



Forestry and
Land Scotland
Coilltearachd agus
Fearann Alba

Central Region

Larbert Land Management Plan 2023 - 2033



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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.




Land Management Plan Details

LMP Name:	Larbert		
Grid Reference:	Main entrance NS 8491 8242	Nearest town or locality:	Larbert
Local Authority:	Falkirk		
Land Management Plan area (hectares):	25.99		

Owner's Details

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(Maps and Appendices II > III attached seperately)

Table 1 - LMP version history

Version	Date	Comments
1.0	08/08/22	Initial draft for Planning and Projects Manager review.
1.1	26/08/22	Draft for internal review Minor updates to text and maps following v1.0 feedback
2.0	22/09/22	Draft submission for Scottish Forestry. Minor updates to text following internal review and feedback.
3.0	04/01/2023	Final submission to Scottish Forestry. Consultation responses added to LMP appendices. Minor updates to LMP text following consultation.

1. Summary

1.1 Introduction and Plan Overview

This plan reviews Forestry and Land Scotland's management of Larbert woods, located adjacent to the NHS Forth Valley Royal Hospital. The plan area extends to circa 26 hectares (ha); comprising approximately 17ha of woodland and 9ha of parkland within the remains of a designed landscape. It is a significant site for recreation, health and wellbeing. (For further information, see section 3 and Appendix I.)

Land Management Plans detail our management intentions for a specific area over a ten year period, with outline proposals for a further ten years. They link strategic policies with practical operations and provide regulatory approval for forestry and land management activities. Plans are reviewed after five years to ensure the objectives and management proposals are still appropriate and on track for delivery. Individual operations will be preceded by a more detailed planning process which allows further consideration of site-specific constraints, opportunities and mitigation measures.

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 Program 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.

1.2 Vision and Objectives

The management proposals within this Land Management Plan (LMP) have been identified to achieve our vision and objectives for the site, over the next ten year period.

Our vision for Larbert is:

'To preserve and enhance the social and environmental benefits of the site, through sensitive management, over the next decade and beyond.'

This vision is supported by the following objectives for delivery under this Land Management Plan:

1. Maintain accessible, quality urban woodland environments available to users of all abilities; including partnership working to encourage increased access and opportunities.
2. Control Rhododendron regeneration to prevent its re-establishment and spread and with a view to eradicating the population.
3. Maintain the designed landscape character in a sustainable manner.
4. Reduce risks posed by tree pests and diseases while maintaining woodland character.
5. Maintain and enhance key habitat features such as LEPO woodland and veteran trees.

1.3 Critical Success Factors

The following critical success factors will indicate if the stated objectives have been achieved. (For a full analysis of how progress against the LMP objectives will be monitored see Appendix III/2.)

- Continued use of the site for healthcare, recreation and educational purposes and for projects such as ‘Branching Out’.
- Significantly reduced population of Rhododendron within the site
- Management is sympathetic of historic designed landscape and overall site character is maintained.
- Improved age and species diversity within the woodland with low levels of tree mortality and trees in poor condition.
- Deadwood levels meet or exceed UKFS and UKWAS requirements, veteran trees are maintained with associated habitats.

1.4 Summary of planned operations

Table 2 – Summary of operations 2022 – 2032

Operation	Area (ha)
Clearfelling	N/A
Thinning (for Scottish Forestry approval)	8.48 ¹
Low-impact silviculture (LISS final fell)	5.58 ²
Restocking	<0.5 ³
Afforestation	N/A
Deforestation	N/A
Forest Roads	N/A
Forest Quarries	N/A

¹ Gross area of thinning coupes for approval, net area of felling will be significantly smaller. Respacing not included.

² Gross area of LISS final fell coupes for approval, net area of felling will be significantly smaller.

³ Established regeneration within LISS final fell area not included.

2. Regulatory Requirements

2.1 LMP Standards and Guidance including UKFS

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

In addition, further materials referenced in the production of the plan can be found in section 5.

This plan has been prepared and presented in accordance with UKFS requirements and guidelines and no compliance issues are envisioned.

2.2 Woodland Management

2.2.1 Clearfelling

No clearfelling proposed within plan area.

2.2.2 Low-impact Silviculture/Continuous Cover Forestry

(The table below relates to felling interventions which will remove the final stand overstory – i.e. ‘LISS Fell’ in Forestry Commission Scotland (2016).)

Table 3 – Low-impact Silviculture 2022 – 2032

Management Coupe	Operation	Area	Volume
17001	Selective fell	5.58	40m ³ (estimated)
Total		5.58	40m³ (estimated)

2.2.3 Thinning

Table 4 – Thinning for Scottish Forestry approval 2022 – 2032

Species	Thinning Area
Mixed Broadleaves	8.48
Total	8.48

2.2.4 Restocking

Table 5 – Restocking 2022 – 2032

Coupe	Species	Area (ha)
17002	MB	<0.5 ¹
Total		<0.05

¹ Infill of gaps created through previous felling interventions and/or windthrow.

2.3 Summary of Current and Future Species

Table 6 – Summary of current and future species (figures relate to whole site).

Species	Year 0 (2022)		Year 10 (2032)		Year 20 (2042)	
	Area (ha)	%	Area (ha)	%	Area (ha)	%
Beech (BE)	2.7	9.7	2.2	8.5	2.1	8.1
Birch (downy/silver) (Bi)	4.7	16.8	3.5	13.5	3.5	13.5
European ash (ASH)	0.1	0.4	0	0.0	0	0.0
Japanese larch (JL)	0.9	3.2	0.9	3.5	0.9	3.5
Mixed broadleaves (MB) ¹	1.2	4.3	2.8	10.8	3.2	12.3
Mixed conifers (MC)	0.1	0.4	0.1	0.4	0.1	0.4
Native Mixed broadleaves (NBL) ²	0	0.0	0.4	1.5	0.6	2.3
Oak (robur/petraea) (OK)	2	7.2	2	7.7	2	7.7
Other limes	0.4	1.4	0.4	1.5	0.4	1.5
Scots pine (SP)	1	3.6	1	3.8	1	3.8
Sycamore (SYC)	3.8	13.6	2.8	10.8	2.5	9.6
Not Applicable	10	35.8	9.9	38.1	9.7	37.3
Total	26.9*	100	26	100	26	100

*Difference in area due to presence of multiple storeys within the sub-compartment database (SCDB) resulting in correct double-counting of the same area. Storeys cannot be replicated through the future forest restock function in Forester Web although the woodland will retain a structure of multiple storeys under these proposals.

¹ Will include major components of BE and SYC with smaller components of OK, Bi and other MB.

² NBL species already established but under-represented in SCDB due to dominance of Bi regeneration. Species include cherry, oak, hazel, alder and hawthorn.

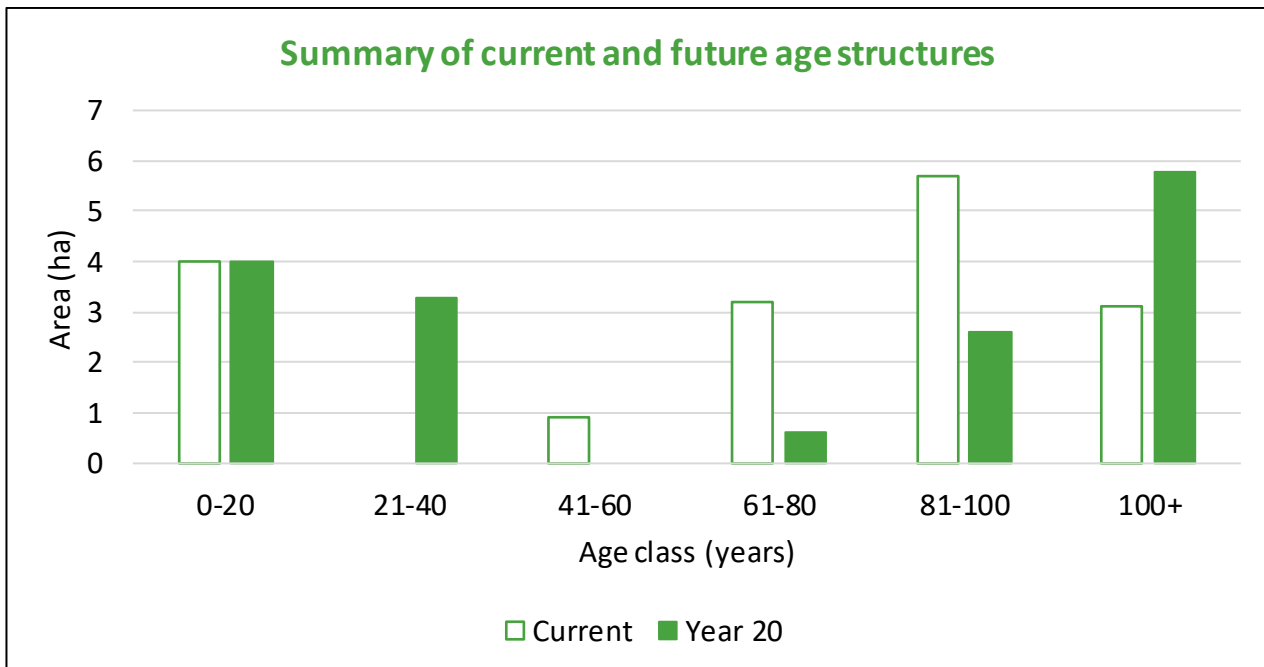
2.4 Summary of Current and Future Age Structure

