South Region (west)

Carrick and Changue

Land Management Plan

Approval date: ***

Plan Reference No: ****

Plan Approval Date: *****

Plan Expiry Date: ******

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

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

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CSM 6 Appendix 1

FORESTRY AND LAND SCOTLAND – Application for Land Management Plan Approvals

Forestry and Land Scotland – Property

Forest Region:	SOUTH REGION (west)
Woodland or property name:	CARRICK AND CHANGUE
Nearest town, village or locality:	BARR
OS Grid reference:	NX 3999 9570
Local Authority district/unitary Authority	SOUTH AYRSHIRE

1. I apply for Land Management Plan approval*/~~amendment approval~~* for the property described above and in the enclosed Land Management Plan.

2. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the SF agreed must be included. Where it has not been possible to resolve specific issues associated with the plan to the satisfaction of consultees, this is highlighted in the Consultation Record.

3. I confirm that the proposals contained in this plan comply with the UK Forestry Standard.

4. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

Signed *Andrew P Jarrott*..... **Signed** .....
PP Regional Manager **Conservator**

Region SOUTH (west)..... **Conservancy** .....

Date **.....**..... **Date of Approval:** .....

Date approval ends: .....

EIA Determination form if required

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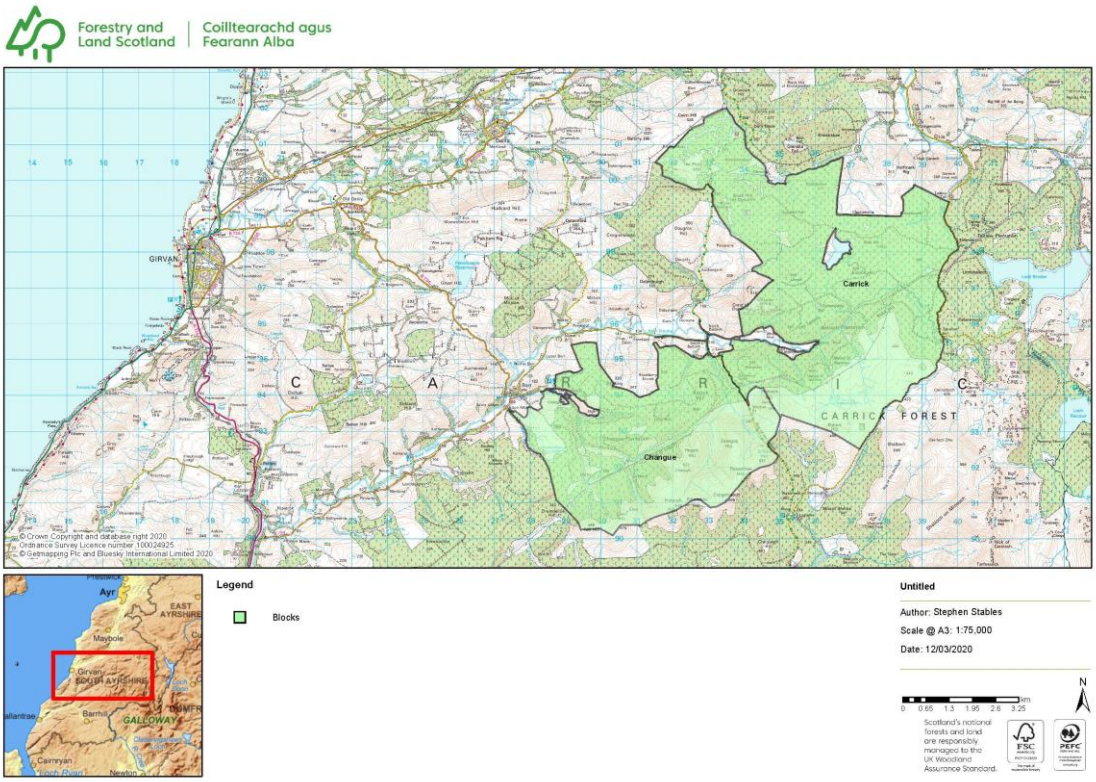
1.0 Summary of Proposals

Part of the Galloway Forest Park and lying within a larger area designated as an Environmentally Sensitive Area, the Carrick and Changue Land Management Plan (LMP) area is located around 15 km east of Girvan, South Ayrshire. At around 6332.5ha, it is a large scale size plan comprising a varied plantation mix of species and age classes and open ground.
Some clearfelling has already taken place throughout the block and this is being accelerated by ongoing sanitation felling of plantation Larch particularly in the Garleffin area. Restructuring is taking place.
Key management issues in this Land Management Plan (LMP) are timber production, water quality, forest renewables, forest road upgrade and formation to allow access to felling coupes particularly the effective deer control required to promote the establishment and expansion of areas of native broadleaves and alternative conifer species for diversity and resilience.
The ten year period covered by this plan (2020-2030) presents detailed felling and replanting and forest road formation and upgrading proposals, proposals that require specific approval from Scottish Forestry (SF).
Longer-term management (beyond 2030) of the plan area is also considered in the plan but mainly to indicate the direction of travel and to provide context.
The forest is FSC certified and the management seeks at all times to meet the UK Woodland Assurance Standard.



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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stephen.stables@forestryandland.gov.scot
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2.0 SF Regulatory Requirements

This section provides a summary of the elements of the plan that are regulated by Scottish Forestry (SF), specifically focussing on operations and activities within the ten year period of this plan.
An existing key element of diversity throughout this Land Management Plan is open space. At lower elevation there are small areas of permanent internal open space, recreation areas and our transient clear fell sites however there are large swathes of wild open hilltop and agricultural land to the south of the LMP.

	Area (ha)
Plantation area	4914.0
External open ground	1418.5
Total plan area	**6332.5**

As can be seen on the plantation / permanent external open ground map, plantation area is deemed to account for around 78% of the total LMP unit area.

2.1 Summary of planned operations

Key activities and operations planned for the first ten years of the plan:

Planned Operations	2020-2030 plan period
Clearfell	544.8ha
Thinning	1,665.3ha
Restock	486.6ha
Road construction	5,890m
Road upgrade	20,000m

2.2 Proposed felling in years 2020-2030

A number of coupes (21 coupes, comprising around 11% of the plantation area) are proposed for clearfell during the 10yr period of the plan (see tables 1,2 & 3)

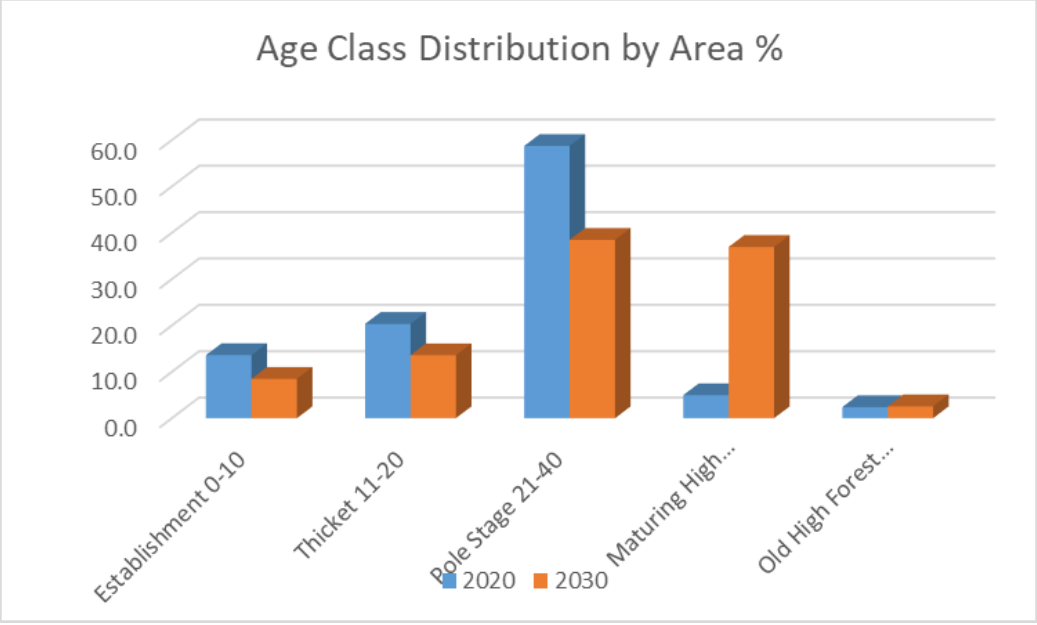
Table 1 – Proposed clearfell coupes first 10 years			
Coupe No.	**Phase**	**Operation**	**Coupe area (ha)**
69057	1	clearfell	65.3
69062	1	clearfell	22.8
69073	1	clearfell	61.9
69082	1	clearfell	25.0
69087	1	clearfell	3.8
69102	1	clearfell	9.4
69106	1	clearfell	29.8
70016	1	clearfell	21.2
70032	1	clearfell	43.8
70060	1	clearfell	2.7
70066	1	clearfell	11.1
70067	1	clearfell	12.0
70068	1	clearfell	17.5
69058	2	clearfell	40.6
69061	2	clearfell	22.7
69086	2	clearfell	36.1
69091	2	clearfell	38.8
70006	2	clearfell	19.3
70014	2	clearfell	12.2
70031	2	clearfell	22.4
70065	2	clearfell	26.4
Total			**544.8**

Table 2 – Proposed clearfell coupes as a % of LMP plantation area			
Coupe No.	**Phase**	**Year**	**Percentage**
69062	1	2021	0.5
69073	1	2021	1.3
70016	1	2021	0.4
70060	1	2021	< 0.1
70066	1	2021	0.2
70067	1	2021	0.2
70068	1	2021	0.3
69087	1	2022	< 0.1
69082	1	2022	0.5
69106	1	2022	0.6
69057	1	2023	1.3
69102	1	2023	0.2
70032	1	2025	0.9

70006	2	2027	0.4
69091	2	2028	0.8
69086	2	2029	0.7
70014	2	2029	0.2
69058	2	2030	0.8
69061	2	2030	0.5
70031	2	2030	0.5
70065	2	2030	0.5
Total			**11.1**

Table 3 – Proposed LISS felling coupes first 10 years			
Coupe No.	**Phase**	**Operation**	**Coupe area (ha)**
NO PROPOSED LISS FELLING DURING PERIOD			
Total			

Table 4 – Change in Age Class over plan period			
Age of trees	**Growth stage**	**Percentage of class at given year**	
		2020	**2030**
0 - 10	Establishment	13.6	8.5
11 – 20	Thicket	20.3	13.6
21 – 40	Pole stage	58.7	38.5
42 - 60	Maturing high forest	5.0	36.9
61 +	Old high forest	2.4	2.5
		100.0	**100.0**



Other Tree Felling in Exceptional Circumstances

FLS will normally seek to map and identify all planned tree felling in advance through the LMP process.
However, there are some circumstances requiring small scale tree felling where this may not be possible and where it may be impractical to apply for a separate felling permission due to the risks or impacts of delaying the felling.
Felling permission is therefore sought for the LMP approval period to cover the following circumstances:

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

*Infrastructure includes forest roads, footpaths, access (vehicle, cycle, horse walking) routes, buildings, utilities and services, and drains.
The maximum volume of felling in exceptional circumstances covered by this approval is 40 cubic metres per Land Management Plan per calendar year.
A record of the volume felled in this way is detailed below will be considered during the five year Land Management Plan review:

Table 5 - Other Felling

LMP/Coupe	Date	Calendar year	Location OS NGR	Volume estimate (m3)	Comments

2.3 Proposed thinning in years 2020-2030

Proposed thinning in Phases 1 and 2 for the 10 year period of the plan are shown in table 3 below.

Table 6 - Proposed thinning			
Felling phase	**Proposed thin year**	**thinning area (ha)**	**% plantation area**
Phase 1	2020	95.5	1.9
Phase 1	2021	47.8	1.0
Phase 1	2022	243.2	4.9
Phase 1	2023	102.1	2.1
Phase 1	2024	136.7	2.8
Phase 2	2025	203.5	4.1
Phase 2	2026	195.5	4.0
Phase 2	2027	332.2	6.8
Phase 2	2028	142.1	2.9
Phase 2	2029	166.7	3.4

2.4 Proposed restocking in years 2020-2030

Our restocking proposals on clearfell sites have been selected by ESC, on-site observations and the performance of various tree species during previous rotations. Where appropriate, species diversification has been undertaken utilising both BL and alternative conifers for species diversification. Species choice also meets the criteria for restocking under UKFS, UKWAS and internal FC policy.

Inverted mounding will be preferred, but hinge and trench mounding may also be used as site dictates. No ploughing will be undertaken due to the excess carbon release on peaty soils and the development of asymmetrical root plates which will affect stand stability.

Restocking will involve internal staff or external planting operators utilising trees of appropriate provenance sourced from various nurseries.

Deer control will be managed internally in line with the deer control strategy for the region.

Proposed restocking and the changes in species for the 10 year plan period are shown in tables 7 & 8 below (specific details in 8.2).

