



**SP ENERGY
NETWORKS**

Loch Ard Forest Central and South | YW6/7

Changing the VIEW : Landscape Enhancement
Proposals Workbook

Project Title: Changing the View : East Loch Ard Forest Landscape Enhancement Proposals
Client: Scottish Power Energy Networks

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<i>Contents</i>		<i>Figures</i>		<i>Photographs</i>	
1	Project Background	1.1	East Loch Ard Future Habitats	1	Site Photographs
	The Site			2	Precedent Project Photographs
	- Site Description	2.1	Local Landscape Character Areas	3	Indicative Planting Palette Photographs
	- Other Projects and Initiatives	2.2	Existing Vegetation		
	- Opportunities for Mitigation	2.3	Visual Amenity and Views		
		2.4	Special Qualities and Landscape Features		
2	Site Appraisal	3.1	Indicative Section Woodland Typologies		
	- Context	3.2	Woodland Edge Treatment 1 Indicative Section		
	- Character/ Landscape Pattern	3.3	Woodland Edge Treatment 2 Indicative Section		
	- Visual amenity and Views	3.4	Woodland Edge Treatment 3 Indicative Section		
	- Special qualities and Landscape Features	3.5	Woodland Edge Treatments Indicative Plan Diagrams		
	- Mitigation Proposals	3.6	Woodland Glade/ Ride Creation		
	- Landscape Management	3.7	Feathered Upland Edge Creation		
3	Precedent Projects and Guiding Principles	3.8	Woodland Establishment Diagrams		
		3.9	Mixed Age Woodland Establishment Diagram		
4	Concept Development/ Optioneering	3.10	Footpath Creation Treatment 1 Indicative Section		
	- Options 1-3	3.11	Footpath Creation Treatment 2 Indicative Section		
	- Options Analysis	3.12	Footpath Creation Treatment 3 Indicative Section		
		3.13	Woodland Edge Indicative Planting Structure		
5	Outline Proposals	3.14	Indicative Woodland Structure (25 years old)		
	- Outline Design Guidance	5.1	Proposal Component Diagram		
6	Realisation Requirements	5.2	Outline Proposals Plan		
	- Implementation				
	- Management and Maintenance				
	- Benefits to Landowners				
	- Outline Costings				

1 Introduction

Project Background

1.1

LUC has been commissioned by ScottishPower Energy Networks (SPEN) to assess the visual impact of existing transmission infrastructure in the Loch Lomond and The Trossachs National Park, and identify areas suitable for potential mitigation in order to reduce identified visual impacts.

‘Changing the VIEW’ (Visual Impact of Existing Wirescape) is a project being driven by SPEN, to positively influence the visual impact of existing transmission infrastructure in some of Scotland’s most sensitive and highly valued landscapes. The project presents a rare opportunity to reduce the landscape and visual impacts of infrastructure in specific areas within or near to National Parks and National Scenic Areas (NSAs). SPEN are keen to work collaboratively and in partnership with a range of stakeholders, to access a share of a £500 million OFGEM fund, to deliver the best possible outcome for the areas in which they operate.

1.2

SPEN greatly value the local expertise and knowledge of stakeholders in understanding the nature of landscape and visual impacts, the potential for mitigation, and importantly, the range of different interests which will influence the deliverability of any given project.

1.3

This stage builds on the work of our initial stakeholder consultation, overall review of existing landscape and visual impacts, and identification of potential projects to take forward.

The project began in 2015, and the following tasks were undertaken as part of Stage 1:

- Overall review of SPEN network in National Parks & NSAs;
- Initial stakeholder consultation event in Glasgow

(May 2015);

- Assessment of landscape & visual impacts – extensive fieldwork informed by desk study; and
- Presentation of key impacts and potential mitigation options to stakeholders (December 2015).

In 2016, the project progressed with Stage 2, involving the following tasks:

- Further consultation with stakeholders about impacts and potential mitigation options (January to March 2016);
- Review of potential mitigation projects to take forward, and appraisal of options and benefits; and
- SPEN technical feasibility and deliverability review of potential mitigation options.

1.4

Stage 3 now builds on the work of our stakeholder consultation, overall review of existing landscape and visual impacts, and identification of potential projects to take forward. Each mitigation project will be developed in further detail, in conjunction with landowners and other stakeholders, to submit to OFGEM for consideration.

Introduction

1.5

The Loch Ard Forest has been identified as an area which may benefit from mitigation, and through a process of stakeholder consultation and technical review, landscape enhancement was identified as the most appropriate form of mitigation.

1.6

The purpose of this workbook is to set out the reasons why Loch Ard Forest would benefit from visual mitigation, and to present the options and ideas for landscape enhancement.

The Site

1.7

Site Description

The section of 275kV overhead transmission line identified for mitigation runs through a large proportion of the Loch Ard Forest, an extensive and gently undulating area of predominantly commercial forestry, located between rugged moorland hills to the south-west and Loch Ard to the north-east. Much of this forest, including the route of the overhead line, is owned by Scottish Water, and forms part of the Loch Ard Catchment. The land is leased to the Forestry Commission and mainly consists of Sitka spruce crop. There are some areas of broadleaved woodland within the crop (consisting of mainly Birch and Oak), some of which is ancient or semi-natural woodland. There are some features of interest in the forest, including listed cottages and an aqueduct which once formed part of the 19th Century Glasgow Corporation Water Works, connecting Glasgow with its water supply at Loch Katrine.

1.8

Loch Ard Forest is part of the extensive Queen Elizabeth Forest Park. There are a number of promoted attractions in and around Loch Ard including The Lodge Visitor Centre at Aberfoyle, and the Loch Ard Sculpture Trail. Parts of the forest are less well used, including the area in proximity to the overhead line, despite informal access via forest and water board tracks.

Other Projects and Initiatives

1.9

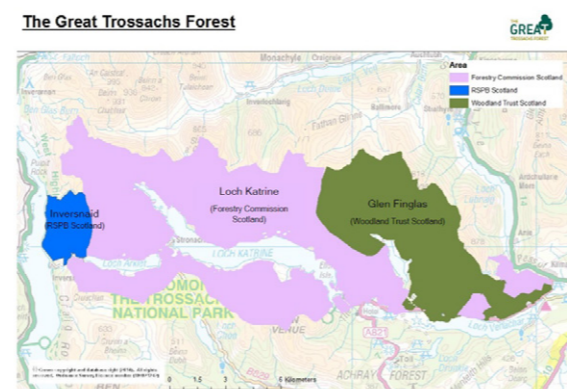
There are a number of ongoing projects and initiatives in the Loch Lomond and Trossachs National Park. **The Great Trossachs Forest Project** is arguably the largest in scale, stretching to over 160 square kilometres. The project area is now the largest National Nature Reserve (NNR) in Scotland. This long term (200 year) project aims to return heavily grazed land and plantation forestry to a more dynamic mix of habitats, including native woodland, in tandem with further opportunities for recreation.



Great Trossachs Forest Project

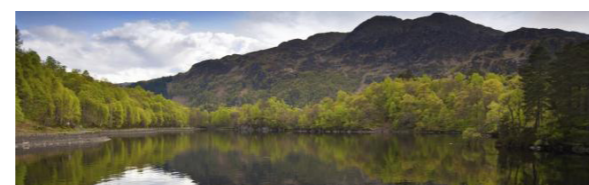
1.10

The overhead line also falls within the project area for the **Strathard – a landscape to live, work & play project**. This is a project which aims to improve land, forest and water management decisions in Strathard using an ecosystems approach, which recognises that natural and human systems are connected.



1.11

The Paths in the Park project aims to support community groups in the National Park who wish to improve their community path networks. The project is led by the **Loch Lomond and The Trossachs National Park Community Partnership**, who work closely with the National Park Authority to provide information, training and guidance to enable path groups to develop community paths and identify methods to maintain them.



Strathard - a landscape to live, work & play project

1.12

The overhead line passes through an area which is known as East Loch Ard, and is managed by Forestry Commission Scotland. The **Land Management Plan for East Loch Ard** amalgamates two earlier forest design plans, and develops the broad aims of those plans in light of developments in national and local strategy.

