REQUEST FOR DETERMINATION UNDER THE E.I.A. (FORESTRY) (SCOTLAND) REGULATIONS 1999	
OPERATION	**Road Construction** (please see Maps 7 - CMS6 Planned Operations)
LOCATION	East Sutherland Forests
GRID REFERENCE	NH 7202 9417
IS THE LOCATION OF THE PROPOSED WORKS WITHIN A "SENSITIVE AREA", AS DEFINED IN THE REGULATIONS? IF SO, WHAT TYPE OF SENSITIVE AREA?	Three of the proposed roads fall within the Starth Carnaig and Strath Fleet Moors SPA & SSSI (Achormlarie western spur road, Achormlarie southern road and Achormlarie northern road); no long term negative impact on SPA is anticipated. Road construction will result in some habitat loss within SPA, however road construction is necessary to achieve the long-term forest restructuring plan. The fallow and restocking periods will give the hen harrier new open ground available for approx.. 10-15 years. Therefore road construction will indirectly have a positive impact on site and allow more open ground to become available to hen harriers.
IF OPERATION IS AFFORESTATION, DEFORESTATION OR FOREST QUARRIES, WHAT AREA IS INVOLVED?	
IF OPERATION IS FOREST ROADS, TRACKS OR PATHS, WHAT IS SPECIFICATION AND WHAT LENGTH & WIDTH IS INVOLVED?	**Forest Road Construction (Cat 1a)** **Achormlarie western spur road** - 2007m long - 15m wide at NH 6567 9756 (off the proposed SSE substation road); (it will probably be constructed outwith the plan period) **Achormlarie southern road** - 3744m long - 15m wide at NH 6735 9632; (c.2.4 km to be constructed within the plan period) **Achormlarie northern road** - 4401m long - 15m wide at NH 6712 9668;(c. 1.7 km to be constructed within the plan period) **Rogart northern spur road** - 300m long - 15m wide at NC 7102 0258; **Rogart western spur road** - 321m long - 15m wide at NC 7108 0193; **Harriets spur road** - 710m long - 15m wide at NH 7668 9362; **Duchess/Countess southern road** - 525m long - 15m wide at NH 7862 9168
IS THE PROPOSED OPERATION IMMEDIATELY ADJACENT TO AN AREA OF THE SAME PROJECT TYPE WHICH HAS BEEN COMPLETED SINCE 6TH SEPT.1999? IF SO, GIVE DETAILS.	Achormlarie western spur road will come off the proposed Loch Buidhe Substation road (SSE ownership) - the substation road doesn't exist yet and the timing of road building on FC ground is likely to be towards the end or even outside the period covered by East Sutherland LMP. All of the remaining proposed roads/spur roads will be continuation of existing roads.
PROPOSED TIMING	Roading - 2015 to 2025
STATE ANY PERCEIVED IMPACT ON THE FOLLOWING:	
ARCHAEOLOGY	No impact is anticipated. Full GIS record exist and archaeology will be identified by workplan process and walk over survey prior to commencement.
CONSERVATION	Outside Strath Carnaig and Strath Fleet Moors SPA no environmental impact is anticipated. Full GSI record exist and species/habitat interest will be identified by workplan process and walk over survey prior to commencement.
LANDSCAPE	No landscape impact is anticipated from internal roading.
WATER	The proposed road line in Achormlarie (southern road) crosses few small watercourse that directly feed into the River Evelix SAC. All civil engineering projects and temporary water crossings will meet SEPA best practice standards (e.g. CAR General Binding Rules & PPG) so that diffuse pollution is eliminated. Water crossings will comply with SEPA guidelines for upland habitats. This will allow populations of mussels to move into appropriate habitat. By planning to keep disturbance to a minimum using available guidance, surveys by experienced ecologists and expert advice when required, we feel that these proposals will not have a negative impact on the integrity of the River Evelix SAC.
RECREATION / ACCESS	The expansion of the forest road network will improve the access and recreational value of the forest
PEOPLE	No issues foreseen
OTHER INFORMATION	Please see Supporting Documents: Appropriate Assessments for East Sutherland LMP in relation to River Evelix SAC and Strath Carnaig and Strath Fleet Moors SPA & SSSI
SIGNED & DATED	Agata Baranska 13.03.2015

6.1 CSM6 Form

CSM 6 Appendix 1b

FOREST ENTERPRISE - Application for Forest Design Plan Approvals in Scotland

Forest Enterprise - Property

Forest District:	North Highland Forest District
Woodland or property name:	East Sutherland Forests
Nearest town, village or locality:	Dornoch
OS Grid reference:	NH 7202 9417
Local Authority district/unitary Authority:	Highland Council

Areas for approval

	Conifer	Broadleaf
Clear felling	474.24	0.00
Selective felling (total thinnable area of LISS within the LMP – **313.85** ha; no more than 10% of that might be removed within one thinning cycle, by using strip shelterwood system or felling groups not bigger than 2 ha – subject to crop condition assessment)	31.39	0.00
Restocking	124.51	38.81
New planting (complete appendix 4)	0.00	0.00

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

2. * I apply for an opinion under the terms of the Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999 for ~~afforestation*~~ /~~deforestation*~~/ roads*/ ~~quarries*~~ as detailed in my application.

3. I confirm that the initial scoping of the plan was carried out with FC staff on 27th of May 2014

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

5. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included.

6. I confirm that consultation and scoping has been carried out with all relevant stakeholders over the content of the of the design plan. Consideration of all of the issues raised by stakeholders has been included in the process of plan preparation and the outcome recorded on the attached consultation record. I confirm that we have informed all stakeholders about the extent to which we have been able to address their concerns and, where it has not been possible to fully address their concerns, we have reminded them of the opportunity to make further comment during the public consultation process.

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

Signed T.J. Cadell Signed.....

Forest District Manager Conservator

District North Highland Forest District Conservancy.....

Date 12.05.2015 **Date of Approval**.....