Table 7 – Restocking coupes, area and species			
Restock coupe	**Phase**	**Restock year**	**Restock species**
69057	1	2025	58.5ha SS 6.8ha open
69058	3	2032	36.8ha SS 3.8ha open
69061	3	2032	21.2ha SS/BL 1.5ha open
69062	1	2023	20.2ha SS 2.6ha open
69073	1	2023	44.9ha SS/BL 17.0ha open
69082	1	2024	19.8ha SS 5.2ha open
69086	3	2031	27.1ha SS/BL 9.0ha open
69087	1	2024	3.8ha BL
69091	2	2030	33.7ha SS/BL 5.1ha open
69102	1	2025	9.1ha OC 0.3ha open
69106	1	2024	28.6ha SS/LP 1.2ha open
70006	2	2029	128.3ha SS 1.0ha open
70014	3	2031	12.0ha SS/BL 0.2 open
70016	1	2023	20.3ha SS/OC 0.9ha open
70031	3	2032	21.3ha SS/BL 1.1ha open
70032	2	2027	43.8ha SS/BL
70060	1	2023	2.7ha BL
70065	3	2032	26.1ha SS/BL 0.3 open
70066	1	2023	10.6ha SP 0.5ha open
70067	1	2023	12.0ha BL
70068	1	2023	15.8ha NS 1.7ha open

Table 8 – Change in species over plan period		
Species breakdown by area %	**2020 (current)**	**2030 (end plan period)**
Primary species: Sitka spruce	60.5	58.9
Secondary species: other conifer and broadleaf *	17.0 (6.0)*	17.2 (6.0)*
Native broadleaf	0.5	1.6
Open space	22.0	22.3

** The broadleaf species percentage within the Secondary species figure is included for illustration to reinforce the modest increase in broadleaf across the plan area over the plan period*

2.5 Access and roading 2020-2030

A modest length of new forest road construction is required during the approval period for this LMP. Regular and significant lengths of upgrade and maintenance will also inevitably be required.
The proposed construction over the 10 year plan period is shown below in table 9 below.

Table 9: Proposed road construction

Table 9 – Proposed Roads Construction and Maintenance		
Period of Proposed Construction	**Proposed length for construction**	**Proposed length for maintenance**
2020 to 2024	3,150m	10,000m
2025 to 2029	2,740m	10,000m
Beyond 2030	3,500m	10,000m

2.6 Departure from UKFS Guidelines

The LMP seeks to follow UKFS guidance in all aspects.
Whilst a 2m height differential should be achievable across all restock areas, given our trend towards a reduction in coupe size, landscape considerations, Hylobius management and stand stability, it may not always be possible to follow the adjacency guideline.
The adjacency guideline will primarily be addressed by delayed felling i.e. a coupe will not be felled until all surrounding crops are at least 2m tall however in the mid to short term the secondary option to deal with adjacency through delay restocking remains i.e. a coupe will not be

restocked until all surrounding crops are at least 2m tall. In this instance a formal amendment will be sought from Scottish Forestry (SF) (see Threshold Tolerance table).

2.7 Tolerance table

See Appendix III

3.0 EIA Screening Determination for forestry projects

3.1 Proposed deforestation

There is no proposed woodland removal within the LMP.
Modest increases to permanent open space, mainly focussed within riparian zones and on upper treeline margins, are however likely.

3.2 Proposed forest road works

New forest road construction is required to access some of the phase 1 and 2 felling coupes and to facilitate access into virgin first rotation crops at Darley to the south and Garleffin to the north.
There are no site designations impacted by the proposed construction work.
Given the licencing thresholds, the topography of the plan area and the modest scale of our proposed road construction work there should be no requirement to apply for a SEPA Construction Site licence.
Currently the rump of our proposed road construction is scheduled for beyond the approval period of this plan and this includes the potential construction of a section of forest road extending south from Darley and connecting into the road network in the White Clauchrie LMP area. This proposed link option could additionally contribute towards minimising timber haulage on county roads by providing an alternative haulage route south along forest roads.
There is a current requirement for all timber to travel internally and eastwards therefore much of the existing forest road network is part of the main timber haul route.

3.3 Proposed forest quarries

Development quarry work over the lifetime of the plan will inevitably be required to provide a regular source of material for forest road construction and maintenance in the area. Although several small, inconspicuous quarries are scattered throughout the LMP, three active, principal FES quarries have been identified; the North Balloch quarry serves the Changue block and the Garleffin and White Rue quarries the Carrick block. To avoid the risk of using rock of unsuitable chemical content, stone material for forest road upgrade and new construction to service the planned timber harvest will be sourced from the main quarries.
Where development work is undertaken all works shall be done in accordance with The Quarries Regulations(1999). Additional quarry development proposals outwith the agreed tolerances will be submitted to

SF for approval prior to any work taking place (see Tolerance table Appendix III).
To avoid diffuse pollution arising from rainfall derived leaching, appropriate soakaways are in place in the main quarries and all construction work will comply with the general binding rules specified in the Water Environment (Controlled Activities) (Scotland) Regulations 2011.
District policy is to target Irish pipe bridges and other inappropriately designed structures for removal as they are known barriers to fish migration; there are no known such structures identified in the Carrick and Changue LMP area.

3.4 Proposed afforestation

There are no new planting areas proposed for the period of this plan. Naturally regenerated dispersed tree cover on open ground, where the canopy cover is less than 20% of the area, will be accepted where this does not significantly impact on other management objectives such as water quality, landscape, biodiversity and deer control.

3.5 Additional regulatory considerations

None

4.0 Critical Success Factors

The following factors are deemed critical for the successful implementation of the Land Management Plan:

- Complete construction of the planned forest road network
- Enhance and expand the existing areas of Native broadleaf woodland and permanent open space throughout the plan area
- Improve water quality throughout R Stinchar catchment through enhancement of the riparian zones (centred on Water of Gregg)
- Complete peatland bog restoration (dependent on district prioritisation programme)

5.0 Introduction

5.1 The existing land holding

The Carrick and Changue LMP stretches from Barr village in the west across the minor U57 Nick of the Balloch county road over to Tairlaw Toll in the east on the Straiton / Newton Stewart county road.
The block totals around 6332.5ha, lies some 5km south of Straiton, South Ayrshire and bounds directly onto the FES land management plan units of White Clauchrie and Upper Cree to the south and Tairlaw and Carrick Forest Drive to the east. An intimate mix of private plantation forestry and agricultural land lies to the north and west of the plan area.
A significant part of the plan area, around 1418.5ha, comprises open hill ground that currently forms part of a grazing tenancy.
The Northern Ireland Interconnector corridor cuts through the southern boundary of the plan area.
Part of the Galloway Forest Park, the plan area also lies within the larger designated Western Southern Uplands Environmentally Sensitive Area (ESA) and within the Buffer Zone of the Galloway and Southern Ayrshire Biosphere Reserve.

This plan is a revised submission of an earlier 10 year plan approved in 2006. Single year extended approvals until 31 March 2020 have been subsequently agreed by SF (previously FC).

5.2 Setting and context

5.2.1 Core timber production

Although the block generally presents DAMS scores < 17, suggesting that most of it may be a candidate for alternatives to clearfell silviculture such as Low-impact Silvilcultural Systems (LISS) or Minimum Intervention broadleaf area, in reality previous attempts at thinning have met with variable success.
Timber production is a key objective and while most of the block will continue to be managed under clearfell – artificial restock silviculture further efforts to thin second rotation crops will hopefully provide areas where Alternatives to clearfell will result.

5.2.2 Deep peat restocking / restoration

Peat bogs, mainly unflushed bogs, account for much of the plan area.
The UK Forestry Standard and the Scottish Government's policy on Control of Woodland Removal presume that sites will be restocked following clearfell. The UK Forestry Standard also requires managers to minimise soil

disturbance, particularly on organic (peaty) soils with a general requirement to consider the potential impacts of soil disturbance when planning operations involving cultivation, harvesting, drainage and road construction.

Since the FC Forests and Peatland Habitats Guidelines Note was published in 2000, the importance of trees in mitigating climate change has become well recognised. Supplementary guidance (FC Scotland practice guide: Deciding future management options for afforested deep peatland) was produced in 2015 to support the original note.

This additional guidance offers a decision making framework based on the likely carbon storage or release from different management options on deep peats. Three restocking options are now available;

1. where the site is a priority for habitat restoration on ecological grounds, conventional restocking will not be required.
2. where the site is not a priority for restoration and is likely to support tree growth of Yield Class 8 or above for Sitka spruce, conventional restocking should be undertaken.
3. where the site is not a priority for restoration to open peatland and is unlikely to support tree growth of Yield Class 8 or above for Sitka spruce, the appropriate action will usually be to create peatland woodland edge.

Under the FES strategy for Lowland Raised bog and Intermediate bog on the National Forest Estate in Scotland 2012-2022, there are environmental and conservation considerations for areas within the plan where there will be a presumption against commercial restocking in the second rotation. FLS bogs with existing canopy woodland have enormous potential to improve towards open bogs if successfully restored and accordingly represent significant conservation opportunities.

As a result of recommendation 5 from this strategy "Initiate further lowland raised bog and intermediate bog restoration work on other plantation sites which are ecologically suitable for restoration" and the decision framework from the FCS guidance the following table identifies an area prioritised for bog restoration according to its perceived habitat value.

A considerable area of blanket bog lies to the west of Linfern loch (on both FLS and non FLS land) and this, subject to south region's priority peatland restoration programme, could be a candidate site for future peatland restoration or peatland edge woodland creation.

Area	Objective	Benefits / positive factors	Implementation
Priority sites for habitat restoration Although there are fragmented areas of deep peat adjacent to Linfern Loch (on both FLS and non FLS land) that show some evidence of moss land vegetation the area is not currently considered to be priority site for peatland restoration			
Sites currently not a priority for restoration; either poor tree growth resulting in peatland edge woodland, permanent open space or conventional restocking undertaken			
Coupes to west of Linfern Loch	• Restore peat areas to peatland edge low density woodland	• Conserve existing moss land vegetation • Reduce risk of transpiration and lowering of water table by conifers immediately adjacent to site • meet UKWAS UKBAP priority habitats requirements • Contribute to reducing acidification within R Stinchar catchment	• Clearfell coupes 69091 & 69094 (consider removing as much brash as possible from sites) • Block drains (possibly with brash) to speed up re-wetting of bog surface and restore water table • Monitor occurrence of regeneration at 5yr intervals and assess impact on resulting habitat (planned BL restock where regeneration is limited)

5.2.3 Grazing lease Agricultural tenancy

Some of the open ground to the south of the plan area is subject to a full Agricultural tenancy agreement. The tenancy is projected to continue over the period of the plan however should the situation change, parts of the area would be considered for bog restoration by blocking existing old hill drains to raise the water table.

5.2.4 Interconnector

The Northern Ireland interconnector, constructed around the turn of the century, was the subject of a separate Landscape and Environmental plan with every effort made to mitigate its impact on the landscape and exploit environmental opportunities. Further opportunities will be taken in this iteration of the design plan to reduce the landscape impact of the line through more sensitive use of open space and broadleaf, particularly the shrub layer.

5.3 LMP Presentation

There are no discrete divisions within this forest block, the area is therefore presented and considered as a whole.

Management objectives are consistent with themes identified within the new Forestry and Land Scotland Corporate Plan and Scotland's Forestry Strategy 2019 – 2029.

6.0 (Whole) Plan Objectives

6.1 Issues

Key management issues to consider for this LMP are:

- Commercial timber production in a plan area comprising significant areas of relatively even aged forest, often unthinned
- the impact of that timber haulage volume on minor county road network
- Steep ground management operations and potential for land slips
- Management of the R Stinchar and tributaries catchment
- Recreation focus around Barr village locus
- Management of open ground
- NI interconnector utility corridor

6.2 Key Challenges

- Restructure plantation to develop a less even aged forest structure and increase species diversity, particularly targeting broadleaf woodland, in an area where poor soil types, steep ground, exposure and elevation limit options for species choice
- Where appropriate identify areas for LISS development
- Manage operation impacts within R Stinchar catchment riparian network
- Management of the open hill top and agricultural land
- Manage visitor zone around Barr within context of wider forest management
- Assessment and development of public access requirements for the plan area
- Potential to create new forest road link south to the White Clauchrie LMP
- Landscape plantation areas adjacent to powerline interconnector

6.3 Management objectives

Objective 1: Ensure that the plantation continues to contribute to the District's timber production targets.
The plan area is well suited to sustainable timber production with a fairly robust forest road network in place.

Objective 2: Improve forest road access to the plan area and reduce the impact of timber haulage on the minor county road network.
Construct identified forest roads to access proposed phase 1 felling and other first rotation crops.
Consider construction of forest road link to White Clauchrie LMP.

Objective 3: Restructure plantation forest and increase age and species diversity.

The scale of planned clearfell over the plan period will significantly contribute towards the age class and species diversity of the plan area.

Objective 4: Management of steep slope plantation ground and reduced frequency intervention.
There has been evidence of land slips in some recent felled areas in the Carrick block. For site stability and water quality benefits, restocking of permanent broadleaf crop that will involve little future operational impact should be considered.

Objective 5: Create areas of stable woodland around key recreation and conservation areas where intervention frequency is minimised.
Significant areas of broadleaf woodland and or LISS conifer areas within the riparian zones and adjacent to Barr village will improve the quality of environment for the residents and communities around Barr village, for visitors within that local economy and benefit water quality and the conservation value of the plan area.

Objective 6: Improve water quality and alleviate peak flows from the LMP unit.
Diffuse pollution from clearfell and restock proposals is a potential threat to maintaining good water quality. The proposed enhancement of riparian zone buffers throughout the plan area, following all best practices and guidance during forest operations, should contribute towards maintaining and ameliorating the moderate ecological status of the R Stinchar and its tributaries.
Liaise with statutory bodies over catchment management and Natural Flood Management (NFM).

Objective 7: Manage open agricultural ground areas.
Maintain current agricultural lease sites and explore opportunities to develop and expand other land use within the plan area.

Objective 8: Landscaping interconnector corridor.
The scale of planned clearfell over the plan period will significantly contribute towards the age class and species diversity of the plan area.