Stage 1 and 2 Findings

1.13

A landscape and visual impact assessment, undertaken by LUC, identified the key landscape and visual impacts associated with the existing overhead line in this section. In landscape terms the line is relatively well integrated within the forest, although can appear out of scale with landscape features such as the small scale knolls and ridges. With the exception of users of the **Rob Roy Way** long distance footpath, who experience views of a small section of the line, this part of the forest is not extensively used for recreation. Consequently the line is not visible to large numbers of people; however where it is seen it tends to be in proximity to the viewer, and often dominates views. In places the line detracts from the rugged upland backdrop to the forest, including views to one of the most popular Munros, Ben Lomond. Conversely, the line, and more noticeably the linear wayleave of open space associated with it, is noticeable from Ben Lomond and other hills to the south-west. The wayleave is approximately 80m wide and comprised of low shrubbery and open grassland, flanked by geometric compartments of coniferous woodland.



Opportunities for Mitigation

1.14

Although the impacts of the overhead line through the Loch Ard Forest area were not generally seen as being of the highest priority, there was extensive stakeholder support for mitigation projects which addressed this large area within the National Park. It was considered that engineering solutions such as re-routing or undergrounding of the overhead line would result in similar landscape and visual effects, as permanent forest wayleaves would be required for both of these solutions. Landscape enhancement, focused on redesign of the existing wayleave and surrounding area, was therefore identified as the most appropriate solution for further exploration.

1.15

The long-term aim of landscape enhancement in this area would be to restructure the forestry on either side of the existing wayleave, in order to reduce its prominence, particularly in views from neighbouring higher ground. This could be achieved by ‘feathering’ of the existing forest edge to remove geometric lines, and could be further enhanced by introducing swathes of mixed native woodland. To facilitate such large scale, and extensive change, this approach may require the development, design and adoption of a new Land Management Plan for East Loch Ard. This could also tie in with the objectives of the Strathard project, which promotes an ecosystem services approach to land and resource management.

1.16

There may be an opportunity to extend the approach outlined above, for landscape scale change across the wider Loch Ard Forest. A ‘spine’ of native mixed woodland along the wayleave could radiate out along the Duchray Water and some of its tributaries, as well as

key recreational trails. This would provide opportunities for the development of a wider green network of habitat, biodiversity and recreational enhancements.

1.17

These proposals align with the objectives of the East Loch Ard Land Management Plan which include:

- *Manage the forest habitat network (FHN) to provide a diversity of habitats, including open space that will benefit a wide range of species.*
- *Continue to manage large areas using continuous cover forestry (CCF) principles and seek opportunities to expand this management type where possible.*
- *Seek to expand the area of broadleaved woodland and use alternative conifers to Sitka spruce, where feasible, particularly in the CCF zone.*

1.18

The woodland restructuring described above could be undertaken in tandem with improvements to access into Loch Ard Forest, by upgrading existing forest tracks and creating new path linkages. There may be the opportunity for planting along these routes, to develop a more permanent network of woodland corridors which would in turn screen views of the overhead line and potentially frame views to key landscape features. One path which could be developed is the route of the 19th Century Loch Katrine – Glasgow aqueduct; this may also offer potential opportunities for historic/industrial heritage interpretation. An alternative route could also be identified for a short section of the Rob Roy Way, to take walkers away from the overhead line, with additional planting to screen or direct views away from the line and its wayleave.

1.19

One of the objectives of the East Loch Ard Land Management Plan is to:

- *Maintain and enhance the recreational features of the forest through considered management around forest entrances and zones along promoted trails.*

2 Site Appraisal

Context

2.1

This 15 km section of overhead line passes through Loch Ard Forest, a rolling, forested plateau crossed by the Duchray Water and other small burns. The forest forms part of the catchment of Loch Ard which lies to the north. The forest is relatively inaccessible, except for forestry/water board tracks and some dedicated mountain biking trails. The Rob Roy Way long distance footpath crosses under the line south of Drum of Clashmore at the south-eastern end of the section, past a small-scale farmed area with several properties at Corrie. There are some areas of semi-natural and planted broadleaved woodland e.g. Blairvaich Wood, and some heather moorland. The forest has a rugged backdrop of craggy hills, including Beinn Bhreac (579 m AOD) to the south, and Ben Lomond (974 m AOD) to the west. At its northern end the line passes in proximity to the Loch Lomond National Scenic Area.

Character/ landscape pattern

2.2

Loch Ard Forest is characterised by its rolling terrain, with linear ridges and knolls, and its coniferous forestry, with some broadleaved pockets and fringes. The blanket of coniferous forestry reduces perception of the undulating landform in places. The meandering Duchray Water is the key landscape feature within Gleann Dubh, running parallel to the line in the north, before crossing beneath the line in the vicinity of Blairvaich. The area is very sparsely settled, but accessible to walkers, cyclists and horse riders via its forestry tracks. At Corrie the line emerges from the forest and passes through a small-scale farmed landscape which offers open views, and more extensive visibility of the overhead line.

Visual amenity and Views

2.3

For a small area at the eastern end of this line section, in the vicinity of Corrie, the towers appear to dominate the small-scale farmed landscape, and detract from its

rugged upland backdrop. There are close views from the Rob Roy Way in this section. Elsewhere the forestry provides effective screening of the line, except in the west where the forest track is more elevated and the forest structure more open. Here, prolonged views of the line are possible, and detract from views towards Ben Lomond; conversely the forest wayleave through the section appears prominent in views from the rugged hills to the south-west.

Special qualities and Landscape Features

2.4

The area displays some of the Special Qualities of the National Park, most notably evidence of the industrial heritage of the area including the aqueduct which was built as part of the Glasgow Corporation Water Works (1856 and 1859). There are some areas of ancient and semi-natural Oak and Birch woodland amongst the large commercial plantations.

Current Management

2.5

The area is currently managed by Forestry Commission Scotland. The **East Loch Ard Land Management Plan** (2016-2026) includes the route of the overhead line. The Plan notes that the current species mix is mainly Sitka spruce (44.3%), with smaller areas of other conifers (11.4%), Oak and Birch (8.4%), Scots Pine (5.7%) and mixed broadleaves (3.6%). Over 25% of the forest is open space, the majority of which is along the overhead line wayleave. By the end of the Plan period (2026) there are planned increases in the area covered by Oak, Birch and other native broadleaves.

This also includes the removal of regenerating Sitka Spruce trees and Rhododendron, where applicable.