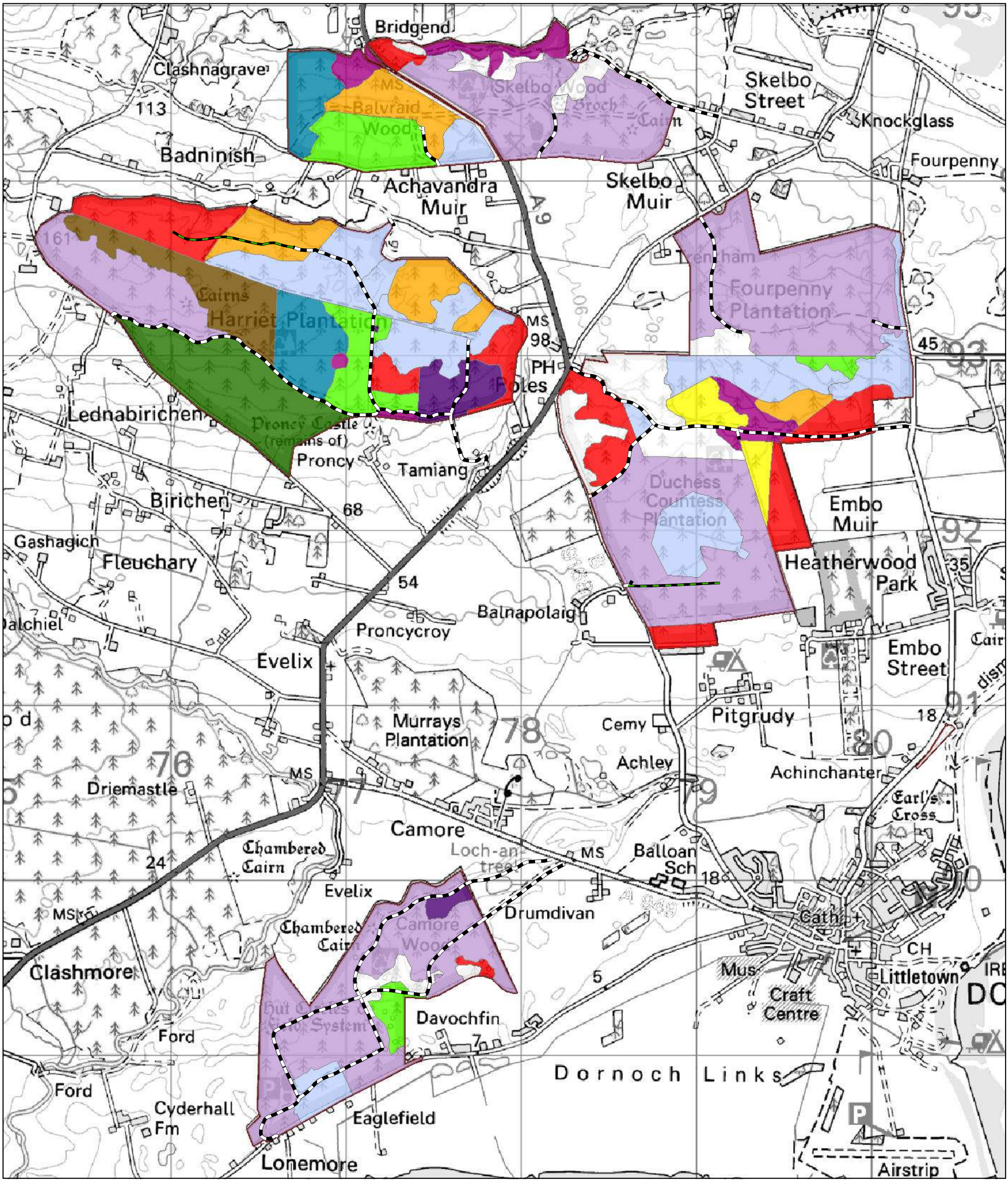
Date approval ends:.....

*delete as appropriate

6.2 Coupe Summary for First Two Phases (2015 -2025)

Coupe Number & Grid Reference for Phase 1 coupes (red)	Area of Felling (Ha) (gross)	Predicted Volume (m3 OB)	Proposed Restock Year	Area to Restock Within Plan Period (gross)	Comments
Coupe 1 Restock - NH78759272	(-)	(-)	2020	14.05	Productive conifer woodland
			2020	0.02	Riparian woodland
			(-)	1.44	Open
Coupe 2 Restock - NH79189305	(-)	(-)	2018	4.14	Productive conifer woodland
			2018	0.12	Riparian woodland
			(-)	0.24	Open
Coupe 3 Restock - NH77728948	(-)	(-)	2017	0.75	Productive conifer woodland
			2017	0.08	Native Woodland with SP
			(-)	0.07	Open
Coupe 4 Restock - NH78469257	(-)	(-)	2020	6.53	Productive conifer woodland
			(-)	0.92	Open
Coupe 1 Felling - NH77249473	2.88	962.20	2021	1.39	Productive conifer woodland
			2021	1.15	Riparian woodland
			(-)	0.35	Open
Coupe 2 Felling - NH75879378	19.92	4031.90	2021	19.22	Productive conifer woodland
			2021	0.70	Native Woodland with SP
Coupe 3 Felling - NH77239284	4.58	842.80	2021	4.58	Productive conifer woodland
Coupe 4 Felling - NH77909301	6.63	2207.70	2021	4.21	Productive conifer woodland
			2021	2.42	Native Woodland with SP
Coupe 5 Felling - NH79889262	10.11	1449.90	2021	2.11	Productive conifer woodland
			2021	3.09	Riparian woodland
			(-)	4.91	Open
Coupe 6 Felling - NH76549210	9.02	2198.90	2023	2.85	Productive conifer woodland
			2023	1.22	Riparian woodland
			(-)	4.95	Open
Coupe 7 Felling - NH78919138	4.59	843.80	2024	2.46	Native Woodland with SP
			(-)	2.13	Open
Coupe 8 Felling - NH77798950	1.09	462.60	2021	0.09	Native Woodland with SP
			(-)	1.00	Open
Coupe 9 Felling - NH78469257	12.46	2428.00	2021	11.54	Productive conifer woodland
			(-)	0.35	Open
Coupe 10 Felling - NC71030307	23.23	16961.20	2022	14.49	Productive conifer woodland
			2022	8.74	Native Woodland with SP
Coupe 11 Felling - NC71490190	8.89	5222.10	2024	7.73	Productive conifer woodland
			2024	1.16	Riparian woodland
Coupe 12 Felling - NC72230102	14.72	3515.9	2021	10.69	Productive conifer woodland
			2021	3.01	Native Woodland with SP
			2021	1.02	Riparian woodland
Coupe 13 Felling - NH66059768	33.76	2776.40	2024	20.23	Productive conifer woodland
			2024	9.32	Riparian woodland
			2024	4.21	Native Woodland with SP
RED COUPE SUMMARY	**151.88**	**43903.4**		**179.68**	

Coupe Number & Grid Reference for Phase 2 coupes (orange)	Area of Felling (Ha) (gross)	Predicted Volume (m3 OB)	Proposed Restock Year	Area to Restock Within Plan Period (gross)	Comments
Coupe 14 Felling - NH77269448	14.69	3230.3		(-)	Fallow - to restock outwith plan period
Coupe 15 Felling - NH76649367	12.95	4164.3		(-)	Fallow - to restock outwith plan period
Coupe 16 Felling - NH77499342	13.66	4723.3		(-)	Fallow - to restock outwith plan period
Coupe 17 Felling - NH79609269	4.95	1081.3		(-)	Fallow - to restock outwith plan period
Coupe 18 Felling - NC72590117	11.28	6100.2		(-)	Fallow - to restock outwith plan period
Coupe 19 Felling - NC70800150	46.49	14067.1		(-)	Fallow - to restock outwith plan period
Coupe 20 Felling - NH67349738	126.09	9082.6		(-)	Fallow - to restock outwith plan period
Coupe 21 Felling - NH67659551	92.25	12818.9		(-)	Fallow - to restock outwith plan period
ORANGE COUPES SUMMARY	**322.36**	**55268.00**		(-)	
FULL SUMMARY	***474.24***	***99171.4***		***179.68***	



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Coimisean na Coilltearachd Alba

Scotland's National Forest Estate is responsibly managed to the UK Woodland Assurance Standard.