Table 7 – Summary of current and future ages structures

Age class	Area 2022	Area 2042
0-20	4	4
21-40	0	3.3
41-60	0.9	0
61-80	3.2	0.6
81-100	5.7	2.6
100+	3.1	5.8
N/A	10	9.7
Total	26.9*	26

*Difference in area due to presence of multiple storeys within the sub-compartment database (SCDB) resulting in correct double-counting of the same area. Storeys cannot be replicated through the future forest restock function in Forester Web although the woodland will retain a structure of multiple storeys under these proposals.

Figure 1 – Summary of current and future age structures



2.5 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 75 cubic meters per Land Management Plan per calendar year. A record of the volume felled in this way will be maintained and will be considered during the five year Land Management Plan review.

2.6 Woodland Management in Visitor Zones

Visitor Zones have been identified in areas where FLS encourage and manage access or where the woodland managed by FLS interacts with popular visitor sites or access routes. Visitor Zones are mapped on Map 11.

In these areas, single trees or small groups of trees will be removed when necessary to protect facilities, infrastructure and trails, or to enhance the setting of features, or to maintain existing views.

Woodland in these zones will also be thinned, or trees re-spaced, for safety reasons (including to increase visibility to ensure that sites are welcoming and feel safe) and where it is necessary to enhance the experience of the forest setting, through the development of large trees, or preferential removal of trees to favour a particular species.

2.7 Roads, Quarries, Timber transport

No road or quarry work proposed.

Timber transport estimated 200 tonnes via exit at NS 8491 8242 over the period 2022-2027. Provisional stacking area on internal spur road at NS 8493 8246. Access will be via B905 and Quintinshill Drive which will require consultation with the Local Authority. More detail is provided in section 4.3.3 and potential impacts on public access are covered in section 4.6.

2.8 Environmental Impact Assessment

No EIA Forestry Projects are proposed.



2.9 Tolerance Table

Table 8 – LMP tolerances

	Map Required (Y/N)	Adjustment to felling period	Adjustment to felling coupe boundaries	Timing of restocking	Change to species	Wind throw response	Adjustment to road lines	Designed open ground
Scottish Forestry (SF) Approval not normally required (record and notify SF)	N	Fell date can be moved within 5 year period where separation or other constraints are met	<10% of coupe size.	Up to 5 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).			Location of temporary open ground e.g. deer glades if still within overall open ground design Increase by 0.5 ha or 5% of area - whichever is less
Approval by exchange of letters and map	Y		10-15% of coupe size.	5 years +	Change of coupe objective that is likely to be consistent with current policy (e.g. from productive to open, open to native species).	Up to 5 Ha	Departures of greater than 60 m from the centre of the road line	Increase of 0.5 ha to 2 ha or 10% - whichever is less Any reduction in open ground
Approval by formal plan amendment	Y	Felling delayed into second or later 5 year period Advance felling into current or 2 nd 5 year period	>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,	More than 5 Ha	As above, depending on sensitivity	More than 2 ha or 10% Any reduction in open ground in sensitive areas Colonisation of open Areas agreed as critical



3. Analysis and Concept

This section describes how the LMP objectives detailed in section 1.2 have been developed and how these inform the current management proposals.

Figure 2 – The process of developing LMP objectives and management proposals.



3.1 Land Management Plan context

Larbert contains both historical woodland and parkland, with areas of tree cover dating back to the 1800s. Once forming part of the designed landscape around Larbert House, it has been used for public healthcare since the early 1900s. Much of the woodland present is of relatively recent origin, dating back to the 1930s and 1960s and is the result of deliberate planting and natural processes which have gradually eroded the original design and layout of the landscape. Some management works were undertaken in the late 1990s, however between 2000 and 2010 a lack of intervention resulted in the spread of *Rhododendron* and small-scale wind throw. Since 2010, a partnership involving NHS Forth Valley, Falkirk Council, Central Scotland Forest Trust, and Forestry Commission Scotland saw much improvement to the site, with the majority of management work undertaken by Forest Enterprise Scotland, now Forestry and Land Scotland. As such, the site now provides an attractive and well-used setting for recreation health and wellbeing activities on the urban fringe and in close proximity to significant healthcare facilities, including The Forth Valley Royal Hospital and Maggie's Forth Valley. The redevelopment of Larbert House and associated buildings has significantly increased the number of residential properties in close proximity to the site and further development is underway less than 200m east of the site boundary.

The site was purchased by FLS from NHS Forth Valley in 2019 and, recognizing the importance of the site for recreation, health and wellbeing, Forestry and Land Scotland's vision for Larbert is: *'To preserve and enhance the social and environmental benefits of the site, through sensitive management, over the next decade and beyond.'*

A full description of the site is given in Appendix I.

3.2 Analysis of previous plan

Sections 3.2.1 and 3.2.2, below, describe previous site planning which has been used to inform the current LMP. Both documents provide useful historic information on the site and are recommended as reference materials in the 10-year revision of this LMP.

3.2.1 FVRH Woods Forest Design Plan

The previous management plan (*FVRH Woods Forest Design Plan 2012-2022*) objectives are reviewed in Appendix III/1.. This plan has been used to inform the current site management objectives, as well as areas where management activities require revision or modification.

3.2.2 Ian White Associates Master Plan

Preceding and informing the previous management plan, the *RSNH Master Plan and Management Framework*, produced by Ian White Associates, identified options for the future use and management of the residual Forth Valley Health Board estate, which included the entirety of the current FLS landholding. The Master Plan has been referenced in the production of this LMP and the management objectives and interventions proposed within the LMP are broadly consistent with the vision set out in the Master Plan.

3.3 Key issues and challenges

Key issues and challenges which require addressing through this management plan include:

- ***Rhododendron* regeneration**
Previous control work was carried out in the late 1990s but a lack of follow up is believed to have made this operation counter-productive. A follow up operation to control the *Rhododendron* regeneration resulting from clearance operations in 2010/12 is therefore required to ensure this situation does not continue.
- **Parkland management**
A key remaining feature of the designed landscape is the wooded parkland surrounding Larbert House and Larbert Loch. The composition and context of this area has changed significantly since the original landscape was laid out, and recent management under the previous plan has had mixed success. The intention with this area going forward is to implement management which maintains the open parkland landscape character, but recognises the current context and use of the site and improves biodiversity value and resource efficiency.

3.4 Constraints and Opportunities Analysis

The following analysis identifies the opportunities and constraints relative to each management objective, as described in section 1.2; and the 'concept' for addressing these factors and achieving the stated objective. See also map 07.



Table 9 – LMP objective constraints, opportunities and concept.

