SSSI plan is being implemented and proposals in the plan will take this into account. Removing conifer regeneration on the upper margin will be reviewed, but the priority is Western hemlock/ rhododendron control within the SSSI and its environs.

			potential to adversely affect water quality within the SSSI. Rhododendron should be controlled. The upper margin outwith the SSSI should be enhanced and conifer regeneration removed. The Red Squirrel Stronghold designation should be considered in the planning process. PAWS restoration should create more robust NBL network. A DMP should be produced as part of the plan process.	Scattered conifer regeneration on the upper can play a positive role in landscape and ecological diversity. Maintaining species and age class diversity for Red Squirrel will be a plan objective. PAWS restoration and enhanced NBL linkages are proposed. A deer management plan will be produced.
SEPA	11/1/2018	06/2/2018	The plan should consider the impact of management on flood risk downstream. The plan should specifically refer to and follow the guidance within the Water Framework Directive and UKFS Guidelines and GBRs. The plan should include measures for dealing with invasive plant species that threaten the water environment if relevant. CCF opportunities should be identified and encouraged to mitigate against water run off. Identify areas of peat and propose measures for its future management to maintain and enhance this resource.	The UKFS Forests and Water Guidelines will be followed. Invasive non-native plant species will be monitored and controlled. PAWS restoration and riparian enhancement with open ground and NBL will protect water quality and riparian ecosystems. Peat areas are limited on site. Wet flushes and other wetland features will be protected.

			The plan should identify measures to implement the FCS Guidelines on Water Management and protect water features, including wetland, flushes and springs.	
		21/04/2020	The following comments were received following the final consultation whilst the plan was on the Public Register: Essential that private water supplies are protected during forest operations in line with Forest and Water Guidelines. No Comments to make regarding EIA SOR We note that two new forest roads (425m and 385m in length) and 16,100m of ATV tracks are proposed. We would like to emphasize that any engineering activities in or adjacent to the water environment, such as crossings over any watercourses visible on a 1:50,000 Ordnance Survey map (or diversions or realignments of any natural watercourse, regardless of size) are likely to need authorisation under the Water Environment (Controlled Activities) (Scotland) Regulations	FLS will protect water supplies and adhere to Forest and Water Guidelines. Decision not to comment noted. Relevant Guidance will be adhered to.

			(CAR) and should follow the related elements of the Forests and Water UK Forestry Standard Guidelines. You should also be aware that a construction site licence (CSL) under CAR is required for the management of surface water run-off from a construction site which • is more than 4 hectares, • is in excess of 5km, or • includes an area of more than 1 hectare or length of more than 500m on ground with a slope in excess of 25° See our Sector Specific Guidance: Construction Sites (WAT-SG-75) for further details. Below these thresholds, you will need to comply with CAR General Binding Rule 10 which requires, amongst other things, that all reasonable steps must be taken to ensure that the discharge does not result in pollution of the water environment.	Relevant regulations and guidance will be followed.

SF Conservancy	11/1/2018	12/1/2018	Species diversity in LMP area already exceeds the minimum UKFS requirements, maintain or enhance this in next rotation. A linked permanent habitat network comprising retentions, native woodland and open ground should be the long term ambition. Consider alternative species to replace larch which may play a positive landscape role. The forest is highly visible from the A815 and this is a popular tourist area, the plan should use visualisations and coupes should be of a scale and shape sensitive to the local landscape. Include a deer management plan and coordinate efforts with neighbours.	The plan envisages a significant expansion in native broadleaves as the PAWS areas are restored and riparian zones enhanced post felling. This will create a robust native broadleaf area with good linkages through to the upper hill, but concentrated on the lower and mid slopes. Aspen, Norway spruce and Scots pine have potential to replace larch as species to create landscape diversity. The positive landscape impacts of larch are however hard to replicate. Coupe size and scale will be sympathetic to landform and visualisations will be used to present and inform the plan.

Strachur Community Council	11/1/2018	31/01/2018 16/04/2020	No Comment The following comments were received following the final consultation whilst the plan was on the Public Register: We welcome the objectives of the LMP, in particular the intention to: 1. Maintain a visually diverse woodland which is in keeping with the landscape character. 2. Maintain and enhance the recreational infrastructure. 3. Maintain and enhance water quality in relation to both private and public water supplies. We hope that 2 and 3 are not compromised at any stage of the management activities, particularly during felling operations and during road ATV track construction.	The plan includes proposals to meet these aspirations. Relevant guidelines will be followed during operations; disruption to recreation will be avoided wherever possible and water quality maintained.