P1. Site Photographs



Images showing current management of the forest and wayleave through the area

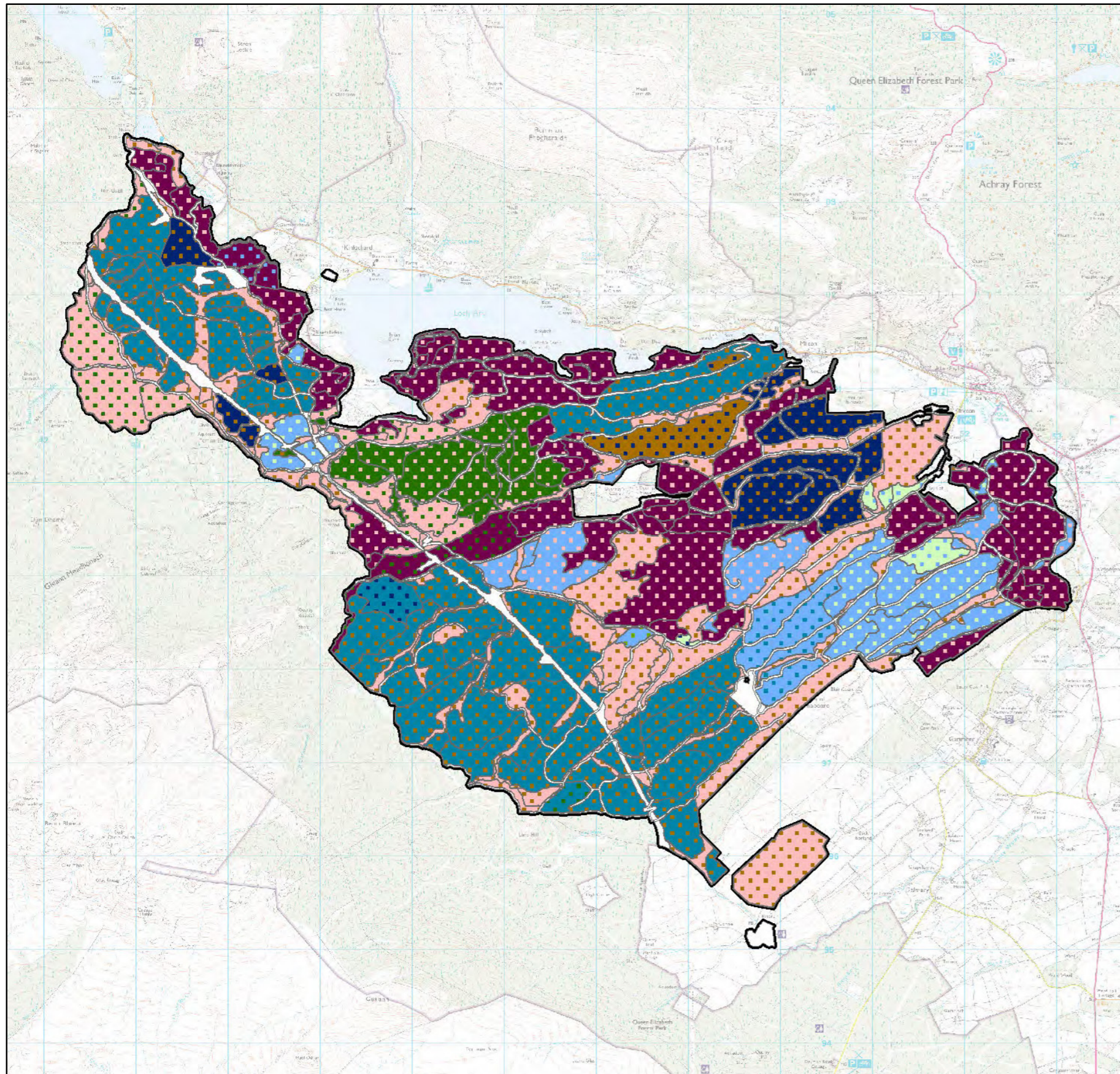


Images showing current management of the forest and wayleave through the area



Images showing the aqueduct

F1.1 East Loch Ard Future Habitats



East Loch Ard

Future Habitats

- Birch
 - Oak
 - Mixed broadleaves
 - Douglas fir
 - Larch
 - Norway spruce
 - Sitka spruce
 - Scots pine
 - Mixed conifers
 - Open
 - Plan Boundary
- small squares indicate second species

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



0 1 1:40,000
Kilometers on A3 paper

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Forestry Commission Scotland
Coimisean na Coilltearachd Alba

3 Precedent Projects and Guiding Principles

General

3.1

This first section of this chapter sets out precedent projects, the principles of which, inform the development of concept design for Glen Gyle.

This section is followed by the setting of guiding principles which have been developed to inform the design process for landscape enhancements for the mitigation of visual impacts of lines on the experience of Glen Gyle.

The guiding principles have been set out as a workthrough to demonstrate the following design elements which are to be taken into consideration during design development:

- Great Trossachs Forest and Scottish Natural Heritage Woodland Typologies;
- Materials;
- Woodland edge treatments;
- Woodland glade/ ride creation;
- Feathered woodland upland edge creation;
- Woodland establishment;
- Footpath creation; and
- Woodland planting structure.

Precedent Projects

3.2

The following projects have been identified as examples of the type of work that could be carried out in the Loch Ard Forest.

Ben A'an Improvement Programme

Ben A'an is a popular small hill in the Queen Elizabeth Forest Park, to the east of Loch Katrine. The improvement works began in October 2014 and are part of The Great Trossachs Forest Project, which aims to restore a large scale area of Scotland's native woodland. The path

upgrade is part of a wider project called 'The Mountains and the People', funded by Heritage Lottery Fund in partnership with Cairngorms National Park, Loch Lomond and the Trossachs National Park, Forestry Commission Scotland and the Cairngorm Outdoor Access Trust. The first stage is complete, comprising trail upgrades and the felling of non-native trees beside the path. Stage 2 will see the forest management team carry out ground preparation works before re-planting part of the area with native trees.

Waterfall Trail, the Lodge, Aberfoyle

The Waterfall Trail at the Lodge, in the Queen Elizabeth Forest Park, has re-shaped the gateway to a network of trails in the forest, offering all visitors the chance to access and enjoy the forest. A new route was created, incorporating a number of the trail's highlights; this is now a clear primary trail which has encouraged further development and the addition of environmental play, art and interpretation. The Lodge Forest Visitor Centre is run by the Forestry Commission.

Glenlude, Scottish Borders

The John Muir Trust is working on a 20-year plan to 'rewild' a former sheep farm and conifer plantation into a mosaic of native habitats, at Glenlude, near Selkirk in the Scottish Borders. The conifer plantation is gradually being replaced with native broadleaf trees, which are also being planted on some of the open grassland. The trees are grown from seed collected locally and grown in Glenlude's tree nursery. Volunteers include schools, John Muir Trust members and a drug and alcohol rehabilitation charity.

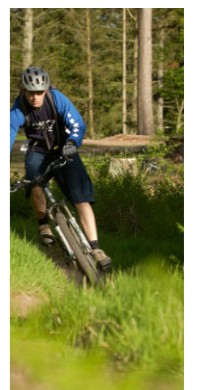
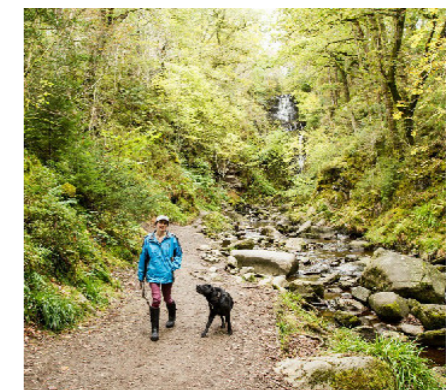
7Stanes Mountain Biking

The 7stanes are award-winning mountain biking centres that span southern Scotland. They include Glentress near Peebles and Glentool in Galloway. Each has a wide range of routes to suit beginners, families and experts. Many combine mountain biking with other activities such as wildlife lookouts and zip wires.

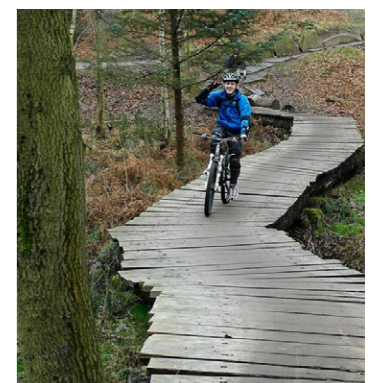
P2. Precedent Project Photographs



Ben A'an Improvement Programme: Images showing native woodland planting and regeneration



Waterfall Trail at the Lodge, Aberfoyle showing footpath through forest and woodland



Glenlude: Images showing gradual removal of conifer plantation for creation of mosaic of native habitats through native woodland planting

7Stanes Mountain Biking showing activities within existing woodland settings

P3. Indicative Planting Palette Photographs

Planting

3.3
The following images display the proposed planting species and style, and materials palette which are proposed to be used in East Loch Ard Forest.

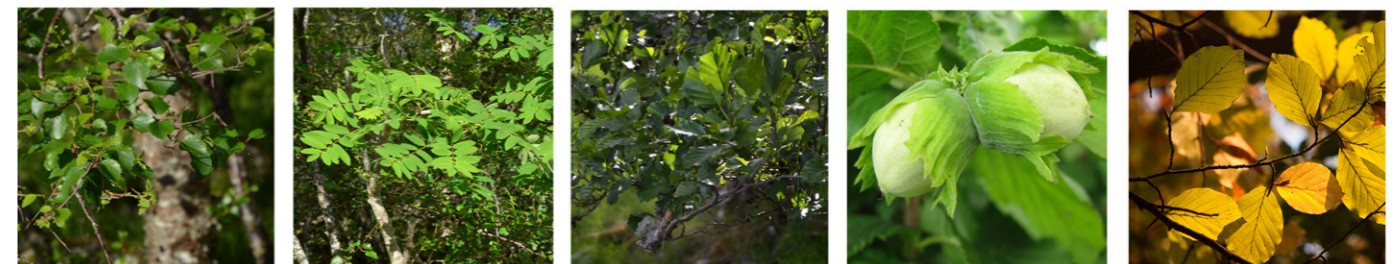
3.4
The following is a list of native species which can be drawn on for woodland mixes. Many of these species are common to the National Park. **The Biodiversity Action Plan for the National Park** (Wild Park 2020) notes that expanding and restoring native woodland is one of the major goals for Forestry Commission land in the National Park.