Objective (for delivery in this LMP)	Constraints (to the delivery of this objective)	Opportunities (for the delivery of this objective)	Concept (how objective can be delivered)
<p>Maintain accessible, quality urban woodland environments available to users of all abilities, including partnership working to encourage increased access and opportunities.</p>	<p><i>Rhododendron</i> and grey squirrel damage could impact woodland quality and visitor safety.</p> <p>Some paths can be muddy in winter limiting use and affecting users experience.</p> <p>Expansion of ruderal vegetation (e.g. bramble) limiting user experience and access some key areas, particularly adjacent to Larbert Loch.</p>	<p>Close proximity to nearby healthcare facilities and residential areas, WIAT woodland.</p> <p>Good network of existing well-maintained trails, including all-abilities access facilities.</p> <p>Established woodland, parkland and loch provide an attractive setting. Species and age diversity add to amenity value.</p>	<p>Maintain woodland condition through appropriate interventions – increase woodland resilience age and species diversity and remove invasive <i>Rhododendron</i>.</p> <p>Maintain current the path infrastructure and consider options to expand surfaced paths where feasible.</p> <p>Target intensive parkland management in areas which are key for the visitor experience.</p>
<p>Control <i>Rhododendron</i> regeneration to prevent re-establishment and spread with a view to eradicating the on-site population.</p>	<p>Significant population scattered throughout the site.</p> <p>Access to <i>Rhododendron</i> problematic in some areas (e.g. island and loch shore).</p>	<p>Majority of the site is easily accessible on foot and most plants are small.</p> <p>Some work could be carried out by volunteers.</p>	<p><i>Rhododendron</i> control should be prioritised and all regeneration removed from the site within the lifetime of this plan.</p>

Objective (for delivery in this LMP)	Constraints (to the delivery of this objective)	Opportunities (for the delivery of this objective)	Concept (how objective can be delivered)
	Mature <i>Rhododendron</i> plants outwith ownership may seed into site.	Action before existing plants establish fully will help to prevent future spread. Work with neighbors to remove plants on adjacent land where possible.	Explore options for volunteer input for minor site management activities such as scrub clearance and <i>Rhododendron</i> control.
Reduce risks posed by tree pests and diseases while maintaining woodland character.	Mammal control is not appropriate or practical in this location. Several diseases present in the wider area and transport links and public use could act as a vector for diseases entering the site. Grey squirrel damage most severe on beech and sycamore which together form a significant proportion of the species present. Squirrel damage increases vulnerability of trees to other pests and diseases and may affect tree safety.	Relatively diverse species and age composition of existing woodland. Larch and pine are well-spaced in relatively open woodland environment on East coast, reducing risk of associated diseases. Natural regeneration including minor species is present in many areas. Only small population of current species are vulnerable to catastrophic pests/diseases (e.g. <i>Phytophthora ramorum</i> and ash dieback).	Remove all larch in coupe 17001 as part of ongoing conversion to native woodland (as per previous plan). Thin woodland to further reduce humidity and encourage increased natural regeneration. Diversify woodland structure and species composition favoring species more resistant to grey squirrel and which are likely to be tolerant of future climates. Target sycamore and birch in thinning and respacing operations and enrichment plant with minor species if necessary,

Objective (for delivery in this LMP)	Constraints (to the delivery of this objective)	Opportunities (for the delivery of this objective)	Concept (how objective can be delivered)
	<p>Difficult to predict future pest and disease outbreaks.</p> <p>Climate change may make area more suitable to pests and diseases.</p> <p>Beech, sycamore and downy birch may not be drought tolerant.</p>	<p>Gleyed soil type indicates existing substrate is not highly prone to drought conditions.</p>	<p>Target trees in poor health for removal.</p> <p>Consider opportunities to install pine marten boxes to naturally control the grey squirrel population.</p>
<p>Maintain the designed landscape character in a sustainable manner.</p>	<p>Significant growth of ruderal vegetation (e.g. bramble, raspberry, willowherb) in some areas.</p> <p>Birch regeneration may affect long-term species composition and character.</p> <p>Recent and ongoing development changes character of surrounding (designed) landscape.</p> <p>Mature trees continue to dominate, with fewer young and middle-aged trees</p>	<p>Veteran trees, deadwood, and heritage features add to landscape character and improve biodiversity value.</p> <p>Mixture of natural regeneration and replacement planting can provide future generation of trees.</p> <p>Natural species diversification and scrub establishment could improve biodiversity value and resilience.</p> <p>Existing parkland trees can provide framework for vegetation management areas.</p>	<p>Survey replacement parkland trees to identify requirements for further planting.</p> <p>Manage birch regeneration to maintain and enhance amenity value.</p> <p>Retain predominantly open nature of parkland.</p> <p>Continue to utilise mowing in areas which are key for recreation and visitor experience. Reduce mowing in other areas to improve biodiversity value.</p>

Objective (for delivery in this LMP)	Constraints (to the delivery of this objective)	Opportunities (for the delivery of this objective)	Concept (how objective can be delivered)
<p>Improve biodiversity value through habitat enhancement.</p>	<p>Public access will cause disturbance for certain species (e.g. ground nesting birds).</p> <p>Invasive non-native species such as grey squirrel and <i>Rhododendron</i> negatively impact on native species and habitats.</p> <p>High proportion of non-native species (e.g. beech, sycamore) within the woodlands.</p> <p>Lack of connectivity with surrounding woodland habitats.</p> <p>Large area of intensively managed grassland currently undertaken for amenity and landscape value.</p>	<p>Veteran trees (and heritage features) provide habitat for bats, insects and other wildlife.</p> <p>Recent restocking of felled areas has established a greater proportion of native species, including flowering and fruiting species such as hawthorn and cherry. Prolific regeneration of birch.</p> <p>Wide diversity of habitats within site including open water, veteran trees and ‘ruderal’ vegetation such as bramble and raspberry. Benefits could be enhanced further through low-impact grassland management.</p> <p>Some floristic diversity in less intensively managed areas.</p>	<p>Pursue low-impact management of open land within parkland and allow natural scrub to develop in certain areas to benefit invertebrates and other wildlife.</p> <p>Continue to promote native species (e.g. oak) where appropriate in the landscape context.</p> <p>Allow all woodland areas to gradually progress towards a greater proportion of native species, including active progression of coupe 17001 to native woodland within the lifetime of this plan.</p> <p>Control the <i>Rhododendron</i> population.</p> <p>Explore options to further improve ground flora by seeding woodland and parkland areas with appropriate species.</p>



4. Management Proposals

4.1 Silvicultural prescriptions

Silvicultural management will focus on the use of low-impact silvicultural systems (LISS), namely continuous cover forestry (CCF). This is consistent with previous management practices which included LISS interventions such as thinning, group selection and small-scale clearfelling to improve safety, biodiversity and amenity value. The overarching objective of LISS/CCF management will be to create and maintain a complex stand structure, as defined in Kerr and Haufe (2011). This is considered the most appropriate approach to maximising biodiversity, amenity value and resilience in this woodland, while retaining the current woodland character which is important for the visitor experience. Restocking will be via natural regeneration wherever possible with felling and thinning interventions focused on encouraging and releasing existing regeneration and on releasing suppressed trees of underrepresented species. All silvicultural interventions will aim to promote species such as oak, cherry, birch, hazel and alder, over sycamore. Enrichment planting will be carried out where considered necessary to restock gaps and increase species diversity, and 'replacement' planting of parkland trees will continue as required to ensure a continuity of population.

4.1.1 Clearfelling

No clearfelling proposed within plan area.

4.1.2 Low-impact Silvicultural Systems (LISS)

(Relates to felling interventions which will remove the final stand overstory – i.e. 'LISS Fell'. Includes all felling <0.25ha in extent (CCF), and LISS clearfelling between 0.25ha and 2ha.)

A single tree selection system will be employed throughout the woodland to meet the objectives set out above and in section 1.2. Within management coupe 17001 ('Big Wood'), selected trees will comprise all remaining non-native conifer species, and selected non-native broadleaved species. Scots pine will not be removed but retained to provide an additional element of species and structural diversity. Non-native tree regeneration will also be removed as described below.

Within management coupe 17002, LISS thinning will be employed as detailed in section 4.1.3, below. Trees selected for removal will typically comprise sycamore and beech in favor of other broadleaved species such as oak, birch and rowan. Trees will be marked by the planning team prior to felling operations taking place. See maps 08 and 09.

4.1.3 Thinning and respacing

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

Crown thinning will be employed to improve species and structural diversity by:

- Releasing suppressed trees of under-represented species and younger age classes.
- Promoting the growth of existing regeneration.
- Encouraging further natural regeneration by opening up the woodland canopy.

Following guidance in Kerr and Haufe (2011), thinning interventions will seek to identify a maximum number of 50 'frame' trees per hectare. Frame trees will not be marked but will instead be positively identified by the forester/planner at each thinning intervention based on professional judgement and experience. As the production of high-quality timber is not a management objective under this plan, selection of frame trees for stem quality will not be the primary factor but should be considered where opportunities arise. Trees of particular visual, cultural or environmental value, including veteran trees, should be retained and a proportion of frame trees should be selected for their potential to become future veterans. Thinning around existing veteran trees and selection of future veterans should follow guidance set out in *Veteran Trees: A guide to good management* (Read 2000).