7.0 Analysis and concept

7.1 Analysis

The following table sets out the site factors that are deemed significant in influencing the long-term management of the forest block.

Objective	Opportunities	Constraints	Concept
Commercial timber production	Provide planned sustainable timber supply.	Age class uniformity within block. Steep ground working. Enhancement of non-commercial habitats (conservation / agricultural).	Variety of coupe sizes to fit topography programmed for smoothed timber supply. Maintain core conifer restock programme and increase BL area in future rotations. Consider alternative species (ie extended rotation age) for steep working sites
Restructuring	Significant areas of even-age pole stage and mature plantation present opportunities to continue the age class and species restructuring work that previously has taken place over the plan area.	To minimise the prospect of windthrow and to maximise the crop's commercial value, even-age plantation should be harvested over a relatively short time-frame.	Large coupe sizes to maximise timber extraction and restructuring. Design coupe boundaries to offer coupe structure choice and to build resilience over future rotations.
Catchment management and peak flows	Make a positive contribution to the moderation of peak flows within the R Stinchar catchment. Maintain and enhance water quality within the R Stinchar catchment	Conifer monoculture planted close to watercourses. Creation of additional open space and/or non-productive broadleaves with potential loss of productive conifer.	Enhance riparian corridors through additional open space and native broadleaves planting/recolonization within wider buffer zone. Increase species diversity. Monitor conifer regeneration and control where resources allow. Monitor efficacy of

		Nat. regeneration of conifer in riparian buffer zone. Broadleaf browsing damage.	browser control.
Deer control to increase opportunities for BL and soft conifer establishment to meet UKFS requirements	Effective deer control could lead to an expansion of natural broadleaf colonisation, especially in riparian corridors, and increased flora diversity on open ground for a relatively low cost/ ha. Link the timing of deer control effort to the timing of browsing-sensitive restock. Clearfell areas will create open areas to allow deer control.	High cost implications. Neighbouring properties may have differing objectives and may be affected by reduced deer numbers. Public access can constrain deer control.	Larger felling coupes facilitate deer control and make restock areas less sensitive to deer damage. Group restock species sensitive to deer browsing into areas where deer control can be targeted.
Open ground management	Expand grazing area under lease. Maintain "wild" open land and landscape feel.	Renewables development and facilitation of Government green energy policies.	Connect open hill ground to low lying valleys. Increase areas of permanent open space at elevation through reducing tree line. Create additional internal open space particularly riparian zones.
Wildlife – red squirrel	Maintain red squirrel habitat and connectivity	Utilising large-seeded BL species as major component in broadleaf mixtures.	While not a stronghold area for red squirrels, use of large seeded BL will generally be avoided. Felling order will not isolate squirrel

			population.
Wildlife – black grouse	Soften woodland boundaries with low density restock adjacent open ground to improve habitat for black grouse.	Edge areas difficult to access for deer control to minimise browsing of alternative conifer/BL	Target areas of BL/SP where control can be maintained, otherwise reduce density of LP planting to create more open buffer with adjacent open ground.
Increase opportunities for BL and soft conifer establishment to meet UKFS requirements	Effective deer control could lead to a significant expansion of new mixed woodland along the upper margin and increased floral diversity on open ground for a relatively low cost/ ha. Link the timing of deer control effort to the timing of browsing-sensitive restocks within the wider LMP area. Respond to wider national changes in deer management that may occur, specifically if deer numbers are reduced more generally across adjacent open ranges. Increased levels of deer control can work synergistically with high levels of public access by making the deer less settled in one area. Increased access to the upper forest margin, which is the	Recreational access can constrain deer control. Track formation and deer control are expensive options. Neighbouring properties may have differing objectives and may be affected by reduced deer numbers.	Improve access for deer management along the critical upper forest margin. Group restock species sensitive to deer browsing into areas where deer control can be targeted. Create larger felling coupes as appropriate to facilitate deer control and make restock areas less sensitive to deer damage. Explore establishing of BL and alternative conifers in the second phase, once deer numbers have reduced.

	critical locality for deer control, could help facilitate future management		
Access and Health	Enhance access and enable communities to enjoy woodlands	Formal recreation in block restricted to west with focus on Barr. Maturing single species high forest offers few internal or external views.	Maintain access and enhance trail environs through specific crop treatment around Barr trails area. Enhance in-forest experience with increased open space and species diversity. Introduce signage as appropriate as forest structure becomes more attractive.

7.2 Concept

The concept forms the broad framework for the detailed design and is presented graphically in the Analysis and Concept map. There are six main strands to the overall design concept outlined as follows:

Existing external open land

A huge element of the plan area comprises open hill ground; the Nick of the Balloch range that includes Craigenreoch, Pinbreck Hill, Cairn Hill and Eldrick Hill lies to the south.

Currently there is no intention to reduce the area of open hill through additional conifer restock however additional broadleaf planting areas have been identified along riparian zones that may partially extend into the open ground.

Commercial conifer zone / Core timber production

The block comprises upland Sitka spruce and mixed conifer plantation that provides a sustainable timber volume stream for the district.

Although constrained by the limiting site types, opportunities will be taken where possible to extend rotation length, increase species diversity and generally reduce average coupe size throughout the plan area.

Significant areas of the current productive commercial core comprises poorer quality growing crop that could potentially be converted to alternative conifer restock, peatland edge woodland or open space in second / subsequent rotation.

Roadside corridor

The LMP area is bounded by the Straiton / Glentrool minor road to the east and is bisected by U57 minor county road at the Nick of the Balloch and at Garleffin; both roads allow linear viewing into the plantation.

An enhanced diversity of restocking options particularly broadleaf planting will be pursued in and around these sites with the potential for alternatives to clearfelling explored.

Lochs (water bodies) / Water of Gregg and other riparian zone enhancement

Linfern Loch, within the plantation matrix, and Aldinna Loch out on the open hill are significant water body features within the plan landscape.

Linking Linfern loch to and improving its connectivity to open hill ground to the north and to other riparian zones may potentially be achieved through conifer removal and peatland restoration around the loch with the creation of new open space areas and groups of native BL restocking in excess of the basic proposals of the legal drivers and voluntary codes i.e. the UK Forestry Standard (UKFS) the Forest and Water Guidelines (FWG) and the UK Woodland Assurance Standard (UKWAS)

Riparian enhancement, particularly along the Water of Gregg and other tributaries of the R Stinchar is also considered a priority.

Utilities corridor

The corridor of the Northern Ireland Interconnector overhead cable is a highly visible, angular feature that cuts through the southern boundary of the plan area. Work has already taken place to ameliorate the impact on the landscape of the feature.

Additional permanent open space and broadleaf restock is proposed to further enhance the feature compatibility in the landscape.

Internal open ground

There are significant areas of open ground given over to grazing leases in and around Barr village and these will persist.

Permanent open space associated with coupe boundaries, forest road edges, quarries and archaeological features remains a significant component of the plantation core.

All heritage features will continue to be conserved and protected within areas of permanent open space as per approved management plans/archaeological guidelines.

8.0 Long Term Land Management Plan Proposals

8.1 Management

The Carrick and Changue plan has been designed in accordance with sound silvicultural and environmental principles within the framework outlined by the UK Forestry Standard, the UK Woodland Assurance Standard, Scotland's Forestry Strategy and the Forestry and Land Scotland Corporate Plan.
An overarching aim for management of the block over the next 20 years is to provide a continuing supply of timber for national markets. Sitka spruce will be the key species for this along with alternative conifers and productive broadleaves targeted where site conditions produce acceptable growth.
The accompanying Management map provides details of our coupe management proposals and the table below provides a summary of the average annual felling and thinning volumes (m3ob) expected for the next 10years (plan period) and beyond:

Fell period	Thinning / LISS	Clearfell	Total
2021	19,181	21,771	40,952
2022-2026	8,726	12,787	21,513
2027-2031	7,383	16,781	24,164
2032-2036	5,452	13,012	18,464
2037-2041	4,407	34,527	38,934

8.1.1 Clear Felling

Clearfelling has already commenced across the LMP however with a still significant area of existing plantation generally at pole stage or maturing high forest block restructuring, with 8-10yr age gaps developed between felling coupes (and possibly even wider gaps immediately adjacent to Black Grouse areas) remains an objective.
With a greater species diversity of future conifer restock and our intentions, where possible, to retain mature conifer species through extending their rotation length (mainly Scots Pine and Norway spruce) we hope to generate a more diverse age class structure in the plantation thus improving the spatial appearance and structure of the block.
Although efforts have also been made to reduce the size of the clearfell coupes for landscape and biodiversity considerations across the plan area, with less visible larger coupes at elevation and the merging of some lower lying coupes into a single larger scale coupe with a long term objective for broadleaf woodland, the average coupe size remains relatively high.

The following table reflects proposals contained within the Management map for the Carrick and Changue LMP area and shows

- the coupe clearfell proposals by species and hectare for the 10 year period of the plan

Clearfell proposals for 10 year plan period

Coupe	SS	NS	Larch	SP	LP	Other con.	BL	Open space	Total
69057	57.3	-	1.7	-	-	-	-	6.3	65.3
69058	40.0	-	-	-	-	-	-	0.6	40.6
69061	19.5	-	-	-	-	-	1.3	1.9	22.7
69062	21.6	-	-	-	-	-	-	1.2	22.8
69073	37.5	-	10.1	-	-	-	-	14.3	61.9
69082	19.0	-	0.5	-	-	-	-	5.5	25.0
69086	28.5	-	1.5	-	-	-	-	6.1	36.1
69087	-	-	3.8	-	-	-	-	-	3.8
69091	37.6	-	-	-	-	-	-	1.2	38.8
69102	-	-	7.7	-	-	0.4	-	1.3	9.4
69106	27.5	-	0.3	-	1.7	-	-	0.3	29.8
70006	19.3	-	-	-	-	-	-	-	19.3
70014	10.2	-	1.8	-	-	-	-	0.2	12.2
70016	20.7	-	-	-	-	-	-	0.5	21.2
70031	21.8	-	-	-	-	-	-	0.6	22.4
70032	43.3	-	-	-	-	-	-	0.5	43.8
70060	0.4	-	2.0	-	-	-	0.2	0.1	2.7
70065	22.4	-	2.5	-	-	-	1.0	0.5	26.4
70066	1.6	-	9.1	0.2	-	-	-	0.2	11.1
70067	3.0	-	6.0	-	-	-	-	3.0	12.0
70068	11.0	1.0	5.0	-	-	-	-	0.5	17.5
Total	***442.2***	***1.0***	***52.0***	***0.2***	***1.7***	***0.4***	***2.5***	***44.8***	***544.8***

Given the prevailing poorer site types virtually the entire plan area will be managed under a clearfell management type using either conventional harvester and forwarder working or, in the more sensitive steeper areas, skyline. Lower lying coupes may be subject to shelterwood or Alternative to clearfell systems.
Adjacency issues will either be dealt with through delay felling i.e. a coupe will not be felled until surrounding crops are at least 2m tall or, more infrequently, through delay restocking i.e. coupe not restocked until surrounding crops are at least 2m tall.
All proposed operations sites will be surveyed prior to work taking place to identify the presence of species such as Birds, Otter, Squirrel, Bats and Badger or adjacency of other species sensitive to disturbance that may require specific management treatments i.e. avoiding breeding seasons**.**
The following table confirms that, as per paragraph 3.4.2 in the UK Woodland Assurance Standard (second edition), no more than 25% of the plan area is due to be felled in any five year period within this plan approval period.

5yr Fell period	Area felled (ha)	Area felled as % of plantation area
2020-2024	326.3	6.6
2021-2025	177.1	3.6
2022-2026	137.8	2.8
2023-2027	101.9	2.1
2024-2028	150.2	3.1
2025-2029	218.5	4.4

It is of course important to manage forestry activities in acid sensitive water catchments and within this LMP area there are three catchments identified as being “at risk” that are impacted. Calculations involving our proposed felling and restocking for these catchments have been prepared and are included at Appendix IV**.**
Due to the relatively low levels of planned clearfell the “at risk” catchments all satisfy the felled area threshold however they do not meet the closed canopy forest >15yrs needing to be less than 30% of the catchment in 15 years’ time. In extensively (>50%) forested catchments like those present in and around the Carrick and Changue LMP area, additional measures to reduce the impact of forestry will be more closely considered.

For conservation, biodiversity and water quality considerations efforts have been made

- to increase conversion of conifer stands to broadleaf woodland
- to extend the felling period between coupes to over 7yrs
- to marry coupe shape better to landform and where possible to reduce the overall size of the remaining clearfell coupes

Subject to favourable water chemistry status, there is a district commitment towards our proposed felling and restocking for these catchments.

8.1.2 Thinning

Thinning will be undertaken in line with the districts programme, utilising appropriate equipment and methodologies.
Thinning has previously taken place throughout the LMP unit. Centred mainly on the more sheltered valley bottoms of the Changue block but also in limited parts of the Carrick block, success has been variable.
Carried out on a 5-7yr cycle in accordance with our local policy, the crops have been thinned to improve timber quality but also to realise amenity, biodiversity and landscape objectives. Whilst opportunities to dramatically increase the overall thinnable area and move more of the block from a clearfell to Group Shelterwood management system are limited by site type, opportunities to develop thinning to the south west of the Changue block and in some second rotation crops across the plan area may arise.