Woodland mixes

Pinus sylvestris	Scots pine
Betula pendula	Silver birch
Betula pubescens	Downy birch
Alnus glutinosa	Alder
Populus tremulus	Aspen
Fraxinus excelsior	Ash
Fagus sylvatica	Beech
Carpinus betulus	Hornbeam
Quercus robur / Quercus petraea	Oak (Common / Sessile)
Sorbus aucuparia	Rowan
Sorbus intermedia	Whitebeam
Prunus avium	Wild cherry / Gean
Salix fragilis / alba / caprea / cinerea / aurita	Willow (Crack / White / Goat / Grey / Eared)
Ulmus glabra	Wych elm
Acer campestre	Field maple
Ilex Aquifolium	Holly
Juniperus communis	Common Juniper

Native Hedgerow / Shrubs / Understorey

Crataegus monogyna	Hawthorn
Prunus spinosa	Blackthorn
Acer campestre	Field maple
Corylus avellana	Hazel
Fagus sylvatica	Beech
Ilex Aquifolium	Holly
Lonicera periclymenum	Honeysuckle
Sambucus nigra	Elder
Rosa canina	Dog rose
Rosa rubiginosa	Sweet briar
Viburnum Opulus	Guelder rose
Ligustrum vulgare	Wild privet



Silver birch (Betula pendula) Rowan (Sorbus aucuparia) Alder (Alnus glutinosa) Hazel (Corylus avellana) Beech (Fagus sylvatica)



Scot's pine (Pinus sylvestris) Holly (Ilex aquifolium) Dog rose (Rosa canina) Birch and Willow (Betula spp. and Salix spp.) Goat willow (Salix caprea)



Blackthorn (Prunus spinosa) Hawthorn (Crataegus monogyna) Juniper (Juniperus communis) Common Oak (Quercus robur) Downy birch (Betula pubescens)

Planting/ Woodland Typologies



A. Native pine woodland

Altitudinal range from sea level to over 600m on steeply sloping ground with dry to damp acidic soils. Occurs with upland oakwood, upland birchwood and wet woodland habitats and also in patches within non-native conifer plantations.

Woodland Layer (Primary)

85%

Pinus sylvestris (Scot's pine)

Woodland Layer (Secondary)

15%

Betula pendula (Silver birch)
Betula pubescens (Downy birch)
Sorbus acuparia (Rowan)
Alnus glutinosa (Alder)
Salix cinera (Grey willow)
Ilex aquifolium (Holly)
Corylus avellana (Hazel)

Shrub/ Understorey Layer

Salix aurita (Eared willow)
Juniperus communis (Juniper)



B. Upland birchwoods

Moderate/ steep slopes generally below 400m, with well drained soils, but can extend well above this, can also occur in mosaics with Upland oakwoods, upland mixed ashwoods and wet woodland habitats.

Woodland Layer Primary

85%

Betula pendula/ pubescens (Birch spp.)

Woodland Layer (Secondary)

15%

Pinus sylvestris (Scot's pine)
Shrub/ Understorey Layer
Juniper (Juniperus communis)
Eared willow (Salix aurita)
Aspen (Populus tremula)
Grey willow (Salix cinera)



C. Upland mixed ashwoods

Moderate/ steep slopes with moist soils below 300m, in association with upland oakwood, upland birchwood and wet woodland habitats. Is also found in scattered patches on steep crags up to about 500m.

Woodland Layer (Primary)

85%

Fraxinus excelsior (Common ash)

Ulmus glabra (Wych elm)

Woodland Layer (Secondary)

15%

Grey willow (Salix cinera)
Hazel (Corylus avellana)
Downy birch (Betula pubescens)
Elder (Sambucus nigra)
Sorbus acuparia (Rowan)
Shrub/ Understorey Layer
Blackthorn (Prunus spinosa)
Dog rose (Rosa canina)
Eared willow (Salix aurita)
Gorse (Ulex europaeus)



D. Atlantic oakwoods

Moderate/ steep slopes below 300m in with well drained soils. Can occur in mosaics with upland birchwoods, upland mixed ashwoods and wet woodland habitats. Oak forms >30% of the canopy cover.

Woodland Layer (Primary)

80%

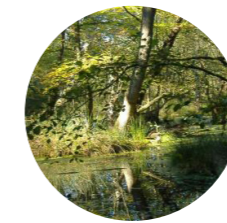
Sessile Oak (Quercus patraea)

Common Oak (Quercus robur)

Woodland Layer (Secondary)

20%

Silver birch (Betula pendula)
Rowan (Sorbus acuparia)
Hazel (Corylus avellana)
Holly (Ilex aquifolium)
Shrub/ Understorey Layer
Juniperus communis (Juniper)
Bramble (Rubus fruticosus)
Dog rose (Rosa canina)
Gorse (Ulex europaeus)
Broom (Cytisus scoparius)



E. Wet woodland

Flushed slopes, wet hollows, valley floors and edges of wetlands, rivers streams and lochs in upland and lowland situations.

Woodland Layer (Primary)

100%

Grey willow (Salix cinera)

Goat willow (Salix caprea)

Downy Birch (Betula pubescens)

Alder (Alnus glutinosa)

Shrub/ Understorey Layer

Eared willow (Salix aurita)

Osier (Salix viminalis)

Hawthorn (Crataegus monogyna)



F. Wood-pasture and Parkland

Mostly below 300m in altitude in areas of native or plantation woodland or enclosed farmland. In upland areas most commonly associated with native woodland.

Tree Planting

Sessile Oak (Quercus patraea)

Common Oak (Quercus robur)

Ash (Fraxinus excelsior)

Alder (Alnus glutinosa)