Frame trees will typically include under-represented species such as oak, and particularly valuable specimens of better-represented trees such as beech and sycamore. As with other silvicultural interventions, the preference will be to promote species other than sycamore, which should normally be considered as part of the thinning matrix. Where frame trees such as oak occur within stands of sycamore and beech, thinning in the surrounding matrix will effectively constitute a form of 'halo thinning' around the selected frame tree. Where existing regeneration is present, trees should be selected for removal to promote growth of the regeneration. Where no regeneration is present and light levels are poor, matrix trees should be selected for removal to open up the canopy and encourage natural regeneration. Trees in poor health should be selected for removal as part of the matrix.

When selecting trees for removal, markers should also be aware of potential bat roost features, as discussed in section 4.4.2.

Respacing of establishing regeneration (natural and planted) <10cm DBH will involve the selective removal of birch and sycamore to favor other species, and respacing stands of pure birch. Some birch and sycamore will be retained in mixed stands where stocking levels of other species are low.

Map 08 shows the main thinning and respacing areas proposed for the plan period.

4.1.4 Long-Term Retentions (LTR)

For planning purposes, Long-Term Retentions cannot be identified in areas assigned to LISS or Minimum Intervention management. For this reason, no areas of LTR are formally identified at Larbert, although in practical terms a proportion of trees will be retained significantly beyond the age or size generally adopted for commercial management purposes.

4.1.5 Minimum Intervention Areas and Natural Reserves

Due to high recreation use and ongoing management requirements, no areas are currently considered suitable for Minimum Intervention or Natural Reserves. The 'Big Wood' (coupe 17001) may be suitable for Minimum Intervention or Natural Reserve management once the conversion to native woodland has been completed, thanks to the relatively low density of public access compared with the rest of the site.

4.1.6 Regeneration proposals

Within existing woodland areas, natural regeneration will be the preferred method, with enrichment planting used as necessary to introduce additional species and fill in any gaps or areas of lower stocking density. Where necessary, enrichment planting should consist of under-represented site-suited species such as lime and oak.

Outwith the woodland areas, a survey will be conducted to assess the population of new parkland trees which have been planted to maintain the population going forward. The survey will identify how many trees have been planted against the target set by the previous plan and what condition these are in, and will be used to inform whether any additional planting is required. Natural regeneration will also be accepted outwith the woodland area as a component of population continuity, although in key locations this may be controlled as appropriate in order to preserve the existing parkland character.

4.1.7 New planting

No new planting is proposed.

4.2 Forest Protection

4.2.1 Herbivore management

Roe deer are present on and around the site, with anecdotal observation suggesting up to eight individuals utilising the adjacent farmland. Lethal control is not considered a viable management option due to local terrain, infrastructure and public access. Therefore 1.2m tree tubes or small fenced enclosures will be employed to protect regeneration, if and where required. This has proved effective in previous interventions, although unprotected regeneration is also present.

4.2.2 Tree Health Management

A number of pests and diseases threaten tree populations on the site, as detailed in Appendix I/5.4. Tree health management interventions to address these are described below.

4.2.2.1 Ash Dieback

Ash Dieback (*Hymenoscyphus fraxineus*) is known to be present at Larbert and in the local area. Due to high public use of the site, and the potential for catastrophic tree failure, infected ash trees will be felled where considered necessary for public safety and amenity purposes. Typically, this will consist of trees located within the mapped visitor zones which display 50% retained canopy cover or less, as per current Scottish Forestry guidance.

4.2.2.2 Phytophthora ramorum

Phytophthora ramorum is not known to be present at Larbert but has been recorded within the local area at Callendar Wood (c.5km distance), which required a significant (temporary) change to woodland management due to the issuance of a Statutory Plant Health Notice (SPHN). In line with SF and FLS strategies, there is a presumption not to pre-emptively remove any larch from this area of the country. Management will therefore focus on maintaining the current low density of larch and relatively open stand structure within the woodland (e.g. through thinning and respacing where necessary), which will reduce the risk of infection. Natural regeneration of larch will be allowed to establish and only removed in favor of other species such as oak. The exception to this will be in management coupe 17001 where all non-native conifers will be removed in line with conversion to native woodland.

4.2.2.3 Dothistroma Needle Blight

Dothistroma Needle Blight (DNB) (*Dothistroma septosporum*) is not known to be present at Larbert but does occur within the local area at Arns/Fannyside (c.8km distance). As with *Phytophthora ramorum*, maintaining an open stand structure through thinning and respacing should help to reduce the risks posed by DNB.

4.2.2.4 Grey Squirrels

Grey squirrels are causing extensive damage to sycamore and beech through bark stripping and are discussed in section 4.2.3.2, below.

4.2.3 Invasive species management

4.2.3.1 *Rhododendron ponticum*

Young *Rhododendron* is present throughout the site and poses a significant threat to the delivery of all management objectives. Continued intervention is required to remove this population, prevent its spread and facilitate eventual eradication from the site. Mature bushes on immediately adjacent land outwith ownership will necessitate continued control if agreements cannot be secured to remove this.

4.2.3.2 Grey squirrels

Grey squirrels are known to be present within the woodland and are causing extensive damage, especially to sycamore and beech through bark stripping. While their presence limits species choice and negatively impacts woodland resilience, lethal population control is not considered practical or appropriate in this setting. Management will therefore focus on the selective removal of sycamore in favor of other species such as oak.

4.2.4 Abiotic environmental threats (windthrow, wildfire, drought, frost, flooding and waterlogging)

A climate change risk assessment has been carried out for the site and is recorded within Appendix I/2.4.1. Risks from windthrow, frost, flooding and waterlogging are considered to be low, while the risk of wildfire is considered to be low-medium and drought, pests and disease risks are considered to be medium.

A decrease in the frequency of grass mowing may increase fire risk within the parkland areas during hot, dry periods depending on replacement vegetation type. However, maintaining current levels of vehicular access, improving access to Larbert Loch and regularly mowing key areas should help to control any potential outbreaks. Increasing species and structural diversity through the application of LISS/CCF management will reduce the risk from drought, pests and diseases.

4.3 Roads, Quarries and Timber Haulage

4.3.1 Roads

None proposed.

4.3.2 Quarries

None proposed.

4.3.3 Timber haulage

Only a relatively small volume of timber is proposed for felling and extraction, however this will require careful management due to the high public use of the site, limited brush availability and

lack of bespoke management infrastructure. Recent work at similar sites (Gartmorn) suggests a small-scale forwarder would be capable of extracting the volumes proposed using the existing path infrastructure, without causing undue damage. Previous felling operations have followed a dedicated route within the wood, with armored crossings constructed to protect the footpath network. As per previous felling and timber extraction operations, access will be from the South via Quintinshill Drive as the northern access route is not suitable for timber haulage due to restricted access width. As described in section 2.7 and 4.6, consultation will be required with the Local Authority regarding use of unclassified public roads and core paths during timber haulage operations. See map 12.

4.4 Biodiversity

For a full list of biodiversity features see Appendix I/3.1.

4.4.1 Designated sites management and protection

There are no designated conservation sites present within or immediately adjacent to the site boundary and no special management is required.

4.4.2 Protected species management and protection

4.4.2.1 Bats

Several species of bat are known to use the site both for feeding and roosting/breeding. As per standard practice, all operations will be preceded by an environment survey to identify any biodiversity features, including potential or active bat roosts. Wherever possible, potential or confirmed roost sites will be retained and consideration given to any potential impacts such as disturbance during operations. Where it is considered necessary to remove roost sites (including bat boxes), a specialist survey and full license application will be made as per *FCS Guidance Note 35a: Forest operations and bats in Scotland*. In general, the management proposals within this LMP are considered favorable for bat populations.

4.4.2.2 Watervole

A single unconfirmed record of watervole was reported from Larbert Loch, however FLS environment surveys carried out in May 2022 indicated an absence of this species within the site and a further survey will be carried out in September 2022 to confirm this. Should a population be present, management operations will be adapted and licensed as required.

4.4.3 Ancient and semi-natural woodland management and protection

This plan will progress with the previous aim of converting coupe 17001 ('Big Wood') to native woodland. This coupe contains both long-established and native woodland interest and is adjacent to an area of ancient semi-natural woodland. Management interventions will include the removal of all non-native conifers, with Scots pine being retained. The majority of non-native

broadleaves (primarily sycamore) will also be removed, although some trees will be retained where they are considered important landscape or habitat features (e.g. mature boundary trees). All regeneration of non-native trees will be removed. Perhaps the biggest threat to this conversion is invasive *Rhododendron* regeneration, with mature *Rhododendron* bushes present in the adjacent ancient woodland to the west and the potential for these to seed onto the site. *Rhododendron* management is dealt with in section 4.2.3.