Internal Consultation Summary of Issues from meeting 22/03/2018			Overall objective is to maintain a mixed potentially productive woodland delivering a range of ecosystem services. The Red Squirrel stronghold remains a significant consideration, with maintaining mixed age and diverse conifers being important. Norway Spruce, Douglas Fir and Scots Pine were considered to be the most important species, although areas of Sitka Spruce also contributed to Red Squirrel habitat. Larger seeded broadleaves were felt to be appropriate within this context. Western Hemlock was considered to be undesirable due to the low calorific value of its cones. PAWS restoration was continuing with the removal of Western Hemlock being a priority. The felling of mature Western Hemlock outwith, but in the vicinity of, the PAWS area was considered a priority. Mature areas of Norway Spruce could facilitate a phased conversion to native woodland while providing Red Squirrel habitat.	The internal consultation informed the development of the LMP.

			Rhododendron control was being undertaken and operational maps would be provided to help the plan process. The SE corner of the plan area offered some potential for Native woodland expansion on the open ground. Visitor zones were important to consider with the focus of activity being on the loch shore and associated roads. The activity centre to the SW also used the forest for activities. The Glenbranter DMG had been reformed and a consultant's report was anticipated. Red and Roe deer are present, with the occasional Sika. Access for stalking and extraction was considered adequate. More open ground either as deer glades or restock sites would aid deer control. Osprey, Golden Eagle and Peregrine nest sites in the vicinity would have an impact on the timing of operations. Black Grouse were present in the area but numbers were currently low. Slope stability was a major consideration in places, with areas prone to landslips and areas of rock	

			fields vulnerable to movement particularly during harvest. While there was a good road network in place this requires maintenance and upgrade across large areas to achieve multiple plan objectives. A revised felling plan to bring forward good areas for phase 1 and 2 fellings could enable expenditure on roads to be justified as an essential pre harvest operation that would improve management access generally.	

The following comments were received at final consultation stage whilst the plan was on the Public Register				
Kilmun Community Council		17/04/2020	Efforts should be made to enhance and increase habitat for red squirrels. There is no identification of the exit strategy from the forest tracks onto the minor roads before accessing the A815. The existing condition of these minor roads and bridges, the proposed upgrades, management and community/business mitigation for exiting from the forest track onto the minor roads within the Glenbranter, Benmore and Whistlefield communities along with the acknowledgements of any concerns or requirements at the strategic exit points onto the A815 at Benmore Botanic Gardens and Glenbranter. There is no notification of the constraints of accessing the minor single-track **private** road from the Scottish Water Treatment Plant through Benmore onto the A815. This requires to be addressed at this point of the project.	The plan includes habitat development that will benefit this species. Constraints will be taken into account prior to forest operations: County Council, Community Councils and relevant private owners will be consulted where upgrading is required.

			It is heartening to see within the Landscape Character that recreation routes will be enhanced through the forest glen sides, both at the upper and lower slopes. Every effort should be made to link the new routes to allow circular movement rather than dead points at track end. Routes in the long-term should be way-marked and parking facilities should be increased mid-way along Loch Eck especially on the eastern side of the A815 such as at the forest track close to Dornoch Point, this would allow access without crossing the A815 as what happens at present at Jubilee Point.	FLS regularly review recreation facilities and will continue to offer a range of opportunities in the plan area.

Appendix IV: Supplementary information

Available for inspection at:

Forestry and Land Scotland
Aberfoyle Office
Aberfoyle
Stirling
FK8 3UX
Shirley.leek@forestryandland.gov.scot

+44 (0) 300067 6600

Documentation includes:-

- Roadline surveys
- Production Forecast 2017
- Sub-compartment database
- Conservation plan
- Landscape Character Assessment by SNH
- Aerial photos
- Forestry Guidelines
- Recreation Plan
- Strategic Forest Design Plan
- Forestry Commission approval procedures
- Scheduled Ancient Monument Plans
- Inventory of Ancient, long-established and semi-natural woodland
- Economic felling ages
- Soil surveys
- Crop survey

Appendix V: Deer management plan

Description:

The west shore is part of the Glenbranter Deer Management Unit with the Eastern shore being part of the Loch Eck management unit. Deer control generally across the region has increased and the Cowal Deer Working Group has reformed, with FLS rangers playing an active role. Carrick is the most significant neighbour, and it is believed that they have an aspiration to increase deer control.

Red and Roe deer are present with the occasional Sika. Cull levels on the west shore have been stable for the last 5 years, but cull rates on the east shore have increased, probably due to increased input on restock areas.