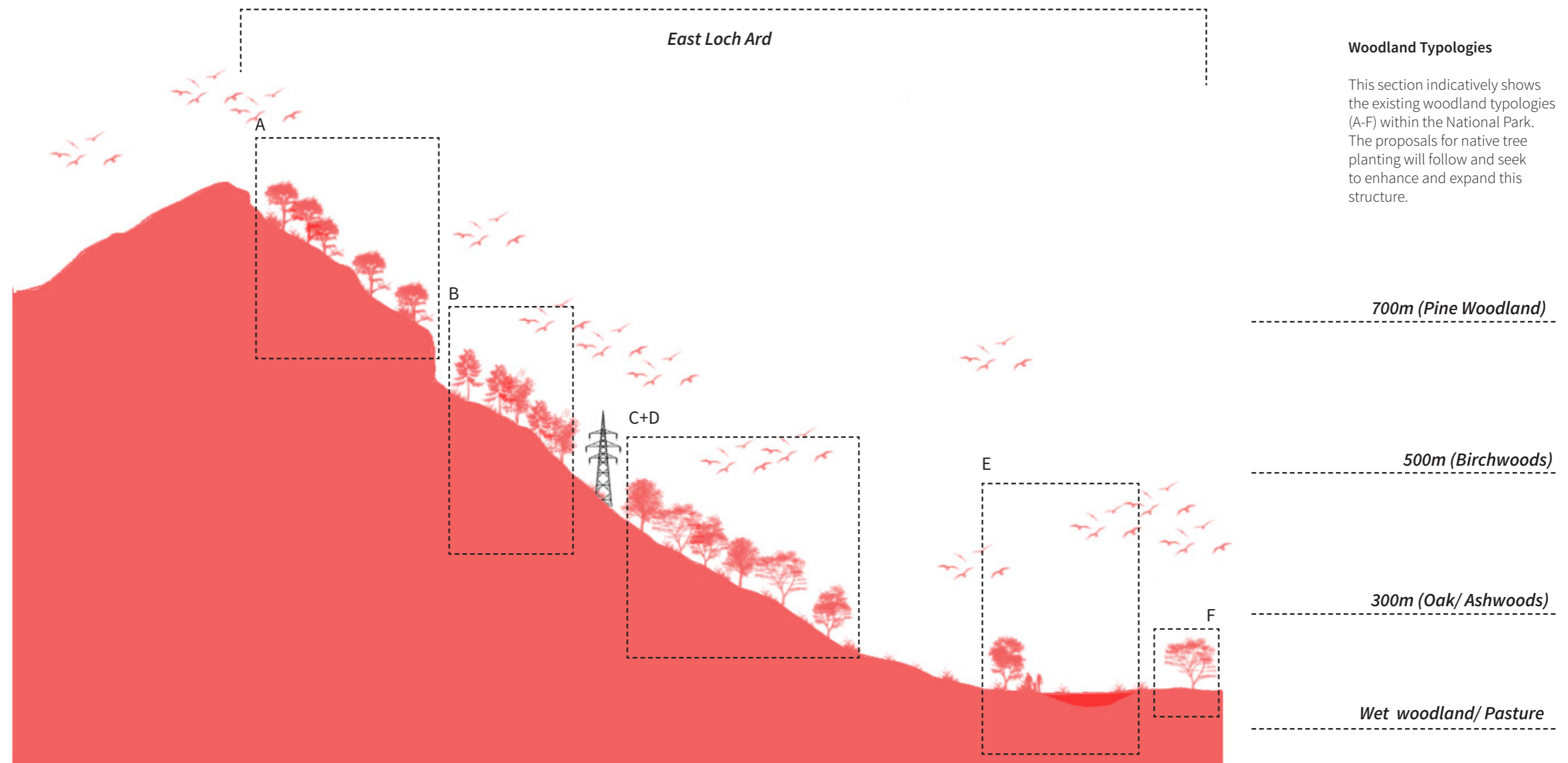
Birch (Betula pendula/ pubescens)

Scot's pine (Pinus sylvestris)

Hazel (Corylus avellana)

Hawthorn (Crataegus monogyna)

F3.1 Indicative Section Woodland Typologies



Materials



G. Fencing

To ensure successful establishment of the proposed native woodland planting area will require to be deer/ sheep fenced for protection from grazing animals. All new woodland will be fenced in accordance with Forestry Commission/ National Park technical guidance and specification.

Fence lines will be designed to be sympathetic to natural contours and integrate forest edges into the landscape, creating natural forest edges as detailed over the following pages.

All fencing shall be treated softwood timber with a durability of 40 years plus with combination of rectangular wire mesh and hexagonal wire mesh netting galvanised to BS EN 10244-2 to prevent deer and wild mammal species. Fencing shall be min. 1.8m in height, 300mm x 220mm max. mesh size with 1050mm wide rabbit/ hare proof hexagonal 31mm mesh netting to base to be turned back by 150mm and pinned.

Treated softwood timber stiles and gates will also be required to facilitate access for woodland management activities. There will also be a requirement to cross streams in some locations which will require appropriate design to prevent access.

All areas shall be assessed by a qualified ecologist to identify species requirements i.e. badgers etc. to ensure appropriate gates are installed.



H. New Footpaths

All new footpaths shall be designed in accordance with SNH/ National Park/ Upland Path Advisory Group technical guidance i.e. Upland Pathwork Construction Standards for Scotland/ Constructed tracks in the Scottish Uplands.

In general paths should be constructed using locally won aggregate where possible to a width varying between 600-1200mm and a minimum depth of 250mm. Minimum depths for path construction are as follows:

- 50mm of compacted surface material;
- 100mm of compacted base material; and
- 150mm of sub-base material.

Excavated material with turfs and boulders shall be used to define and contain the path edge, with the path surface sitting slightly higher than the ground at the path edge to avoid water collecting.

Localised site conditions will require independent assessment of suitable construction methods and materials i.e. in situations of peat/ waterlogged ground which may require matting/ geotextile use.

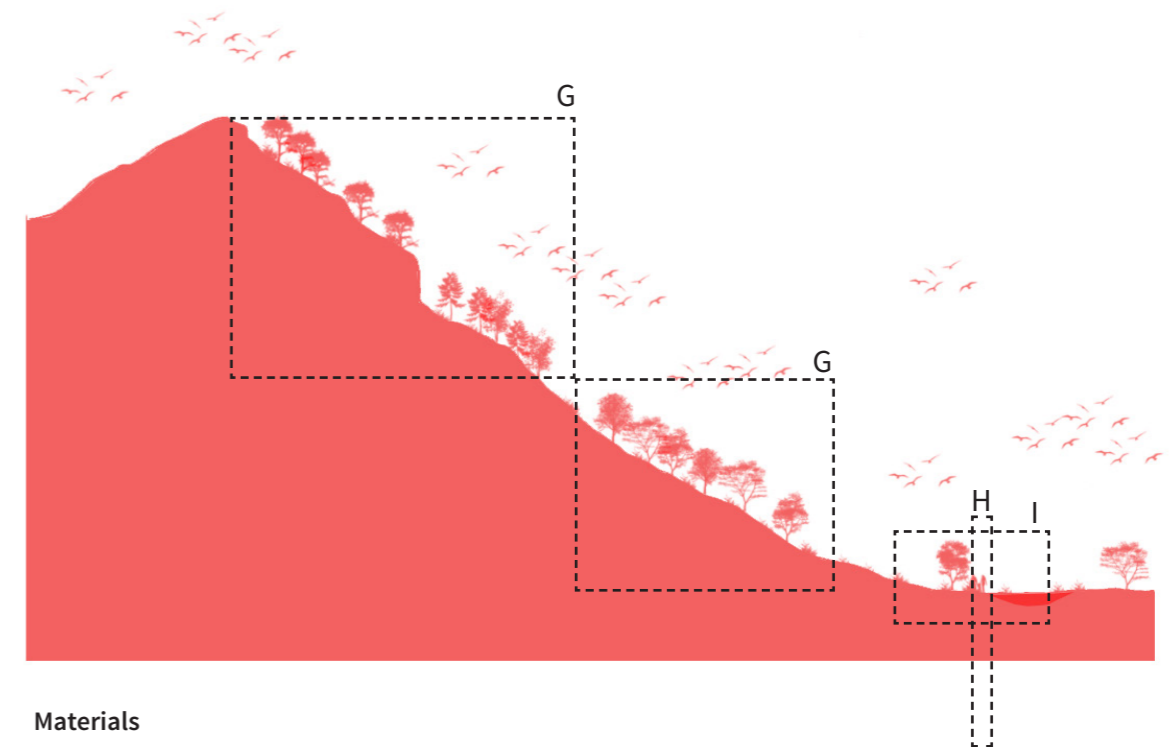


I. Wayfinding

The proposals involve the provision of alternative routes through the site area resulting in the requirement for creation new pathways which deviate from the existing routes. There is therefore a requirement to ensure these are adequately sign posted to ensure that these routes are adopted by users. To assist with this it is proposed that a wayfinding strategy is created to include implementation of the following:

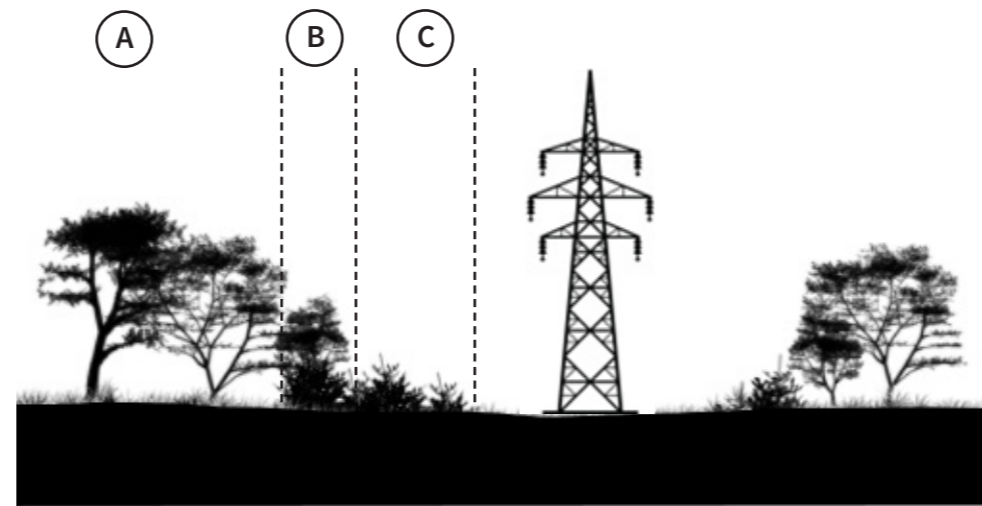
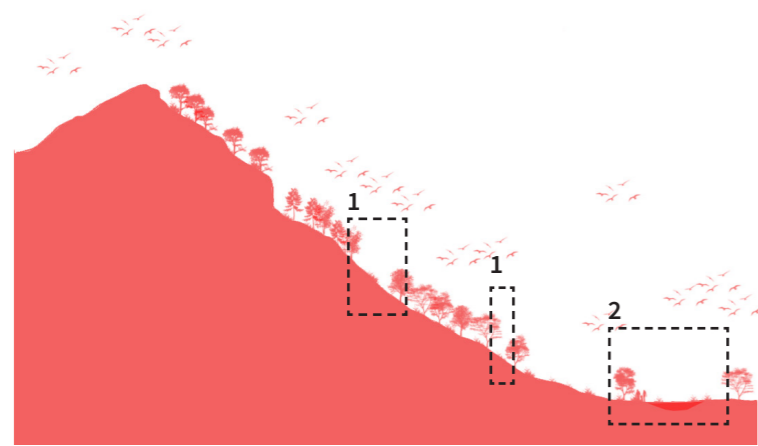
- Fingerpost directional signage;
- Waymarking posts; and
- Orientation panels.

All signage and wayfinding elements are to be design sensitively to suit the surrounding setting and be appropriate in scale and location in accordance with National Park/ Signage Guidance for Outdoor Access guidance. Materials to be utilised shall be durable treated where appropriate to provide a long lifespan.



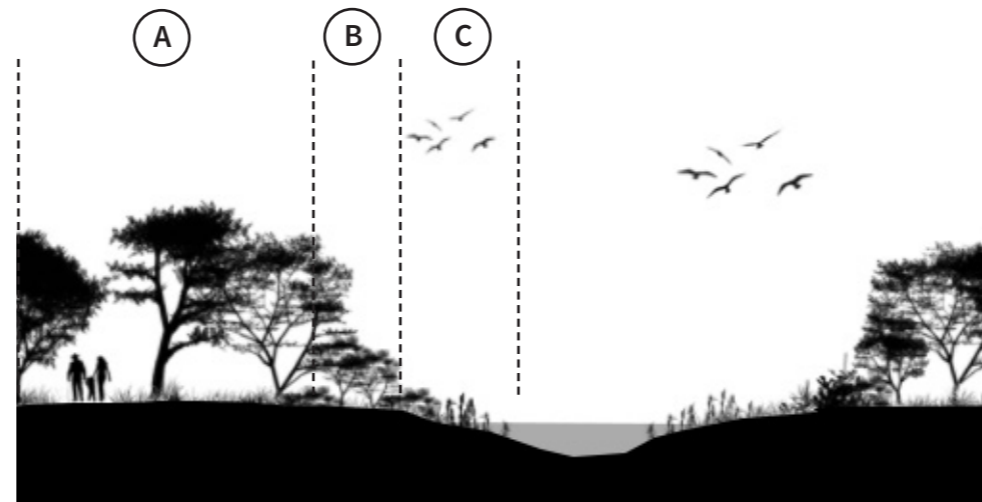
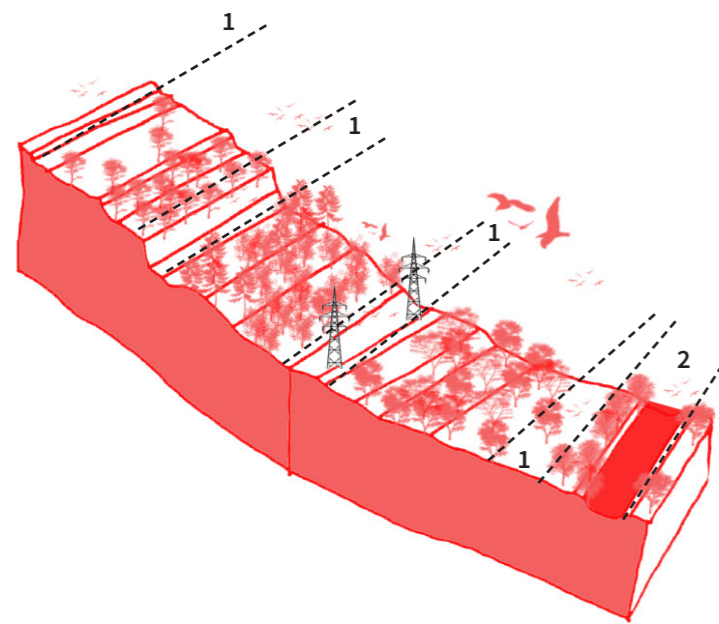
Materials

This section indicatively shows where proposed materials for fencing, footpaths and wayfinding will be deployed.



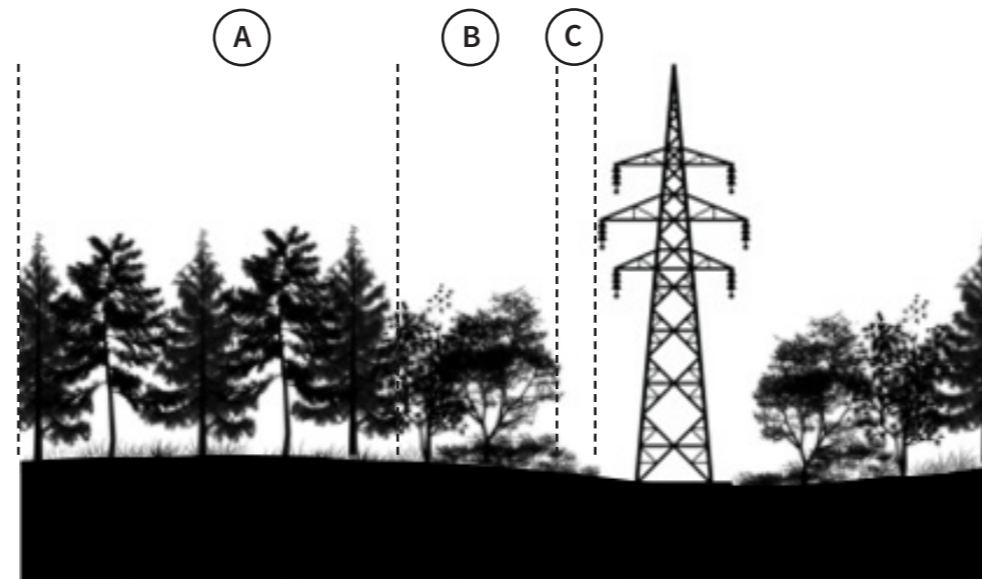
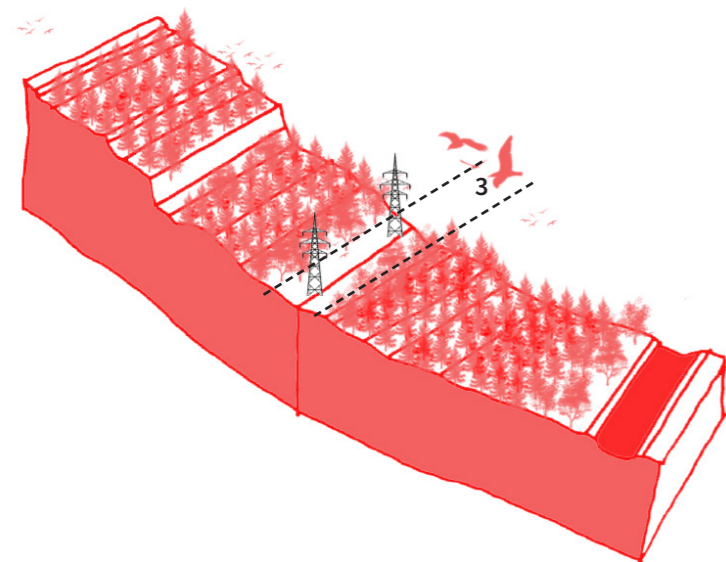
F3.2
Woodland Edge Treatment 1
indicative Section

This treatment will be deployed in areas where new woodland is to be created along the wayleave and to all new woodland edges and glades.