FSC www.fsc.org FSC® C123223 The mark of responsible forestry

PEFC Promoting Sustainable Forest Management www.pefc.org

Map 5 - Management Coupes (a) Dornoch Blocks

Legend

Coupes

- Phase 1 felling (2016 - 2020)
- Phase 2 felling (2021 - 2025)
- Phase 3 felling (2026 - 2030)
- Phase 4 felling (2031 - 2035
- Phase 5 felling (2036 - 2040)
- Phase 6 felling (2041 - 2045)
- Phase 7 felling (2046 - 2050)
- After 2051
- Natural reserve
- Minimum intervention
- Long term retention
- Low impact silviculture
- Open/other land

- Forest Road
- Proposed roadline (within plan)
- Aspirational roadline
- Land Management Plan area

Scale @ A3
1:20,000

N

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PEFC PEFC/16-40-1003 "Promoting Sustainable Forest Management" www.pefc.org

Map 5 - Management coupes (b) Achormlarie

Legend

- Phase 1 felling (2016 - 2020)
- Phase 2 felling (2021 - 2025)
- Phase 3 felling (2026 - 2030)
- Phase 4 felling (2031 - 2035)
- Phase 5 felling (2036 - 2040)
- Phase 6 felling (2041 - 2045)
- Phase 7 felling (2046 - 2050)
- After 2051
- Natural reserve
- Minimum intervention
- Long term retention
- Low impact silviculture
- Open/other land
- Forest road
- Proposed roadline (within plan)
- Aspirational roadline
- CONTOURS
- Land Management Plan area

Scale @ A3

1:20,000

N

The broadleaves on the eastern edge of the felling coupe, adjoining the Natural Reserve, to be exempt form felling.

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PEFC PEFC/16-648-002 Promoting Sustainable Forest Management www.pefc.org

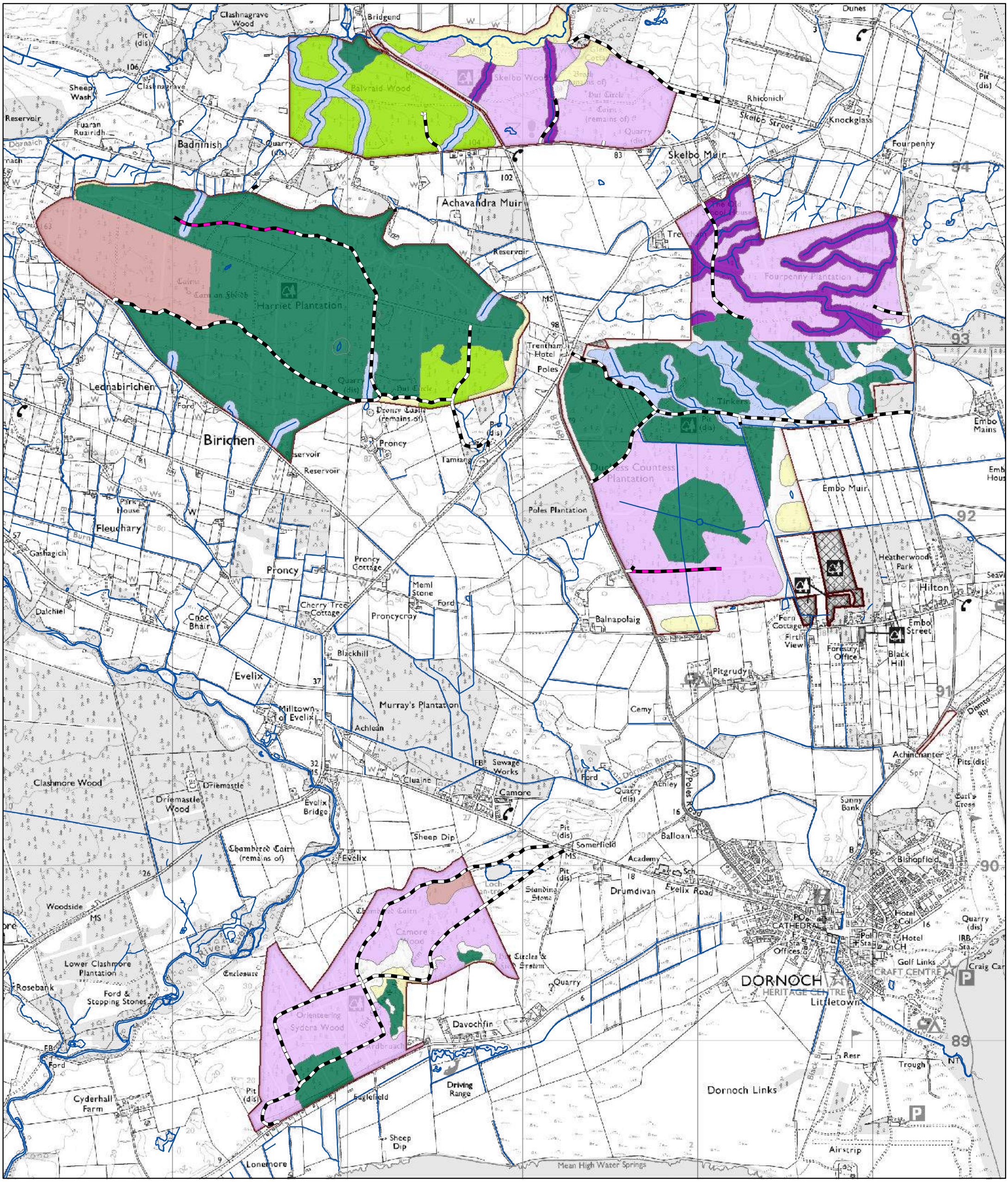
Map 5 - Management Coupes (c) Rogart

Legend

- Phase 1 felling (2016 - 2020)
- Phase 2 felling (2021 - 2025)
- Phase 3 felling (2026 - 2030)
- Phase 4 felling (2031 - 2035)
- Phase 5 felling (2036 - 20340
- Phase 6 felling (2041 - 2045)
- Phase 7 felling (2046 - 2050)
- After 2051
- Natural reserve
- Minimum intervention
- Long term retention
- Low impact silviculture
- Open/other land
- Forest Road
- Proposed roadline (within plan)
- Aspirational roadline
- Land Management Plan Area
- CONTOURS

Scale @A3 1:15,000

N



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Map 6 - Future Habitats (a)