8.1.3 Continuous Cover Forestry (CCF)

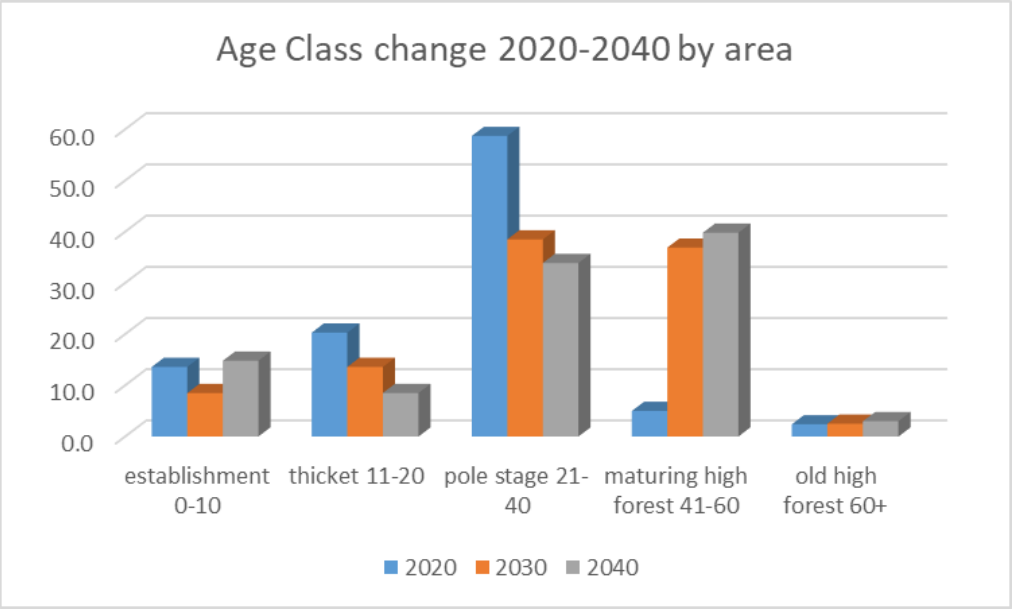
Site type constraints and crop ages suggest that currently few areas of the block are appropriate for management under some type of Low Impact Silviculture System (LISS) to try and maintain permanent woodland cover and contribute to the protection and improvement of water quality, soil quality and biodiversity.
However using Group Selection systems, where appropriate, in some second rotation crops and through regular crown thinning and occasional small-scale clearfells of <2ha (perhaps centred on windthrow) we may be able to provide spatial diversity and areas for either natural regeneration or targeted restock of small seeded native tree and shrub species.
Group Selection generally encompasses:

- progressive thinning
- clearance of windthrow patches
- small-scale felling patches of 0.5ha up to 2.0ha to stimulate restructuring and promote regeneration of target tree species

If there is a management requirement for any coupe greater than 2.0ha to be felled then that prescription will be initially agreed with the FCS as per the Tolerance Table in Appendix II.

8.1.4 Restructuring

Planned clearfell, restocking and the creation of additional open space will continue to gradually change / improve the spatial appearance and structure of the block.
Additional areas of broadleaf and Long-term Retention of mature conifer species such as Norway spruce, in tandem with our revised thinning plan, will provide a greater diversity of habitat throughout the block and benefit it in landscaping terms.
The following chart demonstrates the change in plantation age class structure from 2020 to 2040 in 10 year intervals.



8.2 Restocking proposals, future habitats and species

A modest amount of clearfelling is scheduled for the first two phases of the LMP, restocking is limited to these sites.
The accompanying Future Habitats and Species map provides detail of our proposed restock species and habitats for the Carrick and Changue LMP area where areas mapped as broadleaf essentially comprise 60% broadleaf within an unmappable 40% of open ground.
Ground preparation and planting of quality nursery stock of appropriate provenance will take place with our target stocking density for commercial

conifer species being 2500stems/ha at year 5 and for the non-commercial broadleaf around 1600stems per hectare (2.5m spacing).
Where the opportunity arises restocking will also accommodate natural regeneration.
Natural regeneration will play a larger part in the Alternative to Clearfell areas where no ground preparation or disturbance is anticipated, there remains however the possibility that regenerating trees will not provide sufficient stocking. Where natural regeneration is anticipated the areas will be surveyed at year 4 and where the density of tree cover is insufficient (i.e. not established at 1100 stems per ha.) then the site will be enriched / restocked with the appropriate species or native broadleaf in the following planting season.
The accompanying Future Habitats and Species map provides a details of our proposed restock species and habitats for the Carrick and Changue LMP area.
The following tables shows

- the coupe restocking proposals by species and hectare for the first 10 years of the plan
- the proposed change to area by species at current, 10 and 20 year intervals

Restock proposals for 10 year plan period

Coupe	SS	NS	Larch	SP	LP	Other con.	BL	Open space	Total
69057	58.5	-	-	-	-	-	-	6.8	65.3
69058	36.8	-	-	-	-	-	-	3.8	40.6
69061	20.0	-	-	-	-	-	1.2	1.5	22.7
69062	20.2	-	-	-	-	-	-	2.6	22.8
69073	31.3	-	-	-	-	-	13.6	17.0	61.9
69082	19.8	-	-	-	-	-	-	5.2	25.0
69086	25.5	-	-	-	-	-	1.6	9.0	36.1
69087	-	-	-	-	-	-	3.8	-	3.8
69091	27.6	-	-	-	-	-	6.1	5.1	38.8
69102	-	-	-	-	-	9.1	-	0.3	9.4
69106	27.6	-	-	-	1.0	-	-	1.2	29.8
70006	18.3	-	-	-	-	-	-	1.0	19.3

70014	10.7	-	-	-	-	-	1.3	0.2	12.2
70016	19.8	-	-	-	-	0.5	-	0.9	21.2
70031	20.6	-	-	-	-	-	0.7	1.1	22.4
70032	35.3	-	-	-	-	-	8.5	-	43.8
70060	-	-	-	-	-	-	2.7	-	2.7
70065	25.1	-	-	-	-	-	1.0	0.3	26.4
70066	-	-	-	10.6	-	-	-	0.5	11.1
70067	-	-	-	-	-	-	12.0	-	12.0
70068	-	15.8	-	-	-	-	-	1.7	17.5
Total	***397.1***	***15.8***	***0.0***	***10.6***	***1.0***	***9.6***	***52.5***	***58.2***	***544.8***

Notes on restock coupe work schedule

69057	Core production coupe; SS matrix with open space to coupe edge, Linfern Loch and forest road
69058	Core production coupe; SS matrix with open space to coupe edge and forest road
69061	Core production coupe; SS matrix with open space and BL to coupe edge, watercourse and forest road
69062	Core production coupe; SS matrix with open space to coupe edge and forest road
69073	Production coupe; SS matrix with significant area of open space and BL targeted along un-named burn riparian zone and for visual diversity from county road running north south through coupe
69082	Core production coupe; SS matrix with existing open space and additional open ground to coupe edge
69086	Core production coupe; SS matrix with additional open space and BL to riparian zones and coupe edge
69087	Biodiversity coupe (previously an infected larch site); BL woodland within riparian zone
69091	Core production coupe to west of Linfern Loch; SS matrix with open space and BL targeted towards low lying riparian / aquatic areas around loch to east
69102	Production coupe; DF matrix to eastern edge Dunamoddie hilltop with open space To coupe edge
69106	Core production coupe; SS matrix with open space BL targeted to coupe edge and Dunamoddie hilltop
70006	Core production coupe adjacent to Craigenrery agricultural ground; SS

	matrix with open space to coupe edge
70014	Core production coupe adjacent to Water of Gregg riparian zone to east; SS matrix with BL and open space towards riparian zone
70016	Core production coupe adjacent to (relatively) new Dinmurchie acquisition to west; SS matrix with DF targeted to better site type towards acquisition with open space to quarry and coupe edge
70031	Core production coupe; SS matrix with open space and BL towards Changue Burn riparian zone
70032	Core production coupe; SS matrix with BL towards Changue Burn riparian zone
70060	Biodiversity coupe (previously an infected larch site); BL woodland linking to riparian zone
70065	Core production coupe; SS matrix with open ground and BL to coupe edge
70066	Biodiversity coupe (previously an infected larch site); SP woodland for habitat and species diversity
70067	Non-core production coupe adjacent with Water of Gregg riparian zone to east; BL matrix for riparian enhancement and potential ASNW expansion
70068	Biodiversity coupe (previously an infected larch site); NS woodland for habitat and species diversity

Species	**Area (ha) 2020**	**Plant Area %**	**Area (ha) 2030**	**Plant Area %**
Sitka spruce	2977.8	60.6	2932.7	59.7
Norway spruce	30.1	0.6	44.9	0.9
Larch spp.	175.3	3.6	123.3	2.5
LP (other pine)	219.1	4.5	218.4	4.4
Scots Pine	49.0	1.0	59.4	1.2
Douglas Fir	33.2	0.7	33.2	0.7
Other Conifers	21.8	0.4	31.0	0.6
Broadleaf	325.2	6.6	375.2	7.6
Open Space	1082.5	22.0	1095.9	22.4
Total	**4914.0**	**100.0**	**4914.0**	**100.0**

Through the period of this plan the table shows a modest reduction in area of Sitka spruce and a corresponding modest expansion of minor conifer species and broadleaf woodland. Essentially focused on accessible controllable habitat networks, the increase in species diversity should significantly enhance the landscape and additionally provide an improved woodland habitat for the protection of soils and improvements to water quality. Target stocking densities for non-commercial broadleaf will be a

minimum of 1,600stems per hectare (2.5m spacing) with restocking taking place should the figure not be reached through natural regeneration.
Other than an additional source of firewood the block offers little potential for commercially productive broadleaf plantation.

8.3 Open land

8.3.1 Open land; Quarries

The three main active quarries, North Balloch, White Rue and Garleffin are identified as such on the features map. They will remain as areas of permanent open space during their active life as will the other smaller inactive sites.

8.3.2 Open land; Grazing

To the south of the plantation area open hilltops are a significant component of permanent open space within the plan.
The ground around Pinvalley is subject to a full Agricultural tenancy agreement that is projected to continue over the period of the plan.
There are no plans to increase the area under tenancy.

8.3.3 Open land; Other / Renewables

Parts of both the forest and open ground in the Changue and Carrick sections of the plan area are currently under option to develop a windfarm by Scottish Power Renewables (SPR).

8.4 Visitor Zones

A significant area of the Changue block centred on the Barr trails falls into the local FES interactive and passive visitor zones. To the east of the LMP area, small sections of the Carrick block near to the Stinchar Bridge car park and at the forest entrance where the Straiton road enters the forest fall into the welcome visitor zone (see features map).
These are considered to be one of the district's main recreation facilities and the Recreational demands within these zones will impact greatly on our management choice with standard regimes heavily modified to improve the internal and external views associated with the routes and facilities.
The principal facilities are listed in the table below.

Facility	Concept / Opportunity	Constraint	Plan Development
Barr trails	Enhance the plantation backdrop to the trails complex	Core plantation restricting views. Sanitation felling of larch.	Enhance riparian zones and path immediacies through BL restock and creation of additional open ground. Restock target areas with SP to provide long term backdrop to trails. Improve immediate trail surrounds through species diversity and harvesting alternatives to clearfell. Ensure views to the water fall remain unobstructed.
Straiton road entrance to forest			Long term retentions, increased broadleaf restock and the further development of LISS areas should maintain and develop a "Gateway to the Galloway Forest Park" concept and visual experience for passing visitors.

8.5 PAWS Restoration

All PAWS sites or areas of Ancient Semi Natural Woodland within the LMP will be maintained / restored as per their management plans.

8.6 Natural Reserves, Minimum Intervention and Long Term Retention

Natural Reserves are predominantly wooded, permanently identified locations of high wildlife interest or potential managed for high conservation or biodiversity value in perpetuity.

There are two small Natural Reserves in the plan area (21.5ha), both are targeted to broadleaf woodland.
Around 6.1% of the plantation area has been identified as either Long Term retentions or Minimum Intervention.
As there are sufficient selected Natural Reserves of higher biodiversity value to be found throughout the district, broadleaf areas and isolated conifer retentions will provide our focus for Minimum Intervention management within this LMP area. Minimum intervention has management with no systematic felling or restocking although operations such as fencing, control of exotics and pests, safety work and trail maintenance are permitted.
In Long-term Retention areas, trees are retained for environmental benefit significantly beyond the age or size generally adopted by the woodland enterprise.

9.0 Management Prescriptions

Forest Management Types

- Clearfelling

Generally clearfelling will be carried out by harvester and forwarder however there are some steeper parts of the LMP that will require skyline felling. All timber will be processed as cut to length (CTL) and will utilise brash mats and appropriate machinery to reduce (minimise) ground damage and compaction.

- Thinning

As determined by the district thinning programme, much of the thinning taking place in the block will now comprise second rotation crop first thinnings that will predominately be racks cut into the coupe, every 6-8 rows. Where terrain and slope allows, chevron patterns will be utilised and where an area is not possible to thin, a severance rack will be cut to split the thinnable and unthinnable sections of the coupes.

Subsequent matrix thinning will focus on improving timber quality with suppressed, double stemmed, wolf and co-dominants the focus of removal, where this will not create instability in the stand.

Thinning will normally be carried out at, or below, the level of marginal thinning intensity (i.e. removing no more than 70% of the maximum MAI, or YC, per year). Higher intensities (no more than 140% of maximum MAI, or YC, per year) may be applied where thinning has been delayed, larger tree sizes are being sought or as part of a LISS prescription. In all cases work plans will define the detailed thinning prescription before work is carried out and operations will be monitored by checking pre and post thinning basal areas for the key crop components, with inspections to ensure the stand quality is being enhanced.