Outwith coupe 17001 there will be no deliberate conversion to native woodland, although it is envisioned that these areas will naturally progress towards a greater proportion of native species over time. The FLS Central Region Environment Team have also expressed an interest in establishing shade-tolerant ground vegetation within the woodland to improve biodiversity value.

4.4.4 Veteran trees and deadwood

Where safe to do so, veteran trees will be retained and allowed to develop naturally, however this will not be possible in all locations due to the high public use of the site.

Both standing and fallen deadwood will be retained wherever safe to do so. Due to the nature of the woodland, deadwood will be spread relatively evenly throughout the site but will achieve a minimum of 20m³/ha across the woodland area in accordance with UKFS requirements.

Within the parkland area, a reduction in mowing combined with the potential seeding of wildflowers in some areas will enhance deadwood and veteran tree habitats by providing a nectar source, while potentially reducing public access and safety concerns around these features. Within the woodland area, ground vegetation enrichment planting described above could similarly enhance these habitats.

4.4.5 Riparian and open water management

FLS Central Region Environment Team will monitor the condition of Larbert Loch, including the proportion of aquatic vegetation to open water and undertake appropriate management interventions to secure water quality and biodiversity value if necessary. All operations in the vicinity of Larbert Loch will follow the appropriate guidelines.

4.4.6 Open habitat management

A reduction in the intensity of grass management (mowing) is proposed in order to increase the biodiversity value of the parkland and improve resource efficiency. In areas not intensively managed for recreation, the vegetation will either be left uncut or will be subject to an annual cut-and-lift regime. In both cases these areas may be seeded with annual and biennial wildflowers to improve species diversity. Such management will be detailed through an internal site maintenance plan in agreement with the Environment, Visitor Services and Stewardship teams.

4.5 Historic Environment

For a full list of known historic environment features see Appendix I/3.2, the historic landscape is briefly covered in Appendix I/2.5.

4.5.1 Designated sites and features

The only designated feature which falls within the site boundary is the Ice House, which falls within the curtilage of the Larbert House listed building. (See map 06.) Previous work carried out on this feature included removing the bricked-up entrance and replacing this with a steel grate. This feature will now be maintained in a state of 'managed decay', with access to and visibility of the building retained.

4.5.2 Other historical features

Other historical features will be maintained in a state of 'managed decay' with no active management proposed. The exception of this is the ha-ha ditch where tree regeneration may be removed up to a 5m buffer zone in association with adjacent respacing works, subject to resource availability.

The historic designed landscape will be similarly maintained going forward, with management interventions focused on preserving the general character and key elements of the existing landscape, rather than trying to restore and maintain a fragment of the original designed landscape within a heavily modified surrounding. In practice this will include:

- Reinstating a key connection between the parkland associated with Larbert House and Larbert Loch by clearing a small area of developing scrub along the western shore and bringing this under active management.
- Retaining other areas of existing scrub as biodiversity habitat and to maintain the setting of Maggie's Forth Valley, carrying out respacing work within these areas as appropriate.
- Working with Maggie's Forth Valley to ensure maintenance of the land adjacent to the Maggie's Centre is in keeping with the desired landscape for the centre.
- Maintaining the key view from the timber pier to Larbert Church by controlling tree regeneration as appropriate.
- Ensuring ongoing recruitment of new parkland trees to provide continuity of the population.
- Maintaining the largely open nature of the existing parkland while increasing biodiversity value where possible.

These interventions will be detailed through an internal site maintenance plan in agreement with the Environment, Visitor Services and Stewardship teams.

4.6 Public Access

FLS will continue to welcome responsible public access to the site and seeks to actively encourage use of the site for health, recreation and wellbeing purposes. As mentioned above, the existing parkland landscape will be retained for landscape, recreation and amenity value and established grassland within key visitor areas will be mown to the current regime (at least 4 cuts per annum). Public access will still be permitted in areas of the parkland managed for greater environmental value, as detailed in section 4.4.5, although measures may be taken to discourage access around deadwood and veteran trees for safety reasons.

As detailed in section 2.6, individual and groups of trees will also be managed within key areas in order to maintain recreation and amenity value and ensure site safety.

There is a proposal for a new path linkage between the all-abilities path around Larbert Loch and the new development and associated greenspace to the east of the site. This linkage does not form part of the LMP proposals. Existing pathways will be maintained to facilitate the current level of access and new routes explored where resources allow.

Woodland management activities such as felling, thinning and timber haulage and handling may require some closure and diversion of popular access routes, including core paths. Any such disruption will be discussed with the FLS Visitor Services Team and Local Authority Access Officer and suitable diversions and signage will be put in place as appropriate.

5. Additional reference materials

The following list includes the main technical reference materials which were consulted in addition to the standards listed in section 2.1.

Forestry and Land Scotland (2022) *FLS Larch Strategy 2022*. (Internal guidance document.)

Forestry Commission Scotland / Scottish Forestry *Wildlife and forest operations guidance notes*.

Available at <https://forestry.gov.scot/publications/forests-and-the-environment/biodiversity/wildlife-forest-operations>

Kerr, G. and Haufe, H. (2011) *Thinning Practice: A Silvicultural Guide* (Version 1.0). Available at: <https://www.forestresearch.gov.uk/publications/thinning-practice-a-silvicultural-guide/>

Read, H. (2000) *Veteran Trees: A guide to good management*.

Scottish Forestry (2021) *Guidance on the management of individual ash trees affected by ash dieback in Scotland*. Available at: <https://forestry.gov.scot/sustainable-forestry/tree-health/tree-pests-and-diseases/chalara-ash-dieback>

Scottish Forestry (2021) *Phytophthora ramorum on larch Action Plan*. Available at: <https://forestry.gov.scot/sustainable-forestry/tree-health/tree-pests-and-diseases/phytophthora-ramorum>

UK Forestry Standard Practice Guide (2022) *Adapting forest and woodland management to the changing climate*. Available at: <https://www.forestresearch.gov.uk/publications/adapting-forest-and-woodland-management-to-the-changing-climate/>

Appendix I – Background information, survey and analysis

I/1. – Site Description

I/1.1 Location

Larbert is located entirely within the Falkirk Local Authority area, situated between the M876 and the town of Larbert. It is a WIAT (Woodlands In and Around Towns) site, lying entirely within the 1km WIAT boundary. In addition the site falls entirely within the Central Scotland Green Network Boundary.

I/1.2 Access

Site access is off the B905 via Quintinshill Drive and McAllister Avenue. FLS retain right of access along both Quintinshill Drive and McAllister avenue to the south and the unnamed road leading off Old Denny road to the north. Operational access within the site is limited with no internal forest roads beyond the parkland area.

Main operational access point: NS 8491 8242

I/1.3 Utilities, renewable energy and other infrastructure

Only minor utility constraints are known to be present. A single overhead powerline runs across a small section of coupe 17001 and then undergrounds to the northeastern corner. There are no known private water supplies present.

I/1.4 Adjacent Land Use

Larbert occupies a peri-urban landscape, with agriculture, healthcare, and residential housing being the primary local land uses. Of significant note are the Forth Valley Royal Hospital and Maggie's Forth Valley cancer centre to the north (see below). Completely surrounded by the site are residential properties within the re-developed Larbert House, and other residential properties are located immediately adjacent to the southern and western boundaries. In addition a new housing development is currently being constructed less than 200m east of the site. The remainder of the surrounds are dominated by farmland, with a small area of adjoining ancient semi-natural woodland. A major transport link, the M876, lies just over 100m to the northwest. See maps 01 and 06.

I/1.4.1 Healthcare

The most significant land uses surrounding Larbert are the Forth Valley Royal Hospital (opened 2011) and Maggie's Forth Valley (opened 2017), both of which benefit significantly from the setting adjacent to Larbert Woods. Forth Valley Royal Hospital hosts 25 wards, 16 operating

theatres and 860 beds and was one of the main driving forces leading to the restoration of the grounds and loch at Larbert. The site featured in a 2020 NHS Greenspace Demonstration Project report, which noted that: *'The award-winning grounds are considered as a health enhancing resource for the hospital community and beyond, facilitating treatment, rehabilitation and recreation.'* Maggie's Forth Valley is located 10 minutes' walk from the hospital, providing free cancer support and information. The design and setting of the building on the shore of Larbert Loch and in close proximity to the woodlands is a key feature of the centre.