Legend

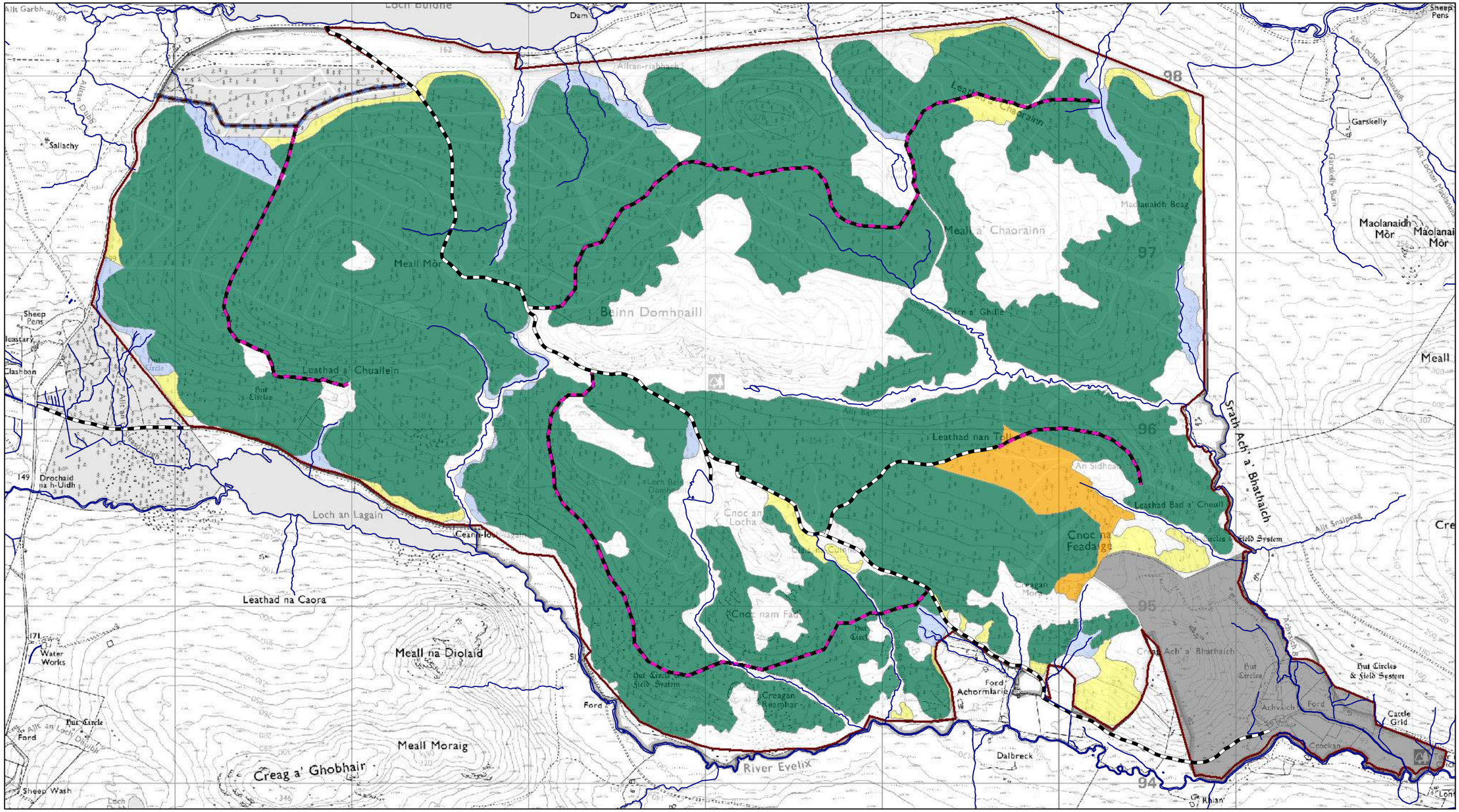
Future habitats

- Sold
- LISS, SP main component
- Mixed woodland
- Native woodland with SP
- Open
- Productive conifers
- Productive conifers, SP main component
- Riparian LISS
- Riparian woodland

- Forest Road
- Proposed roadline
- Water Courses
- Land Management Plan Area

Scale @ A3
1:20,000

N



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Map 6 - Future habitats (b)

Legend

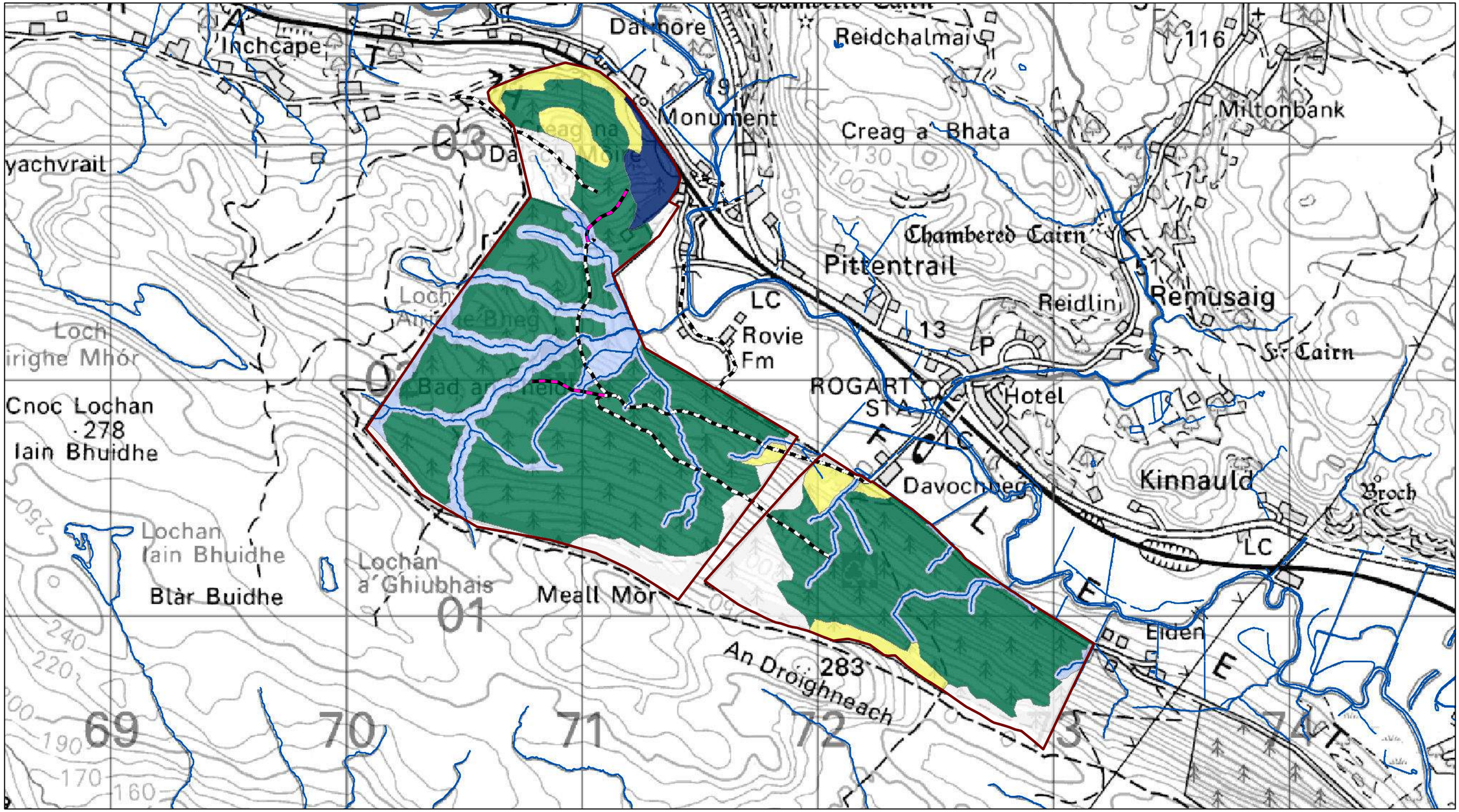
Future habitats

- Agricultural
- Bog woodland
- Native woodland with SP
- Open
- Productive conifers
- Riparian woodland