Reducing deer numbers and associated negative impacts is vital in order to deliver a range of plan objectives. Strategic deer fencing is not an option and the terrain can make any fencing problematic and expensive. Softer conifers and planted broadleaves require deer fencing in most instances to become established.

Objectives:

Reduce damage to SSSI features (Loch Eck SSSI). Work towards deer levels that permit restocking of softer species and establishment of broadleaves via natural regeneration. Work with neighbours to control deer strategically. Accept that deer fencing will be required on some sites for some species.

Resources and Methods:

The culls are managed with a mix of permissions, contracts and FES rangers. Access is currently considered good for both stalking and extraction. Ranger tracks on new restock areas are desirable.

Out of season and night shooting will be used as required to achieve the LMP objectives.

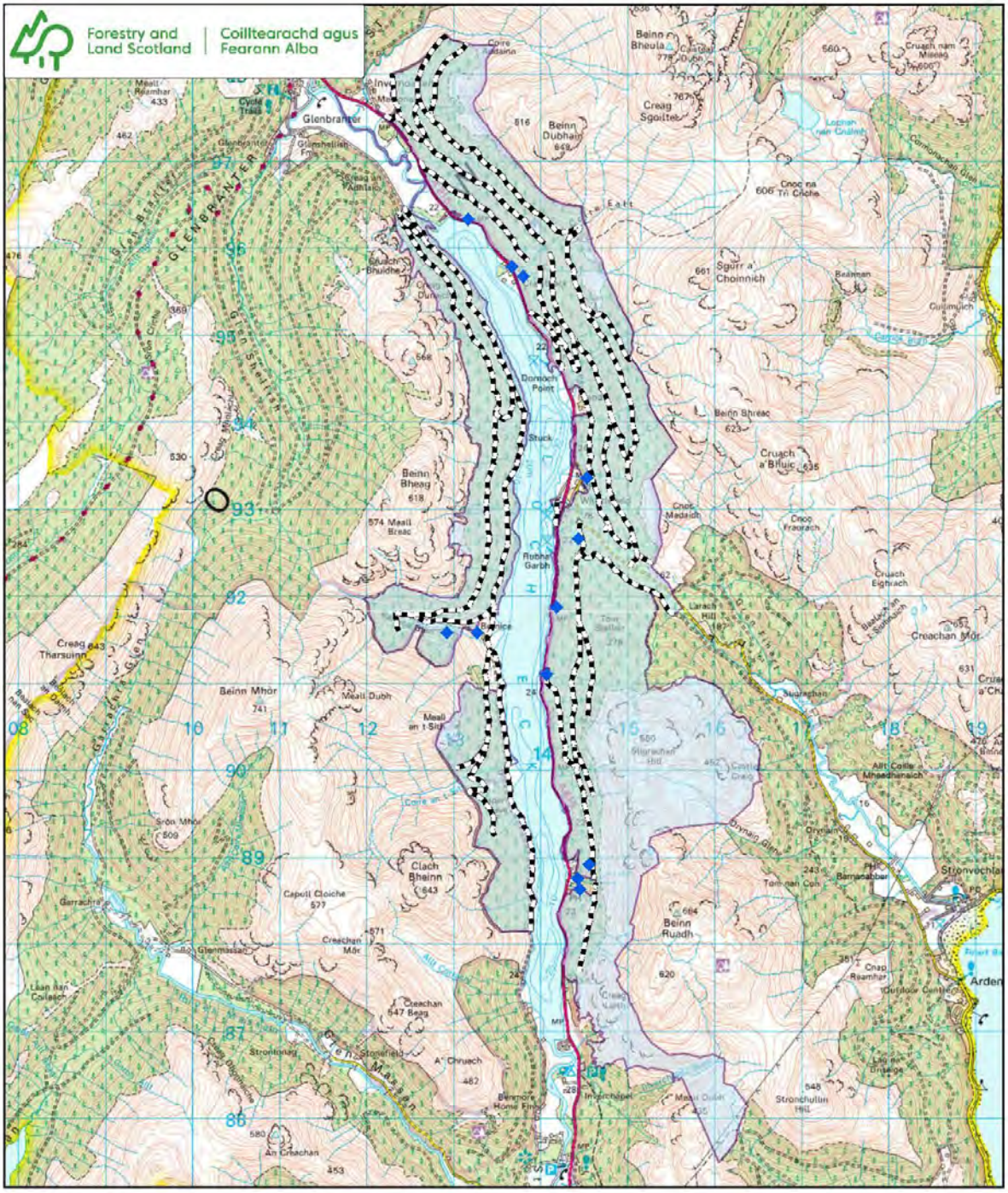
Monitoring:

This will be carried out by the operations and deer management team at Glenbranter and the planning team based in Aberfoyle.