- Low Impact Silviculture

Group shelterwood – Small scale group fellings or areas which have been subject to windblow will be harvested to a maximum of 50m diameter (2 tree lengths) to ensure that humidity and windspeed levels are at their optimum levels for natural regeneration to occur. The regeneration will be monitored (see Natural regeneration).

- Natural regeneration

Natural regeneration will be utilised where appropriate and managed under the district guidance and the guidance from the natural regeneration working group. Regeneration will be monitored to inform and facilitate interventions such as respacing, enrichment planting or ground scarification. This will apply to both clearfell and LISS areas.

- Long Term Retentions

Long Term Retentions (LTR) are an important area of the forest for biodiversity. Where these are present, it would be expected that they would also contain standing deadwood and large woody debris, especially of native broadleaves in excess of 20cm diameter.

- Natural Reserves/Minimum Intervention

Save for the area of conifer reserve at elevation of *P mugo*, there are no Natural Reserves in the plan area.

There are however areas of Minimum Intervention areas identified (generally broadleaf areas) within the plan where, in the long term, as much deadwood as possible will be retained, in excess of the $20m^3$/ha as recommended by the UKFS. This will include a variety of heights and species where available. No trees will be ring girdled or cut above stump level to create deadwood habitat.

Operational Access

The LMP unit has good existing operational access within the forested areas however some new roads construction is required. Road upgrade and maintenance will be required annually for general haulage access and for identified thinning and LISS operations. This will be assessed as part of the operational assessment.

Additional ATV tracks may also require construction to allow for deer control.

Deer Management

Current Deer management is maintained in line with the districts deer management strategy. A sustainable deer population exists such that there is a potential for natural regeneration of broadleaves.

Management of Open Ground

Post clearfelling, there will be no conifer restocking within 20m (and on occasion up to 50m) within the main watercourse riparian zones. It is expected that some of the riparian zones, designed open ground and broadleaf areas will fill in with natural regeneration of both conifers and broadleaves. Through the delivery of this Land Management Plan (LMP) FES will manage natural regeneration in such a way as to ensure that, where practicable, it does not significantly impose a negative impact upon the objectives of the plan. Natural regeneration will be managed so that any negative impact upon designated, protected or promoted habitats, species, landscapes and catchments within or adjacent to the LMP area is minimised and where possible mitigated. The advice of the local Fisheries Trusts and comments from SEPA will be taken into account when planning

management of natural regeneration. All Native broadleaves will be retained.
For areas designated as permanent open space natural colonisation and regeneration will be managed in line with the management objectives for the areas.

PAWS Restoration
PAWS restoration will look to remove all non-native conifers, especially where there is mature cone-bearing and shade tolerant conifer.

New Woodland Creation
There are no areas identified for the creation of New Woodland.

Public Access & Core Paths
Elements of the Core path network for Scotland, mainly on forest roads, criss-cross the LMP area. The trails adjacent to and associated with Barr village are identified as recreational facilities where core development may be an option.

Heritage Features
There are two Scheduled Monuments and several minor heritage features throughout the area but there are no Category A listed buildings present. Discovered heritage features will be buffered in areas of open space and recorded on the FLS Heritage Layer.
Scheduled Ancient Monument plans to be reviewed within phase 1 of plan.

Waste Management (including felling to recycle)
Commercial felling operations generate felling debris in the form of brash and lop / top. Unless being recovered for biomass production, this material is generally left on site for soil protection, nutrient cycling and site amelioration. There are no plans to carry out chipping, mulching or spreading of forest waste over the plan area for ecological site improvement however in response to the infection of *P ramorum* in larch crops, some small scale felling to recycle and chipping trials with the product removed from site for wood fuel may take place.
Detailed plans will be submitted to FCS and SEPA for approval prior to any work taking place (see Appendix II Tolerance table).
Tree guards are not truly bio-degradeable and will be removed for recycling or disposal.

Habitats Regulations Appraisal
No Special Areas of Conservation (SAC) are impacted on by the plan area.

A Habitats Regulations Appraisal is not required.

Appendix I: Land Management Plan Consultation Record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
RSPB	09 February 2018	16 March 2018	• Important area for Black Grouse • Potential for some peatland restoration	• Points generally addressed within LMP text
SEPA	09 February 2018	12 March 2018	• Flood risk • River basin management focussing on water crossings, invasive non-native species and riparian corridors • Felling and replanting percentages, minimum buffers and diffuse pollution • Supporting infrastructure specifically new road construction • Carbon balance and peat areas • Impact on wetlands • Waste on site • Pollution prevention	• Noted see section 3.1.2 • Noted, riparian zone treatment covered throughout text, specific invasive non-native at section 3.4.4 • Noted, addressed throughout text • New road programme identified at section 2.5 • Noted section 5.2.2 and others refer • Noted, see section 3.4.3 • Noted, section 9 refers
Historic Scotland	09 February 2018	08 March 2018	• Presence of Scheduled Ancient Monument records and required revision of their management plans	• Noted within LMP text
SNH	09 February 2018	No response received		

South Ayrshire Council	09 February 2018	No response received		
South Scotland Conservancy	09 February 2018	No response received		
Ayrshire Rivers Trust	09 February 2018	No response received		
CONFOR (by email)	09 February 2018	No response received		
Saving Scotland'sRed Squirrels	09 February 2018	No response received		
DGA Forestry	09 February 2018	No response received		
UPM Tilhill	09 February 2018	No response received		
Scottish Woodlands	09 February 2018	No response received		
Barr Village Community Council	09 February 2018		Request for Community Council presentation	Drop-in meeting attended at Barr village hall and presentation to Community Council carried out 08 March 2018

Consultee	**Issues raised from LMP being on public register**	**Forest Region Response to consultee**	**FCS consideration**
	•	•	•
	•	•	•

Appendix II: Supporting Information

II/1.0 The existing forest and land

1.1 History of the land holding

The bulk of the Carrick and Change plan area was acquired in the 1930s and 1940s. Regular additional purchases in almost every decade from the 1960s right through to 2011 complete the plan area (see table below).

Acquisition date	Deed No	Title	Seller
Nov 1935	9230	Changue and Craigmalloch Estate	Mrs Agnes Miller or Douglas
Aug 1945	11148	Cassillis and Culzean Estate	Cassillis and Culzean Estates Ltd
Oct 1960	9248	Linfairn Farm (pt)	John McWhirter
Feb 1961	9249	Pynannot & Cairn	Trustees/Late James Campbell
Nov 1975	9281	Garleffin Farm (Kilkerran Est)	Sir Charles Fergusson
Mar 1978	9286	Linfairn/Garleffin exchange	Mr & Mrs McWhirter
Mar 1984	9304	Doughty & Dalwyn (pt)	Sir Charles Fergusson
Aug 1990	35071	Blair Farm	Gov. of Bank of Scotland EC
Aug 1991	27729	Darley	W A F Cunninghame
Apr 1992	25881	Linfairn Farm (pt)	I U & Mrs M W M McWhirter
Nov 2011	2001475	Dinmurchie Farm	Roy Webb

Afforestation in the core Changue and Carrick blocks began in the late 1930s and early 1940s, continuing apace as other land was acquired over the years. Despite large areas of unplanted open hill ground, this plan area contained some of the earliest FES forests to have significant harvesting programmes, the area has been regularly harvested since the 1990s, starting a programme of restructuring across the plan area and creating a mix of first rotation and second rotation conifer crops.
Although this large scale plan links to other FES plantation to the south and east, it stands comfortably as a separate land management plan unit for topography considerations.

The potential for amalgamation of this plan area with other design plans areas with common issues within the Carrick Forest "massif" and the creation of larger scale Land Management plans that might additionally focus on landscape scale management of open hill ground areas has been considered.

II/2.0 Analysis of previous plan

2.1 Aims of previous plan and achievements

Objectives from the previous plan were as follows:

Previous plan objectives	Assessment of Objectives during plan period
Maintain commercial softwood timber production in forest core	Clearfell and restock with commercial conifer species continues. Premature clearfell of infected larch (including some associated spruce crop for access) has impacted on the medium term sustainable timber supply.
Increase habitat diversity along the moorland fringe and lower the treeline	Little progress achieved with only coupes at lower elevations being worked. Work proposed for this plan period should have a greater impact on plantation edges.
Increase age class and species diversity. Improve riparian zones and enhance landscape and conservation value across the plan area	Species diversity is compromised in the medium term through loss of larch however additional BL restock to replace the lost larch and restocking with alternative secondary species will continue to provide additional diversity. Block currently contains around 16.0% plantation by area of broadleaf and secondary conifer species and increased open space particularly at elevation and along riparian corridors.
Create more permanent woodland and open semi-natural habitat along the Interconnector route to mitigate landscape intrusion	Significant lengths of the Interconnector route run across open ground and are not impacted on by restocking, other sections run through coupes that as yet have not been felled. Coupes on the Interconnector line that were previously clearfelled have been

	restocked with a view to amelioration of the route using BL restock and additional open space.
Maintain the current Recreational features and investigate further developments	Whilst the current facilities have been maintained, little has been done regarding their enhancement /expansion.

2.2 How previous plan relates to today's objectives

Whilst the 2006 approved plan objectives have generally been met, they have over the period become slightly outdated.
Key Scottish Forestry Strategy themes and objectives for the plan, see table below, are now more directly related to the revised brief (see Appendix III).

	Priority
Productive; Promote sustainable timber supply through revised felling and restocking plans and a supporting road construction / maintenance programme. Increase broadleaf woodland creation.	HIGH
Healthy; Identify additional LISS and Minimum Intervention management coupes to maintain woodland cover and contribute to the protection and improvement of water and soil quality. Control invasive species. Restructure even aged crops.	HIGH
Cared For; Secure and restore PAWS remnant areas. Follow / exceed UKFS standards and Forest and Water guidelines to maintain and improve water quality in the R Stinchar catchment. Protect water soil and air and contribute to Scotland's landscape through the management of views from surrounding minor county roads. Improve external / internal design through revised, more diverse species choice. Maintain and enhance plan area for priority species. Manage SAMs as per management plans.	HIGH
Accessible; Retain existing facilities in partnership with local communities	MODERATE

II/3.0 Background information

3.1 Physical site factors (egs of sub headings below)

3.1.1 Geology Soils and landform

The plan area lies partly on the Southern Upland Fault line. The course of the River Stinchar at Aldinna follows the fault line and whilst the underlying geology for the area is mostly sedimentary greywacke, shales and conglomerates of the Ordovician and Silurian eras, there are significant Felsite and Acid Porphoryte igneous intrusions to the north and Basaltic lavas stretching east on the undulating plateau towards Straiton.

Apart from steeper slopes associated with the R Stinchar valley, comprising The Tappins, Craig of Dalwine and Bencallan, the topography is generally flat to gently undulating. Larg Hill 386m is the highest planted hill however Craigenreoch 565m and its associated range of hills at the Nick of the Balloch including Pinbreck Hill and Cairn Hill are the most dominant landform. Overall they contribute to a "grand landscape" of large boggy areas interspersed with rounded hills and granite outcrops.

Poorer soil types with impeded drainage dominate the plan, a fair reflection of high rainfall in a heavily glaciated landform. Peat bogs, mainly unflushed bogs, account for over 75% of the plan area. Gleys and peaty gleys, generally found on the slopes above the bogs and small amounts of Iron pans, skeletal soils and Brown Earths make up the remainder.

Determined by the altitude and predominance of the peatland, the James Hutton Institute "Land Capability for Forestry" classification for the area is a mixture of F5 and F6 (land with limited or very limited flexibility for growth and management of tree crops) resulting in a relatively limited species choice throughout comprising mainly Sitka Spruce and Sitka Spruce / Lodgepole Pine mixtures.

3.1.2 Water

There are two large lochs within the plan area, Linfern Loch lies within the plantation and is not owned by FES, Aldinna Loch lies to the south on the open moorland.

A number of internal watercourses drain the plan area principally the R Stinchar and its associated tributaries but also further north to the R Girvan. The R Stinchar is currently classified at a moderate status.

Burns flowing from the Meowl of Aldinna and the Black Hill are tapped into an aqueduct and piped east to the forest road (West Aqueduct road) supplementing the public water supply at Loch Braden.

Water quality in the area is a high priority. All of the principal burns are considered important for water quality so specific treatments that exceed water guidelines recommendations in Forest and Water guidelines 5th edition will be made to create significantly wider aquatic and riparian zones to provide long term protection against disturbance from future forestry operations and loss of light from canopy closure.

Overall management of waterbodies and catchment areas is a key environmental issue and we aim to comply with best practice in minimising sediment release from any forest operations and preventing any deterioration in their ecological status / potential. Due to the high incidence of existing open space within the plan, many of the catchments already only have moderate percentages of forest canopy cover over 300m, a figure likely to drop further given our proposed restructuring and planned reduction in future conifer restocking.

FES has considered flood risk of peak flows at the exit of the site and also further downstream. No part of the plan area lies within a Potentially Vulnerable Area (PVA) and there are no SEPA identified Objective Target Areas (OTA) downstream of the LMP area where there are known periodic flooding instances.

It is appreciated that new planting with associated operations of draining and ploughing can give rise to a very slight increase in peak flow (up to 20% at site scale), however with no additional areas of new planting proposed for this LMP and well designed and significant riparian buffers to minimise this effect, no flooding issues are anticipated.

The significance of the potential increase in peak flow will reduce as more water joins from other tributaries and the peak flow is diluted. Clearly if whole water catchments were being proposed for planting this would require greater examination and consideration.