- Land Management Plan Area
- Forest Road
- Proposed roadline
- Proposed substation road
- water_courses

Scale @A3 1:20,000

N



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PEFC PEFC/16-40-102 Promoting Sustainable Forest Management www.pefc.org

Map 6 - Future Habitats (c)

Legend

Future habitats

- Natural Reserve
- Native woodland with SP
- Open
- Productive conifers
- Riparian woodland

- Land Management Plan area
- Forest Road
- Proposed roadline
- Water Courses

Scale @A3 1:15,000

N

Coupe 14 Felling
Coupe 1 Felling
Coupe 15 Felling
Coupe 2 Felling
Harriets spur road - 710m
Coupe 16 Felling
Coupe 17 Felling
Coupe 3 Felling
Coupe 5 Felling
Coupe 4 Felling
Coupe 6 Felling
Coupe 9 Felling
Duchess/Countess southern road - 525m
Coupe 7 Felling
Coupe 8 Felling

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Map 7 - CSM6 Planned operations (a) Felling & road construction Dornoch Blocks

Legend

- Phase 1 felling
- Phase 2 felling
- Forest Road
- Proposed roadline (within plan period)
- Aspirational roadline
- Land Management Plan area

Scale @A3 1:35,000

N

Coupe 18 Restock (Coupe 14 Felling)

Coupe 5 Restock (Coupe 1 Felling)

Coupe 19 Restock) (Coupe 15 Felling)

Coupe 6 Restock (Coupe 2 Felling)

Coupe 2 Restock

Coupe 1 Restock

Coupe 21 Restock (Coupe 17 Felling)

Coupe 20 Restock (Coupe 16 Felling)

Coupe 7 Restock (Coupe 3 Felling)

Coupe 9 Restock (Coupe 5 Felling)

Coupe 8 Restock (Coupe 4 Felling)

Coupe 4 Restock

Coupe 10 Restock (Coupe 6 Felling)

Coupe 13 Restock (Coupe 9 Felling)

Coupe 11 Restock (Coupe 7 Felling)

Coupe 12 Restock (Coupe 8 Felling)

Coupe 3 Restock

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Map 7 - CSM6 Planned operations (a) Restocking - Dornoch Blocks

Legend

- Restock of coupes felled up to 2015
- Restock of 1st phase felling coupes
- Restock of 2nd phase felling coupes
- Forest Road
- Proposed roadline (within plan period)
- Aspirational roadline
- Land Management Plan area

Scale @A3 1:35,000

N

Coupe 10 Felling

Rogart northern spur road - 300m

Coupe 11 Felling

Coupe 18 Felling

Rogart western spur road - 321m

Coupe 19 Felling

Coupe 12 Felling

Coupe 20 Felling

Coupe 13 Felling

Achormlarie northern road - 1657m

Coupe 21 Felling

Achormlarie southern road - 2632m

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Map 7 - CSM6 Planned operations (b & c) Felling and road construction Achormlarie & Rogart

Legend

- Phase 1 felling
- Phase 2 felling
- Forest Road
- Proposed roadline (within plan period)
- Aspirational roadline
- Proposed substation road
- Land Management Plan Area

Scale @A3 1:45,000

N

Coupe 14 Restock
(Coupe 10 Felling)

Coupe 15 Restock
(Coupe 11 Felling)

Coupe 22 Restock)
(Coupe 18 Felling)

Coupe 23 Restock
(Coupe 19 Felling)

Coupe 16 Restock
(Coupe 12 Felling)

Coupe 24 Restock
(Coupe 20 Felling)

Coupe 17 Restock
(Coupe 13 Felling)

Coupe 25 Restock
(Coupe 21 Felling)

Forestry Commission Scotland
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Scotland's National Forest Estate is responsibly managed to the UK Woodland Assurance Standard.

Map 7 - CSM6 Planned operations (b & c) Restocking - Achormlarie & Rogart

Legend

- Restock of coupes felled up to 2015
- Restock of 1st phase felling coupes
- Restock of 2nd phase felling coupes
- Forest Road
- Proposed roadline (within plan period)
- Aspirational roadline
- Land Management Plan Area

Scale @A3 1:45,000

N

6.3 Tolerance Table

	Adjustment to felling coupe boundaries	Timing of restocking	Change to species	Wind throw or environmental response	Adjustment to road lines
FC Approval not normally required (record and notify FC)	<10% of coupe size	Up to 7 planting seasons after felling (allowing fallow periods for Hylobius).	Change within species group E.g. Scots pine to birch, Non-native conifers e.g. Sitka spruce to Douglas fir, Non-native to native species (allowing for changes to facilitate Ancient Woodland policy).	**Low sensitivity area** The affected area where wind throw, disease or other environmental factors represents more than 60% of the crop, the area including standing trees within the affected area may be felled.	**Low Sensitivity Area** • Creation of turning points/ loading bays. • Deviation of less than100m either side of the predicted centre line of the road/ track in low sensitivity areas. **High Sensitivity Area** Deviation less than 50m in either direction from the predicted centre of track
Approval by exchange of letters and map	10-15% of coupe size	7 years +	Change of coupe objective likely to be consistent with current policy (e.g. from productive to open, open to native species).	**Low sensitivity area** • As above to include up to 5ha of healthy crop beyond the affected area to a wind firm or reasonable edge. • The affected area where wind throw or disease is less than 60% of the crop. **High Sensitivity Areas** The affected area where wind throw or disease is more than 60% of the crop.	**Low Sensitivity Area** Deviation of 100 - 150m metres either side of the predicted centre of road in areas of low sensitivity. **High Sensitivity Area** Deviation of 50-100m in either direction from the predicted centre line of road or track
Approval by formal plan amendment	>15% of coupe size		Major change of objective likely to be contrary to policy, E.g. native to non-native species, open to non-native,	**Low sensitivity area** Greater than 5 Ha of healthy crop required to reach a wind firm or reasonable edge beyond the affected area. **High sensitivity area** • The affected area where wind throw or disease is less than 60% of the crop. • Felling of standing trees or healthy crop beyond the affected area.	Deviations exceeding the above.

The consultation tolerances contained within this table have been agreed with Highland and Islands Conservancy complying with OGB36 Forest Design Planning and CSM6, published by Forestry Commission, Edinburgh.

The preferred means of dealing with any adjacency issues will be through delayed felling, i.e. a coupe will not be felled until all surrounding crops are at least 2m tall. Where this is not possible, any adjacency issues will be dealt with through delay restocking, i.e. a coupe will not be restocked until all surrounding crops are at least 2 m tall.

6.4 Management Prescription Types

The future habitat management for North Highland FD forest design plans is visualised on the plan maps as zones of proposed management prescriptions. These management prescription types are detailed in the table below and further detail is provided in **Section 6.5 – Productive Forestry Prescriptions** and **Section 6.6 – Native Woodland Prescriptions**.