I/2. Physical Factors

I/2.1 Topography

The site is relatively flat throughout, lying primarily between the 40 and 60 metre contours. Generally the land slopes away to the North, South and East from the centre of the site. See map 01.

I/2.2 Geology and Soils

Underlying geology is of sedimentary origin (sandstone) with small igneous intrusions in the form of Dyke(s) running on an east-west axis. Superficial deposits are composed of glacial till, overlaid predominantly by noncalcareous gleys with smaller areas of brown earth soils offering 'very good flexibility' for the growth and management of tree crops (British Geological Survey/James Hutton Institute). See map 02.

I/2.3 Hydrology

There are no major watercourses within or in close proximity to the site. The only hydrological feature of note is Larbert Loch, which drains into the River Carron (approximately 500m downstream) via a sluice at the southern end. A minor watercourse is located immediately adjacent to the site and flows Northwards on land belonging to NHS Forth Valley.

The woodlands are not of sufficient size to affect downstream flooding, comprising less than 0.01% of the relevant catchment area. (A threshold of over 20% is considered necessary to have a significant measurable effect at the flood point downstream.) Locally, there have been reports of surface water run-off from the site affecting a neighboring road and residential area. This is not considered to be the result of woodland management but is likely to be a natural occurrence exacerbated by developments beyond the site boundary. Large areas of clearfelling should be avoided on the southern side of the site to reduce the potential for increased run-off in this area.

I/2.4 Climate and Predicted Climate Change

The area has a warm, moist and moderately exposed climate, with a DAMS score of around 13. See map 03. Current models suggest the climate is likely to become warmer with temperatures

expected to be similar to central and southern England for the period 2031-2060, but with less change to precipitation (Forest Research).

Met Office climate change predictions suggest an increase in summer mean temperatures and a probable decrease in summer rainfall which could lead to increased drought risk.

A brief climate change risk assessment has been carried out and overall risk for the site is considered to be low, with medium risks posed by drought and pests and disease.



I/2.4.1 UKFS Climate Change Risk Assessment

A brief climate change risk assessment has been carried out based on guidance in the UK Forestry Standard Practice Guide '*Adapting forest and woodland management to the changing climate*'. Overall risk for the site is considered to be low, with medium risks posed by drought and pests and disease. The current tree species are considered to be broadly suitable for future climates.

Table 10 – Climate Change Risk Assessment

Risk	Rating	Comments	Mitigation
Windthrow	Low	Mature, thinned/open, mixed species stand; DAMS score 13, low elevation. Soil type combined with greater levels of seasonal waterlogging and increasing frequency of storm events may lead to an increase in sporadic windthrow.	N/A - LISS/CCF management and use of natural regeneration where possible will reduce windthrow risks.
Wildfire	Low - Medium	Low risk woodland type and species, though high public use. Close proximity to residential areas. Ruderal vegetation and unmown grass within parkland may present greater fire risk in dry conditions.	Maintaining some areas of regular mowing should help to prevent spread of wildfire. High public use and peri-urban nature elevates risks but increases ad-hoc site monitoring. Good access for fire service to highest risk areas and loch acts as natural fire break/reservoir.
Pests and disease	Medium	<i>Phytophthora ramorum</i> and Dothistroma Needle Blight recorded nearby and ash dieback and grey squirrels present on-site. Increasing mildness/winter temperatures are likely to increase potential pest populations and possibilities for new species to	Monitor, increase species diversity, maintain mixed woodland species composition with a diverse structure.

Risk	Rating	Comments	Mitigation
		colonise. High public footfall and proximity to residential areas/transport infrastructure provide potential vectors for transmission. Woodland has a relatively diverse species composition but with high proportions of sycamore and birch in certain areas.	
Drought	Medium	Predictions are for increased summer temperature and decreased summer rainfall. Several species are not drought tolerant (BE, SYC, Dbi) but existing gleyed soils are not particularly prone to drought	Increase species diversity, maintain mixed woodland of diverse structure. Apply LISS/CCF management.
Frost	Low	Predictions for increased daily mean minimum temperature over winter.	N/A
Flooding and waterlogging	Low	Site is not close to any rivers or coastline. Limited drainage due to soil type, though situated on a slight rise. Only minor areas of surface water flooding shown on SEPA maps.	N/A - LISS/CCF management will limit any potential surface water flooding risks to the surrounding area.
Overall rating	Low	Species and woodland structure are considered broadly suitable to future climates.	Increasing species and structural diversity and applying LISS/CCF management will mitigate highest risks.



I/2.5 Landscape Character and Visibility

The site is not covered by any landscape designations and although the remains of a designed landscape are present, this is not listed on the Inventory of Gardens and Designed Landscapes.

Larbert straddles two 'Landscape Character Assessment Areas': the *Lowland Hill Fringes – Central* and, to a lesser extent, the *Lowland River Valleys – Central*.

Relevant 'Key Characteristics' of these 'Landscape Character Types' are:

- A diverse landcover ... interlocks with woodland and forestry, with some estate landscapes, frequent beech hedgerows and shelterbelts.
- A high proportion of woodland cover including large coniferous blocks, mixed shelterbelts and broadleaf tree clumps; roadside and hedgerow trees and semi-natural woodland.
- Predominance of traditionally managed estate, policy, and designed landscapes
- Concentration of small water bodies, reservoirs and small watercourses, and;
- Frequently enclosed and focussed views along the river valley.

Locally, the site's character is influenced by the historic designed landscape attributed to the remodeling of Larbert House by David Hamilton for Sir Gilbert Stirling in 1825, although there are also thought to be older veteran trees from an earlier planting. The original policy and parkland planting included oak, beech, lime, Scots pine, chestnut and sycamore. (Ian White Associates 2008). The setting and context of this landscape have been significantly modified and eroded over many years, beginning in the late 1920s when the site was first used for healthcare. (Ian White Associates 2008, G.B. Bailey/Falkirk Local History Society, 2020). Although significant steps have been taken since 2010 to restore aspects of the designed landscape, preserving the original layout and design in face of these modifications and current use is not considered practical or appropriate.

Visibility of the site is limited from the surrounding landscape, although the woodland can briefly be seen from the M876, the B905 and from the A883 and A803 to the West of Falkirk. The southern edges are also visible from the top of the Falkirk Wheel. Local views from residential properties, the Forth Valley Royal Hospital and Maggie's cancer centre, and the approach along Quintinshill Drive are more significant. There are several important internal views, including from the Maggie's centre over Larbert Loch, from the wooden pier towards Larbert Church and key views across the open parkland. There are also limited views to the Falkirk Wheel from various parts of the site. The woodlands are experienced primarily at a small-medium scale.

Figure 3 – Larbert as depicted on the 6 inch OS maps of 1888-1913, showing the original layout of the designed landscape, with the current site boundary in red.