There are private dwellings within or close to the block; details of all known private water supplies are held in a District GIS layer (see constraints map). All work undertaken will comply with the Forests and Water Guidelines (Fifth Edition).

3.1.3 Climate

Located in the south west of Scotland, and relatively close to the Firth of Clyde, the area has a predominantly mild windy oceanic climate influenced by the Gulf Stream. Annual rainfall in the block is generally above average for the district ranging from 1800 – 2000 and falls mainly during the winter months, October to February. Although primarily a mid elevation plantation, much of the block is susceptible to the prevailing westerly winds with damaging gales likely during the early part of the year. Winters can be severe and a low cloud base is common.

Guidance on Climate Change suggests that the District can expect an increased frequency of extreme weather events with the climate remaining wet and mild. Whilst there may be little impact on this DP block with regard to primary species choice (mainly conifer) there may be future threats to wildlife habitats. The development and maintenance of a diverse range of habitat networks is considered to be important.

3.2 The existing forest

3.2.1 Age structure, species and yield class

Species / Yield class

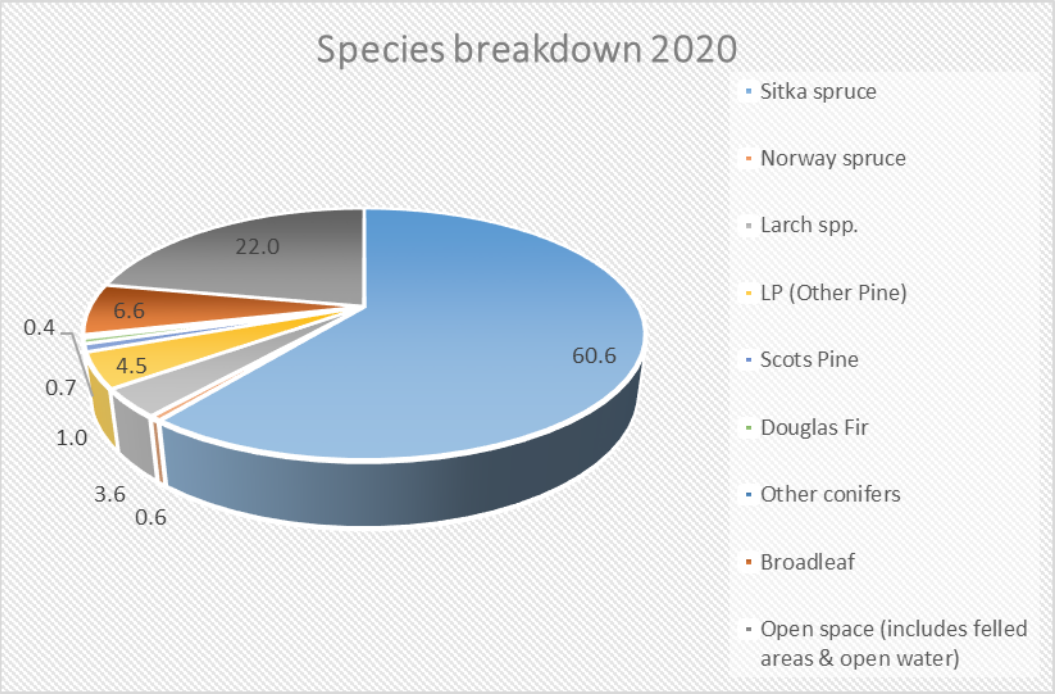
Around 40% of the plan area comprises extensive open hilltop, open water and other open ground. Their detailed treatment is covered in the main body of the text document under section 8.2.

There is a modest amount of species diversity within the plantation area however pure Sitka Spruce and Sitka Spruce / Pine mixtures still dominate the poorer site types present in the block and account for around 65% of the plantation area. Generally found in the more fertile sites, the minor conifer species of Norway spruce, Scots Pine, Larch and other conifers (6%) and broadleaf (just over 6.5%) account for the remainder of the area. With much of the larch component scheduled for removal under plant health notice for the widespread infection of *P ramorum*, species diversity will be further compromised in the short term. Broadleaf is generally confined to the riparian and aquatic zones located throughout the block.

Options available to optimise the value of the site include restocking with alternative conifer species better suited to site conditions such as Scots Pine or converting the poorer spruce crops on the peat land areas to peat land edge woodland or permanent open space.

Only around 0.5% of existing plantation has been identified as Native Woodland under the Native Woodland Survey Scotland project however even this modest area will form a focal point for further broadleaf expansion.

Species in 2020	Total area (ha)	% of plantation area
Sitka spruce	2977.8	60.6
Norway spruce	30.1	0.6
Larch spp.	175.3	3.6
LP (Other Pine)	219.1	4.5
Scots Pine	49.0	1.0
Douglas Fir	33.2	0.7
Other conifers	21.8	0.4
Broadleaf	325.2	6.6
Open space (includes felled areas & open water)	1082.5	22.0
Total	**4914.0**	**100.0**



Yield class is variable across the block but generally poor in the deeper peat land areas.

Age Structure

Whilst existing species diversity may be modest, there is a measure of spatial diversity within the Carrick and Changue LMP with all stages of crop growth represented, the growing stock however is strongly skewed towards pole stage crop (58.7%) giving the plan area a generally open feel.

Block restructuring, with 8-10yr age gaps developed between felling coupes (and possibly even wider gaps immediately adjacent to Black Grouse areas) remains an objective and our intentions, where possible, to retain mature conifer species through extending their rotation length (mainly Scots Pine) will maintain and continue to improve the spatial appearance and structure of the block.

3.2.2 Access

The Carrick and Changue blocks are bounded by the C1 Straiton to Glentrool village road to the east and are bisected by the U57 Nick of the Balloch road. Whilst the Changue section of the plan area can be readily accessed by light vehicles from the west, all timber haulage must exit the blocks to the east onto the C1 Straiton road. To keep timber haulage vehicles as far as possible on the internal forest road network and off of these sensitive county roads infrastructure, timber traffic from the Changue section crosses a short section of county road into the Carrick section to eventually exit the forest. Some timber haulage from the north west of the Carrick section (Garleffin) however will necessarily have to travel north on the U27 road.

Both of these routes are categorised as "consultation route" on the Ayrshire Timber Transport Group Agreed Routes map for Timber Haulage.

There is a significant length of existing forest road across the LMP area, around 68,500m.

3.2.3 LISS potential

Whilst much of the plan area has low to moderate DAMS scores (Detailed Aspect Method of Scoring) of 17, opportunities for a significant expansion of LISS areas are generally constrained by the poor, boggy site types.

Small areas centred around Barr village and adjacent to the minor county roads have already been identified for thinning and LISS management (Low Impact Silvicultural System) and there may be opportunities for expansion into some of the some second rotation crops. These will be added to the district thinning layer in due course.

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

3.2.4 Thinning potential

Small areas of the plan have already been identified for thinning with mixed success. Second rotation crop areas with low DAMS scores and generally within the valley systems potentially provide the only opportunities to expand thinning in the LMP.

3.3 Land Use (egs of sub headings below)

3.3.1 Agricultural land

Open ground lying to the south of the plan is under a full Agricultural tenancy and is projected to remain so for the period of the plan.

3.3.2 Neighbouring landuse

A remote rural area in South Ayrshire, this block adjoins other FLS Land Management Plan units to the south bounding with either other conifer plantation or more commonly onto open hill ground dominated by heather moorland and rough grassland with scattered lochans and areas of exposed rock. To the north neighbouring land use is more agricultural.
High Changue, Aldinna, Black Row and Craigmalloch number some of the private properties within the plantation.

3.4 Biodiversity and environmental designations

3.4.1 Designations

There are no environmental designations (e.g. SSSI, SAC) within or adjacent to the LMP area however the plan area does lie within the Buffer of the Galloway and Southern Ayrshire Biosphere.

3.4.2 Habitats and species

Much of the area consists of deep water-logged peat. Although in general decline, bog habitats (UKBAP priority) are nationally important supporting numerous flora and fauna species. Any conservation or restoration and expansion of bog habitat within the plan would therefore make a significant contribution to biodiversity in particular the targeted creation of additional open ground or peatland edge woodland and their associated conifer plantation removal could significantly improve groundwater levels essential for mire and bog habitats. An extensive programme of drain blocking has been carried out in the open ground centred on Eldrick Hill, Aldinna Loch and the flat areas on either side of the Black Burn. This was carried out to re-wet the site and restore the area to active bog and improve the habitat

value for Black Grouse. Additional work to smooth and restore the Peat Haggs in the vicinity of Aldinna Loch is currently being considered.

There is Native Woodland (including PAWS sites) present.

The Carrick and Changue LMP, along with the adjacent Carrick Forest Drive LMP to the east, is also considered to be a core area for Black Grouse within the district and is also recognised as being of regional importance for the species. A red listed UKBAP species, Black Grouse has been recorded at numerous locations and lek sites within the boundary of the LMP unit and surrounding open ground. Large numbers of the species were reportedly present prior to canopy closure and while numbers have fluctuated as tree canopy closure has increased, the plan presents a great opportunity to provide for the species through enhancing the wetter brood rearing areas in the valley floors with scattered broadleaf planting and increased amounts of open ground, by creating habitat linkages between valley floor and the woodland edge and by establishing stands of native broadleaf species for winter browsing on adjacent sites favoured by Black Grouse.
Annual monitoring of this species will continue.

Whilst management aimed at improving habitat will essentially be concentrated around known lekking areas, the plan will however look to both maintain the species range and enhance it through a greater degree of habitat connectivity.

Red Squirrel is present within the block at low densities but the area is not considered to be a "Red Squirrel Stronghold site". Whilst there are external links to other external broadleaf areas, our continued commitment to second rotation conifer plantation with increased areas of Scots Pine, Norway Spruce and small seeded Broadleaf restock and a continuing absence of any significant large seeded broadleaf will ensure that the block remains advantageous towards Red squirrel. The large private estates to the north on the lower lying agricultural ground with extensive areas of large seeded broadleaves (in particular Oak) are known to harbour Grey Squirrels and these border onto the Carrick and Changue Forests.

A study to monitor the numbers of Pine Marten in the area will continue using breeding boxes to increase the availability of breeding sites in these relatively young woodlands. Emerging research indicates there is a positive correlation between the number of Pine Martens and Red Squirrels and a corresponding reduction of Greys.

Merlin and a number of other upland LBAP priority bird species such as Golden Eagle are associated with the open ground within and surrounding the Land Management Plan. All of these wide ranging raptors should benefit from the planned creation of open ground and low density broadleaf corridors linking the lower elevation valley sites to the open ground hill-tops and the other management prescriptions already identified for Black Grouse.

The principal water bodies and existing riparian habitats are well used by Otters for breeding and movement. Positive riparian zone management measures, often exceeding basic water guidelines, such as an increase in small seeded BL cover coupled with our aim to keep sections of stream banks permanently vegetated and persisting throughout subsequent rotations will increase both the availability and connectivity of suitable breeding and feeding habitat for both of these species. Environment staff now also prepare brash piles along water courses, specifically providing excellent cover for rearing, resting and breeding otters. The main benefits for FLS is that providing these features greatly reduces the likelihood that otters will create resting places or breeding sites within commercial forest stands and the brash piles are also likely to be used by a wide range of animal species and provide valuable deadwood habitat.
An artificial man made pond, dug in 1994, at grid reference NX3897 9967 tested positive for Great Crested Newt in 2015.

3.4.3 Riparian habitats / wetlands

There are several watercourses, including primarily the Water of Gregg, within the Land Management Plan area that mainly drains to the R Stinchar although a few burns to the north drain to the R Girvan. Riparian zone enhancement is a key objective (see section 6.3).
The Water of Gregg is a river in the R Stinchar catchment of the Scotland river basin district 2015-2027. It has been classified, as has the R Stinchar itself, been classified as having “moderate” overall ecological status.
Where wetland features such as springs, flushes and bogs are discovered opportunities to restore the features within individual coupe and in the wider riparian network will be taken.
The artificial pond at NX3897 9967 will be maintained in an area of open ground within the overall connected open ground matrix.
Opportunities for peatland restoration is addressed in the main text section 5.2.2.

3.4.4 Invasive species

There are no non-native invasive plant species (Japanese Knotweed, Giant Hogweed and Himalayan Balsam) known to be present in the block. If discovered they will be treated as per the District's Invasive Species Policy. There are no records of American Signal Crayfish being present in the plan area.

3.4.5 Pests and diseases

Dothistroma Needle Blight (DNB) has been identified on Corsican and Scots Pine crops in the district. Whilst DNB has thus far not been found in the Carrick Forest Drive block future DNB surveys may intensify and it's wider presence throughout the block cannot be ruled out.

Phytopthora ramorum infection has been confirmed on Larch throughout the district and there is significant evidence of infection throughout the Carrick and Changue plan area. Some sanitation felling has already taken place with more imminently scheduled for approved clearfell. It seems likely that in the long term Larch will become a less prominent component of the woodland with increased areas of broadleaf woodland providing most towards species diversity in the block.

Hylobius, the Pine weevil, can cause extensive damage to young conifer crop. As part of the districts chemical minimisation strategy, the *Hylobius* Management Support System (HMSS) is used to measure *Hylobius* numbers on clearfell sites. Using billet traps a sample of the districts conifer restock areas are assessed. Weevil numbers are recorded and are used along with other site data to determine the optimum time for site restocking. This more flexible fallow period between felling and re-stocking may result in restocking not taking place within two years of felling. (see Tolerance table section 2.7 as agreed with FCS).