Management Prescription Type	Stocking Details at Initial Planting	Management Type Detail
Productive Conifer Woodland (See Section 6.5 for detailed species prescriptions)	2500 – 3500 stems per hectare 80% area conifer species 10% area managed open space 10% area broadleaf species	Primarily comprising conifer species in a silvicultural mixture appropriate to site soils and climate. The aim of this management type is to produce softwood by clearfelling for sawlog, small roundwood and biomass markets. The broadleaf element will generally be concentrated around archaeological and recreation sites however on sites with limited nutrition an increased broadleaf element will be included as part of the silvicultural mixture to contribute to site improvement (for example 10% downy birch in a sitka/larch mixture. Open ground will be incorporated around archaeological and recreation sites and as unplantable (for example rocky) ground throughout the coupe. Strenuous effort will be made to control herbivores and the sites will be monitored using the FCS Stocking Density Assessment protocol.
Native Woodland with SP (See Section 6.6 for detailed species prescriptions)	1600 stems per hectare 60% area native broadleaves 20% Scots pine 20% open space	Where this management type is proposed native tree and shrub species will be established at lower density mosaics reflecting the appropriate NVC woodland type for the local soils and climate as detailed in Section 6.5 – Native Woodland Prescriptions. Primarily established with the aim of increasing biodiversity, enhancing recreation and education opportunities and potentially producing low quality timber on long rotations (EG for firewood markets) this woodland will be eventually create a woodland stand structure that contains a range of different age classes, both mature and veteran trees with deadwood and some permanent open areas at the margins and internally. A light level of grazing by herbivores sufficient to allow regeneration of a characteristic range of trees and shrubs and a well developed field layer will be tolerated although deer control will be sufficient to allow establishment of transplants and eventually progression to regeneration. Although non-native tree species will generally be absent, where they are considered particularly beneficial to priority species (e.g. *Larix spp* for woodland grouse or *Picea abies* for red squirrels) they will be tolerated at low levels (less than 15% of species by area).
Riparian Woodland (See Section 6.6 for detailed species prescriptions)	800- 1600 stems per hectare 60% area native species 40% open space	The aim of this woodland type is to provide a significant buffer between productive forestry and watercourses and waterbodies that will increase biodiversity and enhance riparian and aquatic habitats. The species that are planted in riparian zones will be selected to match the NVC community for the appropriate soils type and detail of the proposed habitat prescriptions is contained in Appendix 6. Native tree and shrub species will be established in clusters of high density plantings appropriate to site type and framing other significant habitat (e.g. water vole grassland). A light level of grazing by herbivores sufficient to allow regeneration of a characteristic range of trees and shrubs and a well developed field layer will be tolerated although deer control will be sufficient to allow establishment of transplants and eventually progression to regeneration. The long term aim is that this habitat type will develop to form a permanent network of 'natural reserve' habitat so the fluctuation of levels of open space and woodland will be tolerated although prolific conifer regeneration that will compromise overall aims will be removed.
Mixed woodland (See Section 6.6 for detailed species prescriptions	Dependent on individual area 500 - 1600 stems per hectare 40 % mixed broadleaves 30% mixed conifers 30% open space	The aim of this woodland type is to provide a tree cover on sites where establishment of a native woodland would be difficult given the existing species structure, and where presence of non-native species is acceptable for landscape, social or biodiversity benefits. In areas prescribed ad 'mixed woodland' natural regeneration of native species will be encouraged and some planting might be undertaken, but the non-native regeneration will be accepted, too. There are three areas prescribed as 'mixed woodland' in the LMP area. One is in Rogart, where mature and old conifer and broadleaf trees (including Beech) are cherished by the local people and form a significant and highly visible element of the landscape. The area is designated as a Natural Reserve, with no felling or planting planned. Natural regeneration of both native and non-native species will be accepted. The second area is situated in Camore, where conifers (SP and LP) planted in the 50's on a juncus bog, are slowly dying, creating valuable deadwood habitat. Native broadleaves are gradually colonising the area, creating a habitat link with the native trees and shrubs around Loch-an-treel (outside FC ownership). Given the environmental benefits of deadwood, difficult ground conditions and small area (1.8 ha), felling of the dead/dying conifers would not bring any benefits. The third area is in Harriets plantation, on an exposed hilltop, with very poor and wet soils. The area will never be able to produce commercial crop, and felling the non-native conifers present on site will be uneconomical. The area will be gradually transformed into o more 'native' type of woodland – SP and native broadleaves present on site will be promoted over non-natives, and their regeneration will be encouraged. Natural regeneration of non-natives will be accepted where it won't compete with native species. The aim will be to create more

		diverse and visually attractive woodland cover, which will provide a shelter from wind for the commercial crop growing to the east and south.
Bog woodland (See Section 6.6 for detailed species prescriptions)	500 – 1600 stems per hectare 60% native broadleaves (trees and shrubs) 40% open space	The aim of this woodland type is to provide buffer between productive forestry and open hill, and to provide a tree cover on deep peat, where peatland restoration would not bring significant benefits. The species will be selected to match the NVC community for the appropriate soils type and detail of the proposed habitat prescriptions is contained in Section 6.6. Native tree and shrub species will be established in clusters of high density plantings appropriate to site type. A light level of grazing by herbivores sufficient to allow regeneration of a characteristic range of trees and shrubs will be accepted.
Low Impact Silvicultural Systems	Dependent on the individual system chosen and the seed sources available	LISS is proposed as a prescription where climate is suitable and where it will achieve specific aims – for example addressing water or soil quality/stability issues, enhancing landscape value and/or contributing to biodiversity enhancement. As forests move through the initial thinning regimes a decision will be taken as to which LISS is most appropriate for the site and the management aims. Most commonly shelterwood systems will be practised, avoiding clearfelling more than 10% of the coupe area during one thinning cycle. Full management prescriptions are contained in the coupe workplan for each LISS area. Where significant watercourses have been identified within LISS coupes, a riparian buffer of a minimum of 30 metres either side of the watercourse will be designated as 'Riparian LISS'. Within these coupes thinning will be heavier (up to 150% of marginal thinning intensity) to remove conifer cover over a shorter period. In addition, where no broadleaf seed source exists some supplementary planting of appropriate broadleaf species will be undertaken in small groups of less than 0.1 Ha to establish future seed sources.
Open Land	(-)	Land is maintained as open habitat for biodiversity gain where specific species or habitat types will benefit (e.g. bog restoration) or where another land management objective exists (e.g. agriculture – crofting tenure). Open land will also be specifically prescribed where large scale heritage sites, not able to be accommodated in the standard open space of other habitat types needs protected. Open space will form a key element of native and riparian woodland expansion. Open land as defined in this LMP will comprise a maximum of 20% broadleaf woodland and 10% conifer woodland, primarily associated with improving riparian habitats.
Natural Reserve	Dependent on individual area	A natural reserve is predominantly wooded and permanently identified and is sited in a location where it will be of particularly high biodiversity benefit (for example riparian woodland). All NRs will be managed by minimum intervention unless alternative management has higher conservation or biodiversity value. Any management operations proposed will solely be to protect the integrity of the habitat (for example removal of invasive non-native regeneration). The function of NRs is to provide continuity of habitat to allow sedentary species to establish and thrive. They provide reservoirs of permanent habitat from which more mobile species can expand into other areas of woodland. The two types of NR proposed will be based on semi-natural woodland origin and on plantation woodland origin. It is intended that most riparian woodland will eventually be adopted as natural reserve although with the management required to establish the appropriate species this cannot yet be the case.
Long Term Retention	Dependent on individual area	An LTR is a tree or stand of trees retained for environmental benefit significantly beyond the age or size generally adopted by North Highland Forest District. LTR's are proposed because the trees (not the land they occupy) are of significant landscape or biodiversity benefit. An LTR will be proposed where it is desirable to retain the existing stand beyond normal economic maturity for benefits noted, but there is no imperative to retain permanent woodland cover once the existing stand has fulfilled its objective. In most cases, when selected, LTRs will comprise a stand of stable standing trees however there may be cases where it is desirable to retain large patches of windblow to increase structural diversity and deadwood volume. This latter type of LTR, if present, will be sited where landscape is a low or insignificant priority.