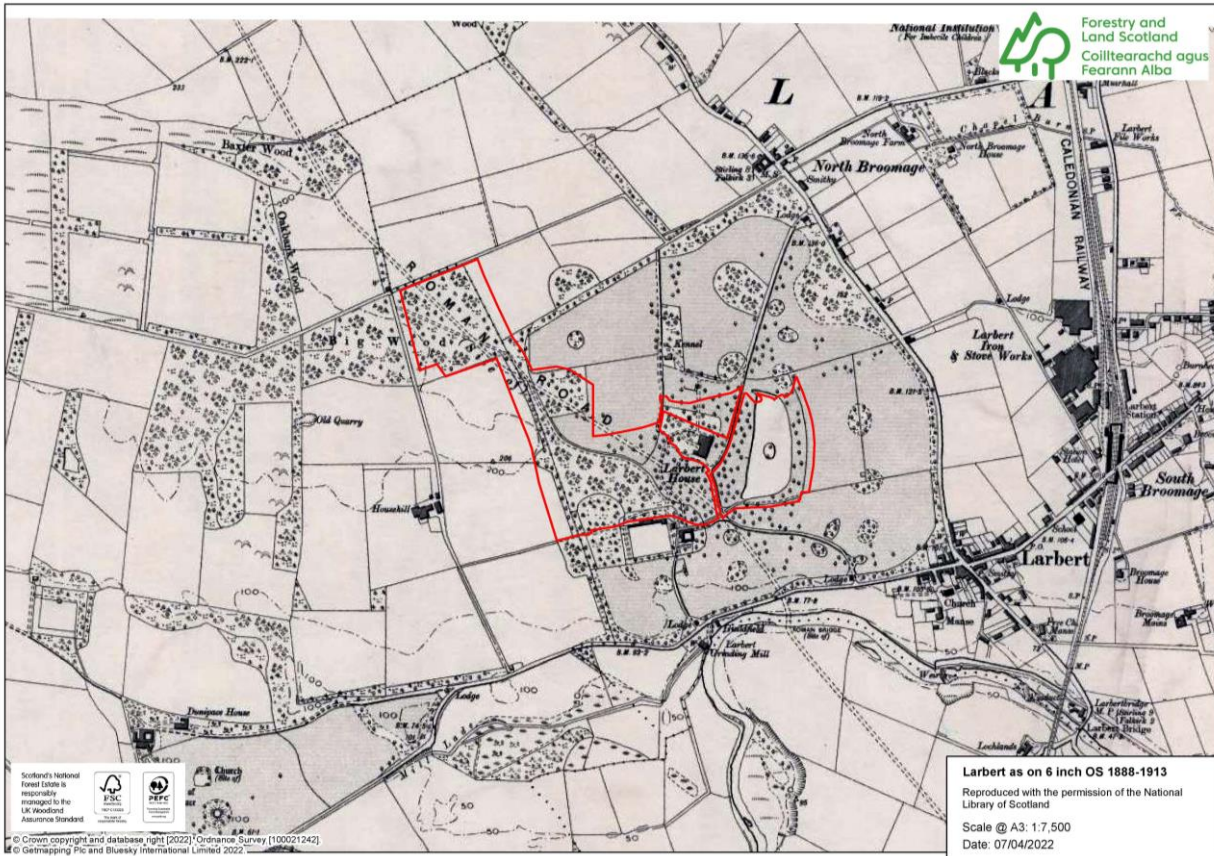


Figure 4 – Larbert as depicted on the 1:10,000 Ordnance Survey maps of 1949-1971 showing significant modifications, with the current site boundary in red.

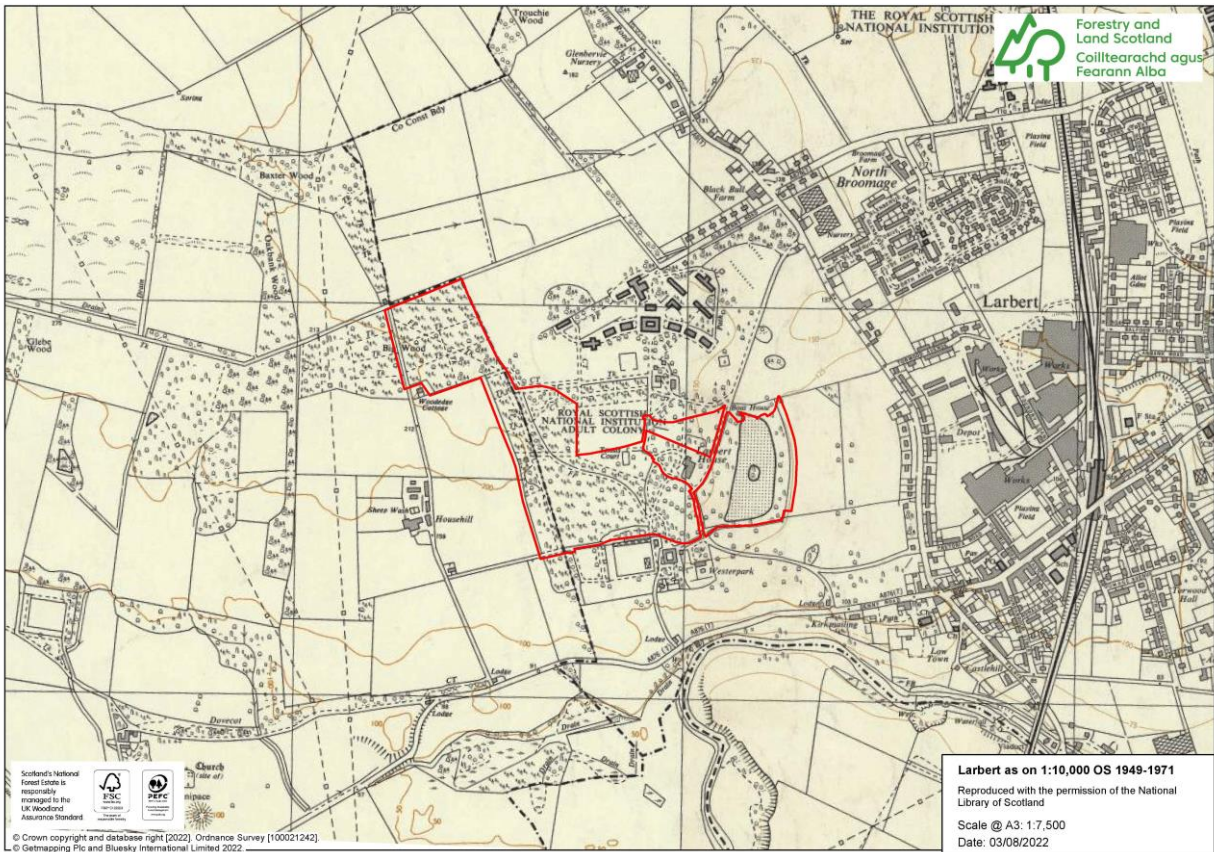
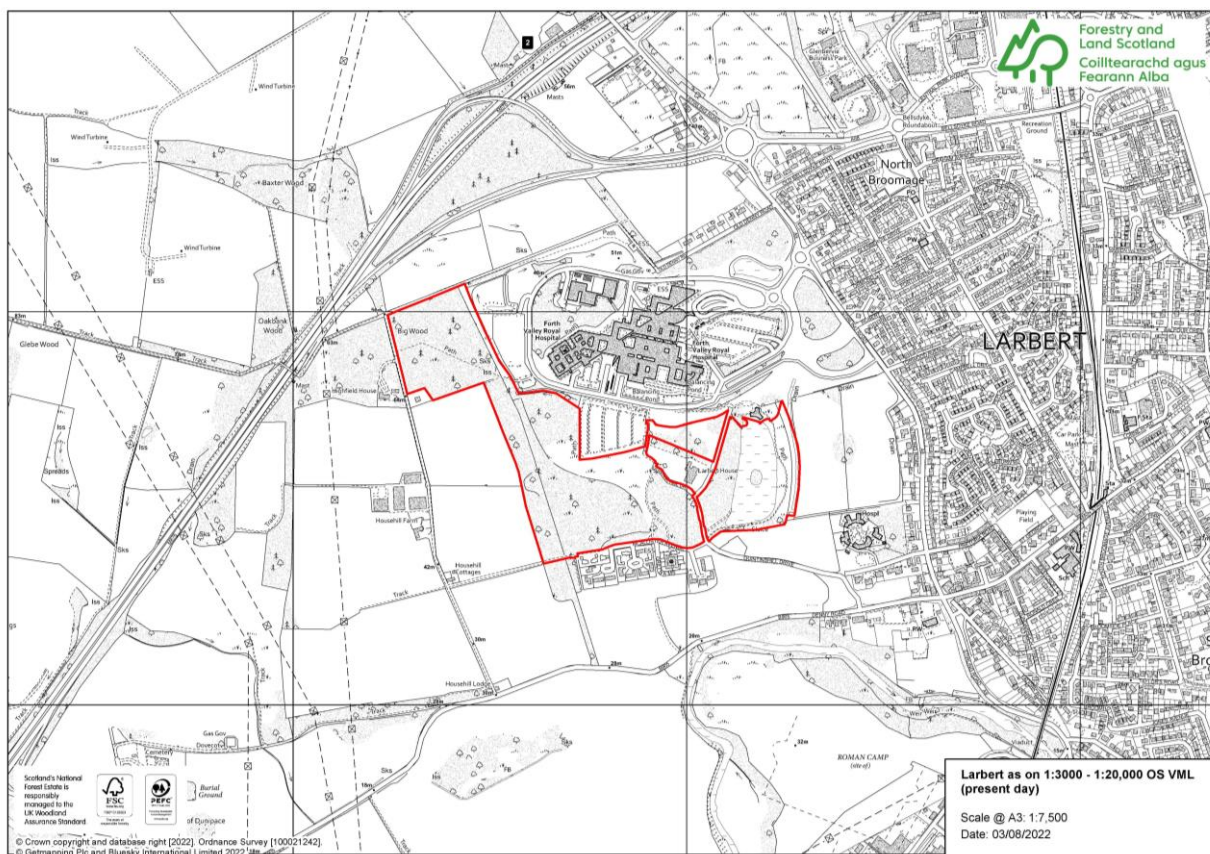


Figure 5 – Larbert as depicted on current Ordnance Survey maps, showing the Forth Valley Royal Hospital and Maggie’s Forth Valley to the North, with the site boundary in red.