F3.3
Woodland Edge Treatment 2
Indicative Section

This treatment will be deployed in areas where new woodland is to be created along water edge/ riparian woodland.



F3.4
Woodland Edge Treatment 3
Indicative Section

This treatment will be deployed in areas where new woodland is to be created to existing plantation wayleave.

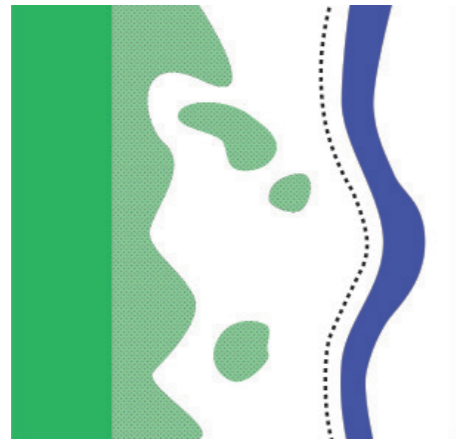
- A. Woodland zone
- B. Shrub zone
This is the transition zone between trees and the open area of the wayleave/ open space.
- C. Herb zone
This is the transition zone between trees and the open area of the wayleave/ open space.

**F3.5
Woodland Edge Treatments
indicative Plan Diagrams**

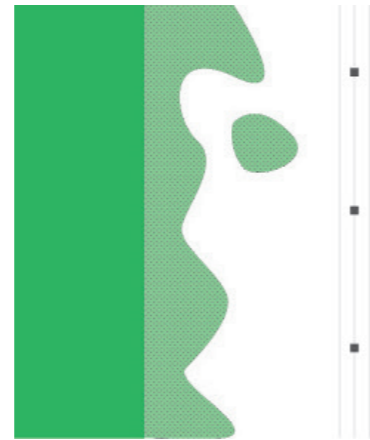
The following plan diagrams illustrate the proposed edge treatment in situations likely to arise during the design development and implementation of native woodland planting. These are intended to act as a guide for edge treatments in the scenarios likely to be encountered.

Treatments all propose naturalistic design of the permanent woodland and woodland edge through creation of glades, rides, scalloped edges, habitat islands and feathered edges to upland slope sides through sensitive following of natural hollows and depressions within the existing landform.

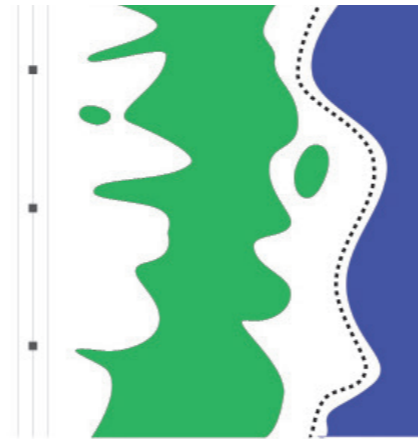
Native woodland edge to existing forestry and open space



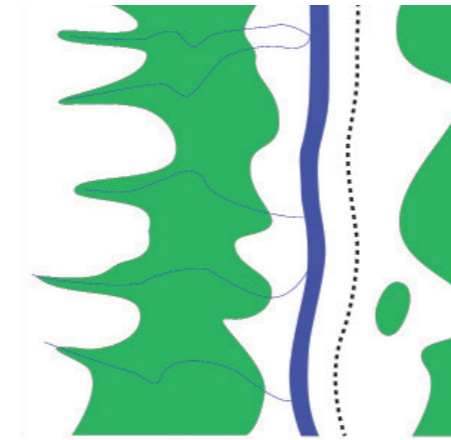
Native woodland edge to wayleave



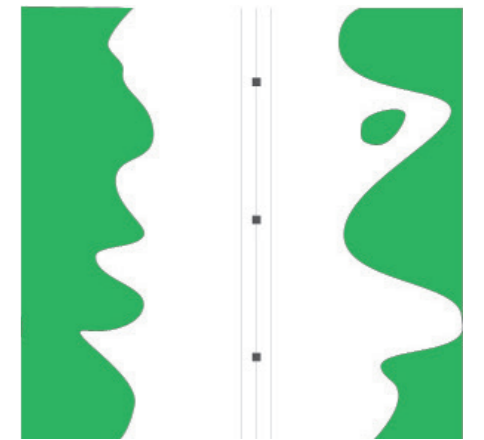
Native woodland on lower slopes between waters edge and wayleave



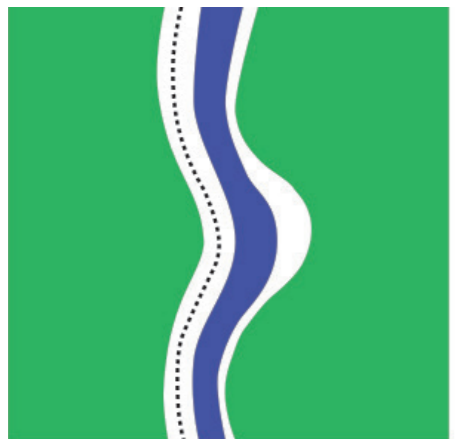
Native woodland on steep slopes with tributaries



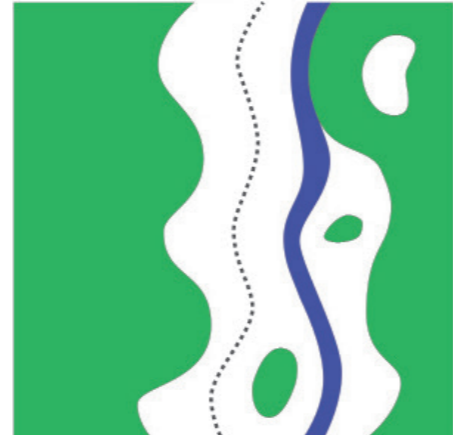
New native woodland edge to wayleave



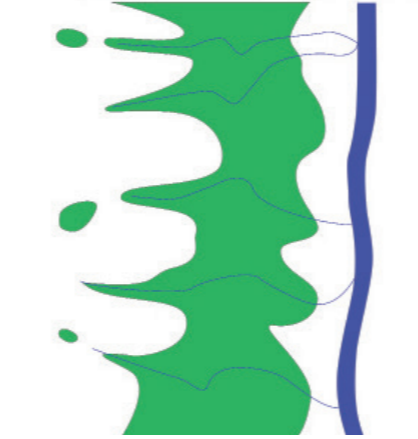
Riparian/ wet woodland corridor along rivers/ streams



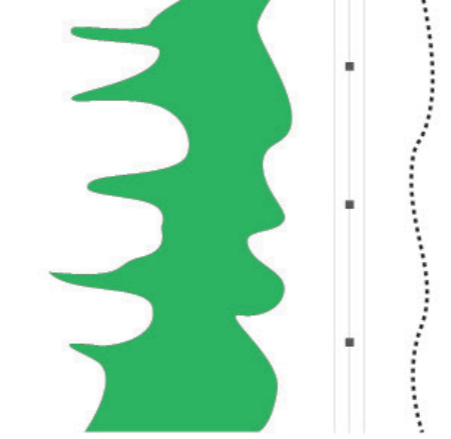
Native woodland edge to river/ stream and footpath