NB:

- All procurement of planting material will adhere to the current guidance (FCS, 2007) on the sourcing of forest reproductive materials.
- All operations will adhere to the Controlled Activities Regulations 2005 General Binding Rules with respect to appropriate buffer strips between restock areas and water bodies.
- It is anticipated that initial applications of potassium, phosphate and nitrogen may be required to establish productive conifer crops. Any requirement for detailed remedial fertiliser programmes will be decided following foliar analysis. Heather control and silvicultural mixtures will be used as a first alternative to fertiliser application. Any initial or remedial fertiliser programmes will adhere to current industry best practice and follow FC Guidelines on water catchment protection. Restocking will be carried out with the principles of pesticide and fertiliser reduction foremost.

6.5 Productive Forestry Prescriptions

Soil Group	Soil Types Relevant to North Highland FD	Characteristics	Species Prescription for Commercial Restocking
1	Brown Earths	Soils with typically good aeration and drainage throughout the profile and well-incorporated organic matter. These soils range from very rich to poor and usually allow deep rooting. Likely vegetation to be encountered includes broad leaved grasses, (e.g. Yorkshire fog, Bent), bracken, bramble, foxgloves, violets and a diverse range of herbs.	Douglas Fir on Poor (must be without heather) to Rich fertility with Moist to Dry soil moisture. Desirable intimate or group mixture; European Larch, Norway Spruce or Western Red Cedar. Generally in sheltered areas with sufficient rainfall Sitka or Norway Spruce on Poor to Medium fertility with Wet to Fresh soil moisture. Desirable intimate or group mixture; each other or European/Hybrid Larch Scots Pine in Podzolised areas on Poor to Medium fertility with Moist to Dry soil moisture. Desirable intimate or group mixture; Japanese/Hybrid or European Larch European Larch on Medium to Rich fertility with moist to Moderately Dry soil moisture. Desirable intimate or group mixture; Scot's Pine or Douglas Fir Japanese/Hybrid Larch on Poor to Medium fertility with Very Moist to Fresh moisture. Desirable intimate or group mixture; Scots Pine Sycamore on Medium to Rich fertility with Moist to Fresh soil moisture. Desirable intimate mixture: Ash† or European Larch Where improved climatic conditions allow: Sessile Oak on Medium to Rich fertility with Moist to Slightly Dry soil moisture. Pedunculate Oak (Local seed source if possible) on Medium to Rich with Very Moist to Fresh soil moisture. Desirable intimate/group or blocky mixtures include; Norway Spruce, European Larch, Western Red Cedar, Silver Birch or Ash Silver Birch on Poor to Medium with Very Moist to Fresh soil moisture. Desirable intimate or group mixture: Oak or Scots Pine Ash† on Rich fertility with moist to Fresh soil moisture and less acidic sites. Mix in groups with; Sycamore, Oak or Beech
3	Podzols	Develop on unfertile acid soils with high rainfall where nutrients are flushed into the lower horizons of the soil profile. Very poor fertility. Vegetation common to these soils are ericaceous plants, grasses including Wavy hair, Matt and Purple moor grass. Light bracken and feather mosses may also be present.	Scot's Pine with Moist to Dry soil moisture. Desirable mixture; intimate mixture with Hybrid Larch Sitka Spruce with Wet to Moist soil moisture. Mix with; Lodgepole Pine in wetter areas or Japanese/Hybrid Larch Japanese/Hybrid Larch with Very Moist to Fresh soil moisture Where improved climatic conditions allow: Sessile Oak (not on 3m) with Moist to Fresh soil moisture. Desirable mixture; Hybrid Larch, Scots Pine or limited Norway Spruce Induration or an impenetrable pan will prevent good drainage, resulting in a need to break this impediment with suitable cultivation that will allow freer draining and greater rooting depth.
4	Ironpans	Develop on free draining acid soils with high rainfall. The transfer of aluminium and iron in solution down through the soil profile develops an ironpan that is impervious to water and root penetration. Vegetation and fertility is similar to that of Podzols above	Scots Pine with Moist to Dry soil moisture. Desirable mixture; Japanese/Hybrid Larch Japanese/Hybrid Larch with Very Moist to Fresh soil moisture. Desirable mixture; Scot's Pine Lodgepole Pine in elevated areas with Wet to Fresh soil moisture Sitka or Norway Spruce (4 & 4b) with Wet to Fresh soil moisture. Desirable intimate or group mixture; Lodgepole Pine in wetter areas or Japanese/Hybrid Larch or Scot's Pine. Sycamore (4b only) with Moist to Fresh soil moisture. Consider intimate mixture with Japanese/Hybrid Larch Breaking of the ironpan is desirable, so as to allow drainage of the site and a potential increase in soil rooting volume and nutrient availability, therefore cultivation that includes amelioration of the ironpan will be considered.
6	Peaty Gleys	Very Poor to Rich nutritional availability, these soils are indicated by Purple moor grass, Calluna and Cross-leaved heath, with sphagnum prevalent in the North and West.	Sitka Spruce on Poor to Medium fertility with Wet to Fresh moisture. Experience in North Highland suggests this crop will rarely establish as a pure stand without fertiliser input. Intimate mix with Lodgepole Pine in wetter and poorer areas or with Japanese/Hybrid Larch in more Pozolised areas. Consider adding blocks of Downy Birch Downy Birch on Poor to Medium fertility with Very Moist to Fresh soil moisture High winter water table can be expected and good drainage will be required to achieve best results.