3.4.5 Wildfire resilience

Wildfire risk for this LMP area is currently low.
Climate Change guidance for the south west of Scotland suggests that significant change to this rating over the period of the plan is unlikely however there are elements of the plan such as the long external boundary links to open ground to the south, our greater public access focussed around Barr village and the core facilities outside the plan area to the east and some remnant areas of infected larch crop with poor tree health that should be continually considered and monitored for Wildfire resilience.

Our long term aims within the LMP to reduce the conifer area, increase the area of broadleaf and open space and create wider riparian corridors should maintain the overall Wildfire risk as low.

3.5 Landscape

3.5.1 Landscape character

This Land Management plan lies adjacent to some of the most remote and unsettled parts of Ayrshire.
An essential characteristic of the landscape is the view of granite outcrops and unforested peaks and the scale of the landscape is grand with a forestry subset where afforestation has taken place.
The land cover of the uplands is dominated by heather moorland and rough grassland and areas of exposed rock.
The 1998 Ayrshire Landscape assessment generally classifies the plan area character categories as mainly "Foothills with forest" where "dark swathes of almost uniform dark green cover many of the rounded peaks and descend to the lower slopes with smaller areas of "Intimate Pastoral valleys" where "the pastoral character should be maintained as a contrast to the surrounding uplands".
The area is very sensitive to any development that would impact on this distinctive character with particular concerns regarding

- keeping hilltops and summits unwooded and maintaining the Wild land character of the area
- restricting forest expansion to prevent further loss of moorland or wild land moss areas
- inappropriate wind power development given the landscape sensitivity

In developing the design the following key landscape specifics have been addressed:
"Forest restructuring for spatial, age and species diversity" and "to expose and preserve cultural features"; throughout the block clearfelling followed by species diverse restock and the creation of additional linked open space will add diversity to the landscape.
"Further planting should emphasise the transitional character of the landscape"; our proposals, with an assumption against large scale forestry, include the creation of an interface between the planted and unplanted parts of the landscape through mixtures of native species restock and conifer replacement, the expansion / regeneration of native woodlands and the use of medium sized coupes to reflect landscape scale will promote all aspects of this landscape character.

"Manage surviving pockets of Native woodland"; our regeneration of existing Native woodland and additional Native woodland planting on valley slopes will enhance the woodland transition from valleys and gullies to the open hill.
With much of the conifer plantation on blanket bog, that is marginal for economic woodland, a reduction in conifer plantation and the creation of some native peatland edge woodland that will link the lower valleys to the slopes and hill summits is planned. On some of the less degraded moss areas opportunities may also exist for peatland bog restoration.

3.5.2 Landscape designations

Carrick and Changue Land Management plan area is not located within a nationally designated or Wild Land Area however it will lie within a Local Landscape Area designation as identified by South Ayrshire council.

3.5.2 Visibility

Whilst there are extensive and dramatic views in all directions from the hill summits that rise above the surrounding plantations (the main visual attraction of the area), the views from the minor county roads that fringe and dissect the plan and those from the extensive internal forest road are limited.

3.6 Social factors

3.6.1 Recreation

South Ayrshire already has a reputation as a region to visit for walking, cycling and horse riding holidays. However, although adjacent to one of the core District recreational facilities in the north, the area covered by the Carrick and Changue Land Management plan is not currently considered to be an expansion area for recreation.
Core paths, identified in the South Ayrshire Core Paths Plan, connect Barr village to the core path network stretching east towards Loch Doon in East Ayrshire. Core paths mainly follow the forest road network,
All of these modest FLS facilities, including core paths, are minimally maintained and would greatly benefit from a makeover.
Recreational demands around these Visitor Zone areas will impact greatly on management choice with our standard regimes heavily modified to improve the internal and external views associated with these routes.

3.6.2 Community

Barr village, lying on the north west edge of the block, is the largest discernible local community although there are numerous other residential properties and other agricultural neighbour interests (Craigmalloch,

Changue, High Changue, Aldinna, and Black Row) that are either contained within or directly neighbour the block.
To facilitate local comment on the plan as part of the Land Management plan process an open drop in meeting was held in the village (see Appendix IV for Community Consultation notes).
The local Barr village Community Council is in receipt of the latest version of our local Strategic Plan and was consulted as a stakeholder in the early scoping of this plan.

3.6.3 Heritage

Text Following *FES Historic Environment Planning Guidance*, this Land Management Plan describes and considers the conservation and management of the historic environment. The LMP includes details of all relevant scheduled monuments, listed buildings, designed landscapes and the most significant undesignated features.
Designated historic environment features are recorded in the Designated Historic Assets Register (maintained by the FLS Archaeologist). Scheduled monuments and listed buildings are managed within a programme of individual Monument Management Plans and Condition Surveys respectively. FLS also maintains a programme of detailed measured survey of our most significant sites in order to enhance the national historic environment record and inform conservation management.

Two Scheduled Ancient Monuments (SAM); Bencallen Hill, chambered cairn and Knockinculloch enclosures lie within the plan area. Continuation of proposals identified in the management plans involving grazing control of a rush sward and removal of regenerating shrubs are required for the sites.
All significant heritage features will be protected and managed following the *Forestry and Archaeology Guidelines* (2011), the FCS policy document *Scotland's Woodlands and the Historic Environment* (2008) and the supporting *FES Historic* Environment Planning Guidelines (available from the FLS Archaeologist).

Known heritage features are marked on workplans before the start of forestry operations. Machine operators are fully briefed on their responsibilities prior to all sites being worked. The known record is based on features recorded on the 1st edition OS Map (1850).

NAME	FEATURE	OS_GRID REF
BENCALLEN HILL, THE DRUID'S	CHAMBERED CAIRN	NX337944

GRAVE		
KNOCKINCULLOCH	ENCLOSURE(S)	NS342005
KNOCKINCULLOCH	HEAD DYKE, KILN	NS338002
ALBANY BURN	SETTLEMENT	NX286922
BALLOCH BURN	FARMSTEAD	NX333935
BALLOCH BURN	SETTLEMENT	NX334936
BARR, CAIRN HILL	CAIRN	NX307907
BENCALLEN	CAIRN	NX334948
CAIRNANNOCK	CAIRN	NX371966
CAIRNANNOCK	BUILDING, ENCLOSURE	NX370966
CHANGUE	FARMSTEAD	NX288936
CORRN ROY	ENCLOSURE, SHIELING HUT	NX335935
DARLEY	BUILDING, ENCLOSURE	NX294923
DARLEY	BUILDING	NX298922
DARLEY	FIELD SYSTEM, SETTLEMENT	NX297917
DUNAMODDIE	CAIRN (POSSIBLE)	NX366963
KIRSTIES CAIRN	CAIRN	NX310921
KNOCKONER	CAIRN (POSSIBLE)	NX363997
LEAD MINE BURN	ENCLOSURE(S), FIELD SYSTEM, RIG AND FURROW, STRUCTURE	NX306922
PINBRECK HILL	CAIRN	NX348937
RIVER STINCHAR	FIELD SYSTEM, HEAD DYKE, STRUCTURE	NX366957
TAM MCKAIN	SHIELING HUT(S)	NS325011
TAM MCKAIN	SHIELING HUT(S)	NS327012
THE PILOT	HOUSE PLATFORM	NS319003
WEE KNOCKINCULLOCH	SHIELING HUT(S)	NS337016
WEE KNOCKINCULLOCH	HUT CIRCLE (POSSIBLE)	NS331014
ALBANY BURN	ENCLOSURE(S)	NX284922
BALLOCH LEAD MINE	LEAD MINE	NX312933
CORRN ROY	ENCLOSURE,	NX337934

	SHEEPFOLD	
DARLEY	ENCLOSURE	NX297918
DRUMNEILLIE HILL	SHEEPFOLD	NX291914
FEATURE: No Site Name	FARMSTEAD	NX278939
FEATURE: No Site Name	FARMSTEAD (POSSIBLE)	NX281927
GARLEFFIN	ENCLOSURE (POSSIBLE), RIG AND FURROW	NS352000
KNOCKINCULLOCH	ENCLOSURE, FIELD BOUNDARY(S)	NS344003
KNOCKINCULLOCH	PEAT CUTTING	NS333009
KNOCKINCULLOCH / BLAIR & SUBSITE OF: KNOCKINCULLOCH	peat cutting	NS333006
KNOCKINCULLOCH , QUARRY	QUARRY	NS340008
KNOCKONER BURN	ENCLOSURE	NX358994
MID HILL BURN	SHEEPFOLD, WALL	NX310922
SHEEP PEN	SHEEPFOLD	NX336940
SHEEP PEN	SHEEPFOLD	NX363956
SHEEP PEN	ENCLOSURE(S), FIELD SYSTEM, RIG AND FURROW, STRUCTURE	NX307922
SHEEP PEN	SHEEPFOLD	NX298938
SHEPARD'S MEMORIAL	MEMORIAL	NX309917
SHIEL BRIDGE	FIELD SYSTEM	NX335943
SHIEL BURN	SHEEPFOLD	NS339014
SHIEL BURN	FIELD SYSTEM	NS334016
WATER OF GREGG	ENCLOSURE	NX293923
WATER OF GREGG	SHEEPFOLD	NX291935
WATER OF GREGG	ENCLOSURE	NX294922
WATER OF GREGG	ENCLOSURE	NX301908
WHITE ROW	NATURAL FEATURE	NX349951

Felling coupes, access roads and fence lines will be surveyed prior to any work being undertaken to ensure that upstanding historic environment features can be marked and avoided. Historic environment features,

including drystane dykes, coming to light during forest operations will be surveyed, recorded, mapped and monitored for inclusion in future versions of the Design Plan and to demonstrate FLS compliance with the UK Forestry Standard.

At planting and restocking, historic features will be removed from ground disturbing operations with opportunities to enhance the setting of important sites considered on a case-by-case basis (such as the views to and from a significant designated site).

Any recent archaeological surveys that have been undertaken on behalf of FLS have been incorporated into the Forester GIS Heritage Module geodatabase - and any new archaeological surveys required (in unimproved upland areas for example, or areas within which the archaeological record is unusually rich) are undertaken to the standards laid out in *FES Historic Environment Planning Guidelines.* This will ensure that undiscovered historic environment features are mapped and recorded prior to forestry establishment and management operations - and will ensure the continued comprehensive protection of the known archaeological resource.

3.7 Forest Renewables

The Northern Ireland interconnector corridor, now a permanent fixture in the landscape, cuts through the southern boundary of the plan area. Ongoing operations will continue minimise its impact on the landscape.

Forestry and Land Scotland is working to develop the wind and hydropower potential of the land and forests that we manage for the Scottish Ministers. Our aim is to ensure that the potential of the National Forest Estate is developed and managed in ways that

- contribute to the Scottish Government's renewable energy target
- maximise financial returns from the National Forest Estate
- secure benefits for local communities and
- achieve a reasonable and sustainable balance with other FLS objectives

Land within sections of the Carrick and Changue plan are currently under option for windfarm development by Scottish Power Renewables (SPR). Two meteorological masts for windspeed data collection have been erected and a wide range of surveys are underway to feed into and inform the EIA and Planning application for the proposed windfarm.

3.8 Statutory requirements and key external policies

The legal status of the land is purchased.

This Land Management plan is in accordance with guidance supplied in

- UK Forestry Standard (4th edition)
- FCS, the role of Scotland's National Forest Estate and strategic directions
- Forest & Woodland strategies
- Design techniques for forest management planning
- Native Woodland Survey of Scotland
- Rationale for Woodland Expansion
- Policy on Control of Woodland Removal
- Managing Forests in Acid Sensitive Catchments
- Historic Land Use Assessment
- Deciding future management options for afforested Deep Peatland

Appendix III. Tolerance Table

PROCESS TO BE APPLIED IN RESPECT TO ANY ALTERATIONS TO APPROVED FOREST PLANS

1) Adjacency issues will normally be dealt with through delayed felling i.e. a coupe will not be felled until all surrounding crops are at least 2m tall.

2) Where this cannot be achieved then adjacency issues may be dealt with through delayed restocking i.e. a coupe will not be restocked until all surrounding crops are at least 2m tall. Where this approach is adopted an assessment must be made and recorded, at the time of the decision being taken, to ensure wider forest and habitat structure is not being significantly compromised. Such evidence must be presented at 5 year review.

3) Tolerance Table:

	Maps Required (Y/N)	Adjustment to felling period *	Adjustment to felling coupe boundaries **	Timing of Restocking	Changes to Restocking species	Changes to road lines
FC Approval normally not required	N	• Fell date can be moved within 5 year period where separation or other constraints are met.	• Up to 10% of coupe area.	• Up to 3 planting seasons after felling.	• Change within species group e.g. evergreen conifers or broadleaves.	
Approval by exchange of letters and map	Y		• Up to 15% of coupe area	• Between 3 and 5 planting seasons after felling, subject to the wider forest and habitat structure not being significantly compromise d.		• Additional felling of trees not agreed in plan. • Departures of > 60m in either direction from centre line of road
Approval by formal plan amendment may be required	Y	• Felling delayed into second or later 5 year period. • Advance felling (phase 3 or beyond) into current or 2nd 5 year period.	• More than 15% of coupe area.	• More than 5 planting seasons after felling, subject to the wider forest and habitat structure not being significantly compromise d.	• Change from specified native species. • Change Between species group.	• As above, depending on sensitivity.