I/3 Environment and Heritage

I/3.1 Biodiversity

The site contains a relatively high proportion of Long-Established of Plantation Origin (LEPO) woodlands which form a continuous link to adjoining ancient semi-natural woodland (ASNW). In addition, several areas of the site are classified as lowland mixed deciduous woodland under the Native Woodland Survey of Scotland dataset, including areas of LEPO woodland adjacent to the ASNW. See map 05.

There are a number of old and veteran trees within the site, although none are thought to be ancient, with the oldest estimated establishment date being 1825 for one area of oak.

Several species of bat (all of which are European Protected Species) are known to use the site and historic bat boxes are present within the woodland areas. In addition to the bat boxes, bats are likely to use veteran trees and heritage features such as the Ice House which contains a known roost site.

The loch provides a habitat and breeding site for various species of waterfowl, none of which are specially protected. Surveys for watervole following reported sightings have so far revealed no

populations on site and a further survey is scheduled for September 2022 to confirm their absence. Goshawk are reported in the area but not thought to be present in the woodland.

I/3.2 Historic Environment

Known historical features within the site boundary are listed below. There are no designated historical remains within the site, with the exception of the Ice House which falls within the curtilage of Larbert House, a Category B Listed Building located outwith, but enclosed by, the site boundary. The foundations of a Boat House associated with Larbert House are located just beyond the site boundary at NS 8513 8273. The designed landscape is covered in section I/2.5, above.

Table 11 – List of on-site heritage features

Feature	Location	Designation	Description
Larbert woods wall	NS 843 829 NS 846 826	Undesignated	Old estate walls within, and on the boundary of, the woodland.
Househill Temporary Roman Marching Camp	NS 844 828	Undesignated	Possible site of a Roman Marching Camp. A watching brief was undertaken on 21 January 2010 on groundworks for a footpath and nothing of archaeological significance was observed. Site investigation in 2011 in Big Wood found no trace. (The majority of this feature falls outwith the site boundary, where some remains of the camp have been recorded. A scheduled ancient monument associated with the camp lies >400m from the site boundary.)
Larbert curved retaining wall	NS 846 825	Undesignated	Section of curved retaining wall, purpose unknown.
Larbert Woods Ha Ha	NS 847 826	Undesignated	Stone-lined curvilinear Ha Ha ditch, part of historic designed landscape.
Ice House	NS 8502 8267	Listed Building	Ice house on a raised mound under woodland canopy. Structure is in a state of managed decay, the outer door was sealed with a steel grate in 2018 to prevent access from the public. The structure forms part of the listed

Feature	Location	Designation	Description
			building curtilage of the nearby Larbert House.
Sluice	NS 8516 8246	Undesignated	Sluice for the man-made Larbert Loch, restored by Forest Enterprise Scotland during last plan period.
Sawmill	NS 8466 8274	Undesignated	The remains of a sawmill dating back to the 1940s. Most of the remains have been removed for a restoration project.

I/4. Public Access and Recreation

A number of surfaced and unsurfaced paths are present, including an all-abilities (tarmac) route around the loch. Some of these form core paths and link up with a network of core paths and rights of way heading from Larbert towards Denny. There is no formal car-parking, however the site is well linked for pedestrian access to surrounding healthcare facilities and residential areas. Basic visitor facilities include picnic benches, interpretation boards and two teaching circles.

The site provides a valuable recreational resource and is well-used by several schools and education groups, and by patients and staff at the Forth Valley Royal Hospital and Maggie's cancer centre. In addition, FLS use the site for various health-oriented projects such as 'Branching Out', seasonal events, and fortnightly volunteer groups. The loch is regularly used for fishing which can present some anti-social problems (e.g. littering of fishing gear), although anti-social behaviour is not generally an issue.

I/5. Woodland Description

I/5.1 Woodland Type

Larbert is characterised by mixed woodland, and is categorised on the National Forest Inventory as 'mixed mainly broadleaved'. The parkland areas are predominantly broadleaved. As mentioned in Appendix I/3.1, several areas are classified as 'lowland mixed deciduous woodland' under the Native Woodland Survey of Scotland.

I/5.2 Species Composition

Birch, sycamore and beech form the largest component species respectively, accounting for c.66% of the woodland area in total. Smaller components include oak, Scots pine and larch with a wide selection of minor species including ash, lime, hazel, alder, rowan, cherry and yew. The wide range of species, including a selection of exotic trees and shrubs, reflects the historical character of the site as a designed landscape with mixed policy woodlands and parkland. This historical composition has changed through previous additions of exotic conifer stands which

have since been felled and replaced with more appropriate species, including a greater proportion of native species. The principle species in natural regeneration are birch and sycamore, although there is also regeneration of Scots pine, larch, oak, rowan and beech. Birch regeneration can create dense thickets in some areas, including where other species have been planted.

See map 04 and Table 6.

I/5.3 Age Composition

A diverse age structure is also present with some areas of tree cover dating back nearly 200 years or more, alongside areas of regeneration 10 years old or less. The majority of the woodlands (58%) are 50-100 years old with the largest age class being c.90 years old (33%). See map 04, Table 7 and Figure 1.

The oldest woodland components are oak, sycamore and beech with areas of birch being generally younger.

I/5.4 Plant Health

A number of tree pests and diseases could threaten tree populations on this site, and climate change could exacerbate these existing issues, or increase the likelihood of new problems arriving.

Phytophthora ramorum is not known to be present at Larbert but has been recorded within the local area at Callendar Wood (c.5km distance). It causes mortality of larch and has been known to affect other species. Infections of *Phytophthora ramorum* are currently subject to Statutory Plant Health Notices (SPHNs) issued by Scottish Forestry, requiring the destruction of infected trees and uninfected trees within a stipulated buffer zone. Larch in this part of the country is considered less vulnerable to infection due to prevailing climatic conditions and as such the FLS strategic objective is to retain most of the larch in this area with minimal pre-emptive felling. In addition, the relatively low density of larch and more open nature of the woodlands at Larbert further reduce the risk of infection. The presence of larch along the M876 corridor to the North-West of the site provides a potential vector for infection although no SPHNs have been issued in the nearby area since 2018.

Dothistroma Needle Blight (*Dothistroma septosporum*) is not known to be present in the woodland but does occur within the local area at Arns/Fannyside (c.8km distance). It causes premature needle defoliation, resulting in reduced growth, and in severe cases, mortality.

Ash dieback (*Hymenoscyphus fraxineus*) is present on site. The disease leads to the eventual mortality of ash trees and can cause catastrophic failure, although a small percentage of the population may be resistant.

Grey squirrels are causing significant damage to sycamore and beech, and have the potential to inflict injury on a number of other tree species. Damage not only leads to poor tree growth and decreased amenity value but can also encourage infection by other pests and pathogens and/or cause tree health declines through increased stress. Squirrel-damaged trees also have a higher risk of branch failure with the associated public-safety risks.

I/5.5 Invasive Species

Rhododendron ponticum is present both within and immediately adjacent to the site. It is highly invasive and can easily take over native woodland habitats, affecting both their biodiversity and amenity value. *Rhododendron* can also provide a host for the disease *Phytophthora ramorum* described above. There was previously an extensive infestation of *Rhododendron* within the site (attributed to its estate/designed landscape origins) which was controlled in the late 1990s and again around 2010/2012. This population is now regenerating throughout the woodland and poses a significant threat to the woodland character and habitats in the future. The control intervention undertaken in the late '90s had a potentially detrimental impact and resulted in increased spread of the species due to a lack of follow up interventions (Mark Hamilton Landscape Services *FVRH Woods Forest Design Plan 2012-2022*). Therefore, control of the currently regenerating population is a key objective for delivery under this LMP.

Grey squirrels are present in the woods and throughout the local area and are discussed above. In addition to the damage inflicted on trees, they also have detrimental impacts on native wildlife.