Cull Targets:

It is proposed to maintain cull levels at current levels, with feedback from damage monitoring and population counts informing future culls.

Appendix VI: Private water supplies



Appendix VII: Summary of operations

	Coupe	Fell Year	Phase	Gross Area	Felling		Establishment			
					Species	Net Area	Species	P/NR	Year	Area
Phase 1	08001	2024	1	10.7	SS	10.7	SS	P	2026	8.8
							Open			1.9
	08009	2024	1	12.5	SS	7.1	SS	P	2026	4.1
					XL	4.5	MC	P	2026	3.9
					NS	1.0	NW	P	2026	3.5
							Open			1.0
	08011	2024	1	13.7	SS	9.5	NW	P	2026	12.9
					XL	3.0	Open			0.8
					MC	1.0				
	08015	2023	1	4.2	SS	3.6	NW	P	2025	3.2
							SS	P	2025	0.5
							Open			0.5
	08019	2023	1	2.9	SS	2.2	SS	P	2025	2.8
					EL	0.5	Open			0.1
	08036	2023	1	12.6	SS	12.1	NW	P	2025	10.8
					NS	0.1	NW	P	2025	1.6
							Open			0.2
	08049	2024	1	2.8	SS	2.5	MC	P	2026	2.6
							Open			0.2
	08055	2024	1	9.8	SS	3.3	SS	P	2026	7.3
					JL	6.1	NW	NR	2029	1.6
					NS	0.4	Open			0.9
	08062	2024	1	3.4	SS	3.4	SS	P	2026	2.1
							NW	NR	2029	0.5
							Open			0.8
	08069	2024	1	0.7	SS	0.6	NW	NR	2029	0.7
					JL	0.1				

Summary of operations continued

	Coupe	Fell Year	Phase	Gross Area	Felling		Establishment			
					Species	Net Area	Species	P/NR	Year	Area
Phase 1	08074	2024	1	3.0	NS	1.7	NW	NR	2029	2.6
					JL	2.6	Open			0.4
	08079	2024	1	14.7	SS	11.0	NW	P	2026	12.6
					NS	0.5	NW	NR	2029	1.1
					MC	2.2	Open			1.0
					XL	0.2				
	08083	2024	1	5.2	SS	4.0	SS	P	2026	0.9
					NS	0.8	NW	NR	2029	3.0
					JL	0.1	Open			1.3
	08085	2024	1	14.8	SS	13.5	NW	P	2026	14.8
					MC	1.2				
	08086	2024	1	18.9	SS	17.4	NW	P	2026	11.3
					HL	0.4	NW	NR	2029	2.0
					MC	0.7	MC	P	2026	3.7
							SP	P	2026	0.4
							Open			1.5
	08090	2024	1	0.4	MC	0.4	NW	NR	2029	0.3
							Open			0.1
Phase 2	08016	2028	2	12.5	SS	12.0	NW	P	2022	2.7
							SS	P	2030	1.8
							MC	P	2030	6.9
							Open			1.1
	08034	2028	2	13.8	SS	13.0	SS	P	2030	12.1
					HL	0.1	NW	NR	2033	0.7
							Open			1.0
	08048	2028	2	16.9	SS	8.8	SS	P	2030	15.0
					NS	7.7	Open			1.9
					JL	0.4				

Summary of operations continued

	Coupe	Fell Year	Phase	Gross Area	Felling		Establishment			
					Species	Net Area	Species	P/NR	Year	Area
Phase 2	08056	2028	2	8.8	SS	3.0	SS	P	2030	2.8
					JL	2.8	NS	P	2030	4.3
					NS	3.0	NW	NR	2033	1.1
							Open			0.6
	08060	2028	2	10.4	SS	6.5	MC	P	2030	8.1
					JL	1.8	NW	NR	2033	1.6
					NS	2.1	Open			0.7
	08092	2024	2	14.2	SS	5.8	SS	P	2026	10.8
					NS	1.0	NW	NR	2029	2.8
					MC	2.4	Open			0.6
					JL	3.9				

clearfell	**206.9**		**202.8**	**SS**	**69.0**
restock only	**0.0**		**na**	**MC**	**25.2**
gross	**206.9**	**net felled**	**202.8**	**SP**	**0.4**
				NS	**4.3**
phase 1	**130.3**			**NW**	**91.4**
phase 2	**76.6**			**Open**	**16.6**
				gross	**206.9**