NOTES:
* Felling sequence must not compromise UKFS, in particular felling coupe adjacency
** No more than 1ha, without consultation with FCS, where the location is defined as 'sensitive' within the Environmental Impact Assessment (Forestry) 1999 Regulations (EIA)
*** Tolerance subject to an overriding maximum 20% open space
**** Where windblow occurs SF should be informed of extent prior to clearance and consulted on where clearance of any standing trees is required

TABLE OF WORKING TOLERANCES SPECIFIC TO LARCH WITH THE INFECTED ZONE

	Adjustment to felling period *	**Adjustment to felling coupe boundaries**	**Timing of restocking**	**Changes to Species**	**Changes to road lines**
SF Approval normally not required	Fell date for all larch can be moved and also directly associated other species	Larch areas can be treated as approved coupes. Other conifers directly associated with larch being felled, may also be removed up to an equivalent of 20% of the area occupied by the larch or 5 ha, whichever is greater	To be undertaken within the overall plan approval period	Replacement as per the agreed restock plan, but where this is not specified or is larch this may be replaced with either another diverse conifer (not SS) or Broadleaves.	
Approval normally by exchange of letters and map. **In some circumstances Approval by formal plan amendment may be required**		Removal of areas of other species in excess of the limits identified above.	Restocking proposals outwith the plan approval period	Restocking proposals for other species which do not meet the tolerances identified above.	New roadlines or tracks directly necessary to allow the extraction of larch material

Appendix IV. Land Management Plan Brief

The main management objectives in this large scale plan unit focus on core Timber production, the integration of Agricultural land, Conservation (priority species habitats) and large scale Landscape views (open space, water and species diversity). The block adjoins Barr village to the west, the centre of the block lies 10km south of Straiton in South Ayrshire

Key Strategic Directions from Role of Scotland's National Estate	Local District Strategic Plan Priorities	Actions / Prescriptions
Healthy: good environmental and silvicultural condition in a changing climate	• Commitment to high quality silviculture and increased use of alternatives to clearfell • Adapt to climate change and make woodlands more resilient to pressure • Deal with invasive species that threaten habitats and biodiversity • Stewardship of carbon resources in estate's trees and soils	• *Increase* area of woodland managed under LISS particularly riparian zones along R Stinchar and feeder burns Water of Gregg and Changue Burn and higher visibility sites along the Pinmullen Burn and the Balloch Burn adjacent to the U57 Nick of the Balloch road • Improve forest resiliance through use of Alternatives to clearfell, smaller coupe size and an *increase* area of broadleaf woodland and *establishment* of a wider range of conifer and broadleaf species diversity and use of natural regeneration in our restocking • *Restructuring* particularly in the landscape scale even aged crop in the Changue section is an important consideration • *Control* invasive species as per FES guidelines (specifically R. ponticum) • *Implement* National deep peat restocking / restoration policy where appropriate (potential candidate areas around Garleffin Fell and Linfern Loch) • Soil stability (landslips), generally found below the forest (west aqueduct) road,

		are an important consideration in both the Changue and Carrick west areas
Productive: provide sustainable economic benefits from the land	• Contribute to local economy by maintaining core timber production • Expand area of productive broadleaf and diversify timber markets • Increase agricultural use of the estate • Develop estate's tourism potential • Provide work in rural areas	• *Meet* production forecast commitment through revised felling /thinning plan (modify to accommodate extent of P ramorum infestation) • *Increase* area of productive broadleaf • *Implement* road maintenance and construction programme required to service harvesting operations considering available options to access unroaded plantation and potential linkage to other LMP units to the south • Sympathetically *manage and develop* plantations surrounding and associated with agricultural tenancies (Dinmurchie & Craigmalloch) and privately owned agricultural units (White Row) • *Consider* sustainability of grazing lease (Pinvalley) and/or alternative landscape scale broadleaf woodland development to *increase* broadleaf area
Treasured: a multi-purpose resource that sustains livelihoods, improves quality of life and offers involvement and enjoyment	• Involve and engage with local people / encourage partnership working • Creation of unique special places • Place for research and development	• Continue to *work* with local community (stakeholder consultation, drop-in meetings etc) to ensure access and facilities are fit for purpose • *Improve and enhance* visitor zone surrounds to Stinchar Falls and other minor facilities through increased species diversity and open space, enhanced use of LISS and integrated management of open space within woodland • *Maintain* high elevation / provenance trial plots
Accessible: woodland	• Improve access and enhance existing or invest in new	• *Retain* access and views to existing walking and cycle trail

that welcome and are open for all	facilities • Use for health benefits and outdoor learning	networks (Stinchar Falls & Loch Doon cycle route – although identified as a core path, Stinchar Falls is not actively promoted) • *Develop* forest road network
Cared for: working with nature and respecting landscapes, natural and cultural heritage	• Improve / restore status and condition of Ancient Woodland sites • Expand / enhance area of Native woodland • Increase area of broadleaf cover • Landscape • Maintain open habitats in good ecological condition • Priority species conservation (Black Grouse, Red Squirrel) • Safeguard heritage features	• *Secure* remnants and *restore* PAWS woodland sites and *increase* area of native BL throughout design plan area for added biodiversity benefits linking to internal and external ASNW sites (Water of Gregg and R Stinchar) • Block is visually prominent from the U57 Nick of the Balloch minor county road; *maintain and enhance* large scale landscape through revised coupe shapes to better suit landform, additional species diversity and open space integrated management • *Maintain and enhance* area for Red Squirrel (priority species) • *Maintain* lek and nesting areas for Black Grouse and *enhance* habitat through creation of woodland fringe • The R Stinchar is important in water quality terms and a significant part of the LMP unit also lies within the Loch Bradan public water catchment (west aqueduct); *manage* watercourses and private water supplies within LMP unit in keeping with UKWAS standards and Forest and Water guidelines to *maintain and improve* water quality within Stinchar catchment • *Manage* minor heritage features as per FES guidelines
Good value	• Seek diverse range of income streams • Reduce carbon emissions from business activities	• *Manage* recreation facilities in partnership with Community recreation and tourism related businesses

		• *Manage* Interconnector wayleave corridor (conifer regeneration)

Appendix V. Assessment of felling and restock proposals within catchments at risk and failing

There are three catchments, identified as being either "at risk" or "failing", that impact on the Land Management Plan area.
See below for base catchment area details.

Carrick & Changue 675 catchment at risk

This catchment at risk straddles two LMP blocks with the largest part of the catchment falling within the Carrick and Changue LMP area and the smaller part within the Carrick Forest Drive LMP area.
The total area for this catchment that includes part of the R Stinchar and Water of Gregg is 3478.8ha. The catchment at risk impacts upon 3235.0ha of FLS plantation comprising open ground to the south of the Changue section, much of the Carrick block and an area of the Carrick Forest Drive LMP.

Open ground area (including open water)	1757.2ha
Plantation area	1477.8ha
Total catchment area (within Carrick & Changue LMP)	3235.0ha*
20% of catchment	647.0ha
30% of catchment	970.5ha

The felled area within the catchment in any 3 year period needs to be less than 20% of the catchment. The table below based on the planned coupe felling programme confirms that this is comfortably the case when no more than 1.4% is ever felled across any period.

3yr Fell period	Currently proposed felled areas (ha)	Proposed fell area as % of catchment area
2019-21	**37.0**	1.1%

2020-22	**0.0**	0.0%
2021-23	**25.7**	0.8%
2022-24	**25.7**	0.8%
2023-25	**46.6**	1.4%
2024-26	**27.6**	0.9%
2025-27	**27.6**	0.9%
2026-28	**31.7**	1.0%
2027-29	**25.0**	0.8%
2028-30	**23.1**	0.7%

The area of closed canopy conifer forest (age > 15years) needs to be less than 30% of catchment in 15 years' time i.e. 970.5ha.
The table below confirms that due to the low levels of planned clearfell this figure is exceeded being around 40.0%.
In the table the proposed fell area for the next 15yrs within the catchment is subtracted from the current plantation area in the catchment to give a notional area of 1304.7ha of plantation within the catchment over 15yrs age (assumes that felled areas will be restocked within 3yrs of felling subject to planned restock and Hylobius Management Support System).

Current plantation area within catchment	1477.8ha
Proposed felled area between 2019 -2033 (15yrs)	173.1ha
Notional plantation area in 15yrs time > 15yrs age	**1304.7ha**

Carrick & Changue 691 catchment at risk
The total area for this catchment that includes part of the Dalquhairnn Burn is 1098.5ha. The catchment at risk only impacts upon 259.5ha of the western part of the Carrick block of the Carrick & Changue LMP*.

Open ground area (including open water)	45.5ha
Plantation area	214.0ha
Total catchment area (within Round Fell LMP)	259.5ha*
20% of catchment	51.9ha
30% of catchment	77.8ha

The felled area within the catchment in any 3 year period needs to be less than 20% of the catchment.
Within this catchment there is no felling planned for the period of this plan.

The area of closed canopy conifer forest (age > 15years) needs to be less than 30% of catchment in 15 years' time i.e. 77.8ha. The table below shows that under the current LMP proposals, where no clearfell is planned within the plan period and only a small area planned for removal in 2032, this percentage figure exceeds the 30% figure i.e. is 68.0%.
In the table the proposed fell area for the next 15yrs within the catchment is subtracted from the current plantation area in the catchment to give a notional area of 176.9ha of plantation within the catchment over 15yrs age (assumes that felled areas will be restocked within 3yrs of felling subject to planned restock and Hylobius Management Support System).

Current plantation area within catchment	214.0ha
Proposed felled area between 2018 -2032 (15yrs)	37.1ha
Notional plantation area in 15yrs time > 15yrs age	**176.9ha**

Carrick & Changue 701 catchment at risk

The total area for this catchment that includes part of the R Stinchar is 2021.8ha. The catchment at risk only impacts upon 328.6ha of the northern part of the Changue block of the Carrick & Changue LMP*.

Open ground area (including open water)	33.0ha
Plantation area	295.6ha
Total catchment area (within Round Fell LMP)	328.6ha*
20% of catchment	65.7ha
30% of catchment	98.6ha

The felled area within the catchment in any 3 year period needs to be less than 20% of the catchment. The table below based on the planned coupe felling programme confirms that this is comfortably the case when no more than 13.1% is ever felled across any period.

3yr Fell period	Currently proposed felled areas (ha)	Proposed fell area as % of catchment area
2019-21	**0.0**	0.0%
2020-22	**0.0**	0.0%
2021-23	**0.0**	0.0%
2022-24	**0.0**	0.0%
2023-25	**0.0**	0.0%
2024-26	**0.0**	0.0%
2025-27	**9.0**	3.0%
2026-28	**9.0**	3.0%

2027-29	**9.0**	3.0%
2028-30	**43.1**	13.1%

The area of closed canopy conifer forest (age > 15years) needs to be less than 30% of catchment in 15 years' time i.e. 98.6ha. The table below shows that under the current LMP proposals, where little clearfell is planned within the plan period and only a further small area planned for removal in 2032 & 2033, this percentage figure exceeds the 30% figure i.e. is 82.9%.
In the table the proposed fell area for the next 15yrs within the catchment is subtracted from the current plantation area in the catchment to give a notional area of 272.3ha of plantation within the catchment over 15yrs age (assumes that felled areas will be restocked within 3yrs of felling subject to planned restock and Hylobius Management Support System).

Current plantation area within catchment	328.6ha
Proposed felled area between 2019 -2033 (15yrs)	56.3ha
Notional plantation area in 15yrs time > 15yrs age	**272.3ha**

Appendix VI. Community Consultation Notes

Changue/Carrick Land management plan
Drop in Barr Village Hall
Thursday 8th March 2018 3pm – 8pm
The drop in was held in Barr village hall to allow interested parties the opportunity to comment on FES plans for Changue/Carrick Land Management plan, Barr is the nearest village to Changue.
25 people attended the drop in :
14 Female
11 Male
Most of the attendees (14) fell into the 46-60 age group.
Generally, the opportunity for the local community to engage with FES staff and be made aware of the District's proposals was well received. Our plans to diversify species and continue with restructuring, particularly along the trail routes were welcomed.

Other points discussed:
Access track:
The state of the road between the old carpark turn off and the new carpark was discussed by many. This road seems to be littered with potholes and with no availability to avoid them.
Our internal roads team have been informed of the work required here.
They have been in contact with Emma and Pauline stating their intentions to fix up this access track/timescales.
Correspondence emails if required. Update as from 19/03/18 the road has now been fixed.

Erection of goalposts:
There was some talk about the erection of goalposts up from Stable cottage, the reasons why and their removal.
Roads have been in correspondence about goalposts. Correspondence emails if required.

Trails:
There was much talk about the trails and decommissioning of all the trails except the Fairy Knowe. The community want to continue with the trails and are keen for FES to take on the rest. The Barr Community Development Trust has met with FES representatives to discuss this further and it has been agreed that the community can take on the rest of the trails. FES will not manage these but have a duty of care for such delights as windblown trees. The community have discussed the idea of using a bespoke leaflet the they will design for visitors to use using an ordnance survey

backdrop. It has been explained that the forest are open for people to walk as per the access code.
This is currently ongoing.
We have been in communication with the community over this for some time, working towards a mutually acceptable solution.

It was suggested that the corridor of trees on the way to the fairy Knowe trail could be softened!! Retain trees as this gives it a magical quality. Does this make sense?
Stables cottage was enquiring about the possibility of a gate on the piece of FE land next to Stables Cottage. Not sure why
Viewing platforms for the Dark Skies, request from Alton Albany guest house.
We were asked by community council members if it was possible to hold gate keys in case of emergencies? They recently had an emergency where an ambulance was called out. What is the protocol for this? I am aware that other communities have asked for this and local policy is to refuse this.