7	Surface Water Gleys	Differing from groundwater gleys in that waterlogging is caused not by a high water table, but by lateral surface-water movement through the soil profile developing a seasonally fluctuating water table. Resulting anaerobic conditions will restrict rooting. Indicative vegetation includes Tussock grass and Creeping Buttercup. Again poor to moderate nutritional availability can be expected.	Sitka or Norway Spruce on Medium fertility with Wet to Fresh soil moisture. Desirable mixture; each other, Japanese/Hybrid Larch or with Lodgepole Pine in wetter poorer areas Where improved climatic conditions allow: Pedunculate Oak on 7b Medium to Rich fertility with Moist to Fresh soil moisture. Desirable group or blocky mixture; Norway Spruce Drainage will be required along with micro site cultivation such as mounding.
9	Molinia Bogs	Often existing on hillsides where flushing is more pronounced. Moderate nutrition available.	FC Forests and Peatland Habitats Guideline Note (2000) and FCS Practice Note 'Forestry on peatland habitats, (2014) states that : 'where the site is a priority for habitat restoration on ecological grounds (to open habitat or native/bog woodland) , conventional restocking will not be required'; 'where site is not priority for restoration to open peatland or bog/other type of native woodland and it's unlikely to support tree growth grater than Yield Class 8 (sitka spruce), the appropriate option will be to create peatland edge woodland' **'where the site is not a priority for restoration and it's likely to support rapid enough tree growth to compensate for greenhouse gas losses from the soil – understood to be Yield Class 8 or above for Sitka Spruce – then the conventional restocking should be undertaken'** It may be therefore considered that more fertile, flushed peats and areas of deeper peat where hydrology has been irreversibly compromised will remain suitable for restocking. Where areas of deeper peat are encountered in intimate mosaic with more favourable soils Sitka Spruce (QSS) will be favoured in a mixture with Lodgepole Pine of disease resistant provenance or hybrid larch. On these more nutritionally challenged sites a proportion (up to 20%) of soil improving species such as birch will be considered.
11	Unflushed Blanket Bogs	Calluna, cotton-grass, deer grass bogs including the hill peats located on upland plateaux and hillsides deeply dissected by burns.	
13	Rankers/skeletal soils	.	Not suitable for tree growth

NB – These prescriptions must be adopted within the local context set out in the main body of this Land Management Plan. Climate, (along with soils) must be included as **the** determining factor in final species selection.

- Planting will generally become a mosaic of the species recommended above and will include areas of non-productive open ground and broadleaf riparian zones. Species choice will be dictated by local conditions and agreed after site visits by management staff.
- No commercial forestry type likely to be suitable on sites wetter than SMR "Very Moist" and vegetation indicating SNR <4.5
- Origin for SS is QSS. However where conditions are sub-alpine then ASS is preferred
- Mixed stands mean that each species occupies at least 20% of the canopy. Blocky areas should aim to cover the area that 3-4 mature trees would cover. Mixtures may need management to favour one or more species. Intimate mixtures of broadleaves with Sitka Spruce or Scot's Pine will normally result in the conifer's dominating overtime so planting in blocks is often the better option.
- † Movement of any plant-passported Ash plants, trees and seeds within Great Bratain is, until further notice, prohibited under UK Government legislation (2012 Plant Heath Order No. 2707) introduced on 29.10.2012.

References:

Kennedy F (2002) *The Identification of Soils for Forest Management,* Edinburgh: HMSO

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Mason, B (2006) Managing Mixed Stands of Conifers and Broadleaves in Upland Forests of Britain, Information Note, Edinburgh: FCS

Wilson, S (2011) Using alternative conifer species for productive forestry in Scotland, Glasgow: Bell & Bain Ltd

http://www.forestry.gov.uk/fr/INFD-8CVE4D

6.6 Native Woodland Presctiptions (NVC)

Soil Group	Soil Types Relevant to East Sutherland LMP area	Characteristics	Aim*	Species Prescription for Habitat Types Predominating in North Highland Forest District
1	Brown Earths	Soils with typically good aeration and drainage throughout the profile and well-incorporated organic matter. These soils are mainly * fertile and allow deep rooting. Likely vegetation to be encountered includes fine grasses, holcus, bracken, bramble, foxgloves, violets and a diverse range of herbs. * However Podzolic Brown earths where nutrients have been leached are “Very Poor”	NW	W19 Juniper wood with sorrel on 1, 1u, 1z and 1b from sheltered sites up to areas with DAMS < 22 W18 Scots pine with heather on 1z in cool to warm with DAMS < 18 W11 Upland oak-birch with bluebell on 1, 1u and 1z in cool to warm with DAMS < 18
3 & 4	Podzols & Ironpan Soils	Developed on Acid * soils with high rainfall where nutrients are flushed into the lower horizons of the soil profile. Frequently induration or an impenetrable pan will prevent good drainage, resulting in a need to break this impediment with suitable cultivation that will allow freer draining and greater rooting depth. Vegetation common to these soils are ericaceous plants, grasses including deschampsia flexuosa, nardus, carex and molinia. Light bracken and feather mosses may also be present. * NOT fertile soils	NW RW	W18 Scots pine with heather on 3, 3m, 4, 4z and 4b Not in Sub-alpine climate, (Cool to Warm) DAMS < 18. W19 juniper wood with sorrel on 3 and 4b Possible up to Sub-alpine zone W17 Upland oak-birch with blaeberry on 3s and 3ms Mainly in Lower Cool to warm climate zone. DAMS < 18.
6	Peaty Gleys	Very Poor to medium nutritional availability, these soils are indicated by Molinia, Calluna and Erica spp, with sphagnum prevalent in the North and West. High winter water table can be expected and good drainage will be required to achieve best results.	NW RW BW	W18 Scots pine with heather on 6z “moist” to “fairly dry” W4 Birch with purple moor-grass on 6 and 6b. Cool to Warm. DAMS < 18.
7	Surface Water Gleys	Differing from groundwater gleys in that waterlogging is caused not by a high water table, but by induration preventing adequate drainage leading to a seasonally fluctuating water table. Resulting anaerobic conditions will restrict rooting. Indicative vegetation includes Holcus, Juncus, Nardus and Deschampsia *caespitosa*. Again poor to moderate nutritional availability can be expected. Drainage will be required along with micro site cultivation such as mounding.	RW NW	W11 Upland oak-birch with bluebell on 7b W18 Scots pine with heather on 7z possibly on margins leading to drier knolls. W7 Alder-ash with yellow pimpernel on 7, 7b and 7z Cool to Warm. Sheltered to Moderately exposed. (DAMS <16)
9	Molinia Bogs	Often existing on hillsides where flushing is more pronounced. Moderate nutrition available.	NW RW	W4 Birch with purple moor-grass on 9a, 9b, 9c and 9d suitable for the transitional areas at the margins between productive forest blocks and peatland restoration sites.
			OG	9e Trichophorum, Calluna, Eriophorum, Molinia Bogs will not be planted or restocked - restoration of peatland.
11	Unflushed Blanket Bogs	Calluna, Eriophorum, Trichophorum Bogs including the hill peats located on upland plateaux and hillsides deeply dissected by burns.	OG	11a A rare peatland type mainly restricted to the driest eastern uplands
			BW	W4 Birch with purple moor grass on 11b,c,d Unflushed blanket bogs
13	Rankers/skeletal soils	The bedrock occurs at <30cm from the soil surface.	OG	13r - rock - not to be planted as it will not support tree growth

*NW – Native Woodland / RW – Riparian Woodland / BW – Bog Woodland / OG – Managed Open Ground e.g. peatland restoration

NB – These prescriptions must be adopted within the local context set out in the main body of this FDP. Climate must be included as a determining factor in final species selection.

- Planting will generally become a mosaic of the woodland types recommended above, dictated by local conditions and agreed after “75% Site Completion Visits”
- Particular note should be made of the inadvisability of planting the peatland types 10 – 14 that may predominate on marginal FD sites
- No native woodland type likely to be suitable on sites wetter than SMR “Very Moist” and veg indicating SNR <4.5

References:

Kennedy F (2002) *The Identification of Soils for Forest Management*, Edinburgh: HMSO

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Rodwell J.S. and Paterson G.S. (1994) *Creating New Native Woodlands; Bulletin 112,* London: HMSO