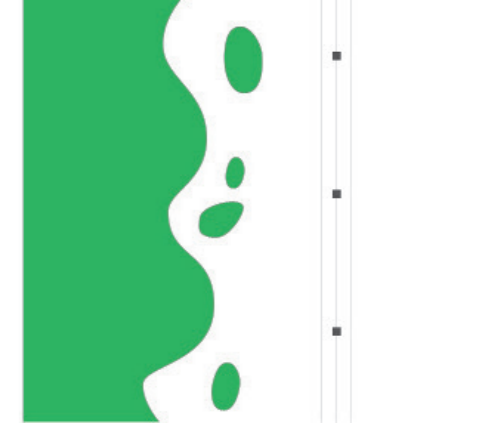
Native woodland planting edge to upland glen



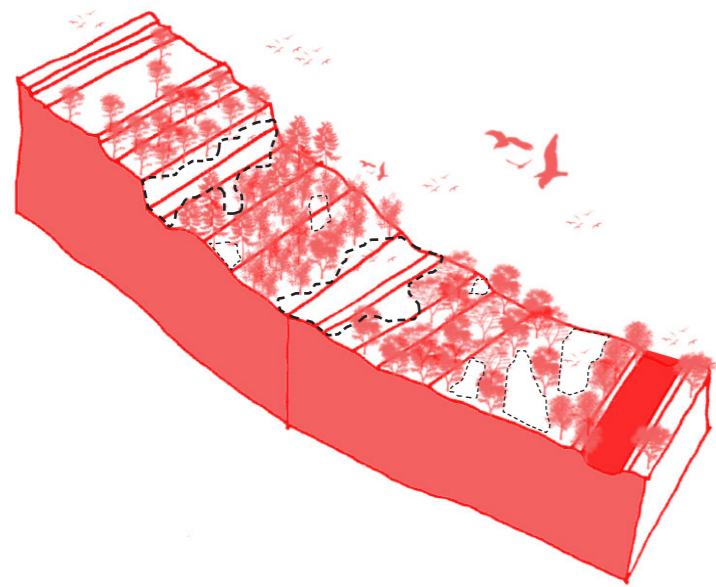
Native woodland planting to lower slopes and wayleave edge



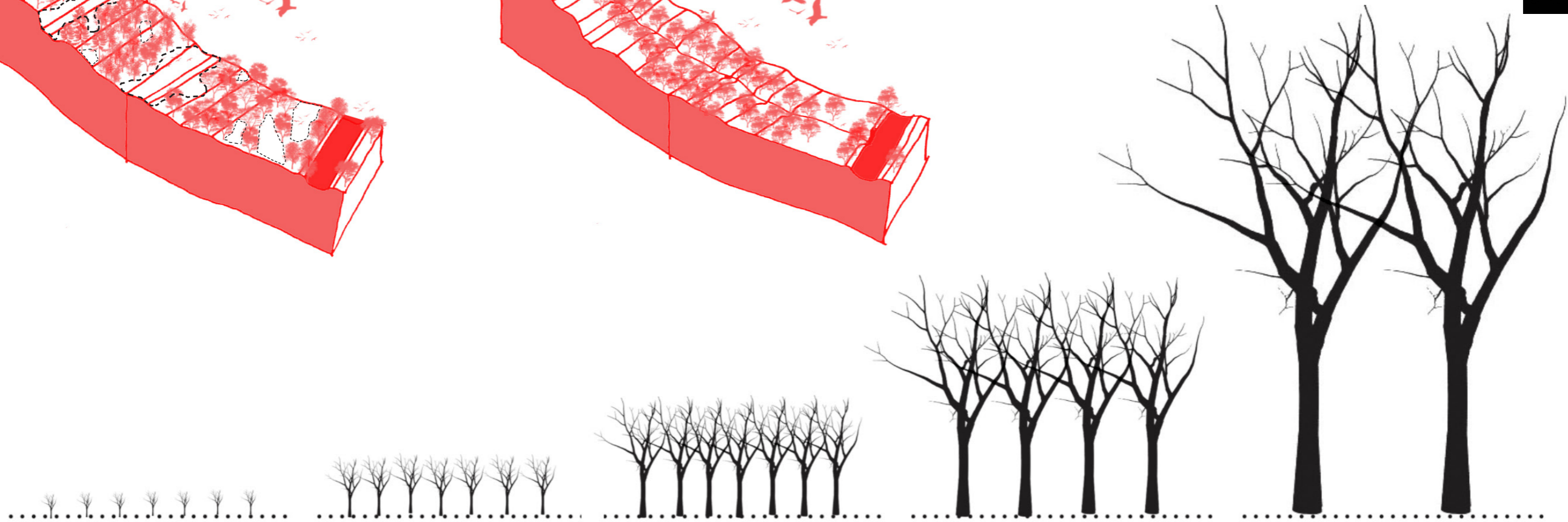
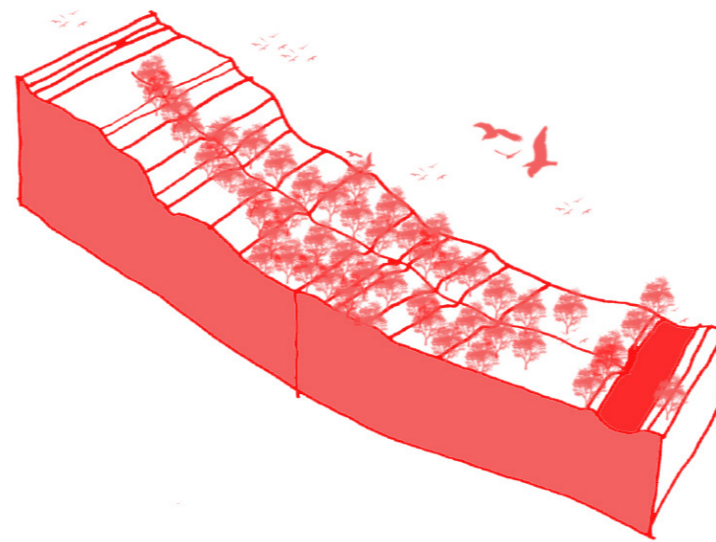
Native woodland edge to wayleave



F3.6 Woodland Glade/ Ride Creation



F3.7 Feathered Woodland Upland Edge Creation



F3.8
Woodland Establishment
Diagrams

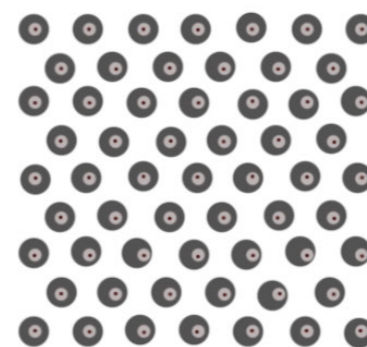
1 year old
Whips at 0.5m-1.0m height and 15cm wide; trunk 2cm wide

Age: 1 year
Canopy: 15cm
Height: 0.5m-1.0m
Girth: 2cm



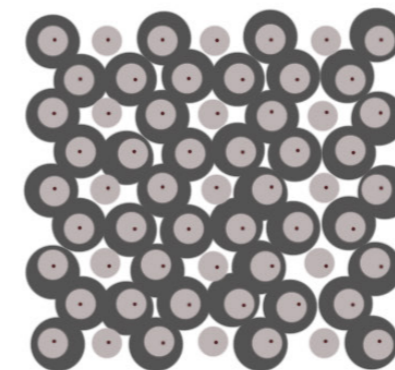
5 years old
Growth 2.0m-3.5m height and 0.6m wide; trunk 8-10cm wide

Age: 5 years
Canopy: 0.6m
Height: 2.0-3.5m
Girth: 8-10cm



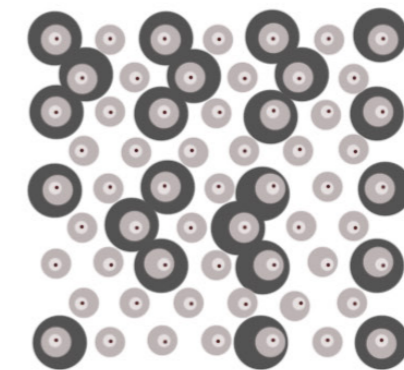
10 years old
6.0-7.5m height and 1.2m wide; trunk 15-20cm wide

Age: 10 years
Canopy: 1.2m
Height: 6.0-7.5m
Girth: 15-20cm
Thinning: every 5-10 years



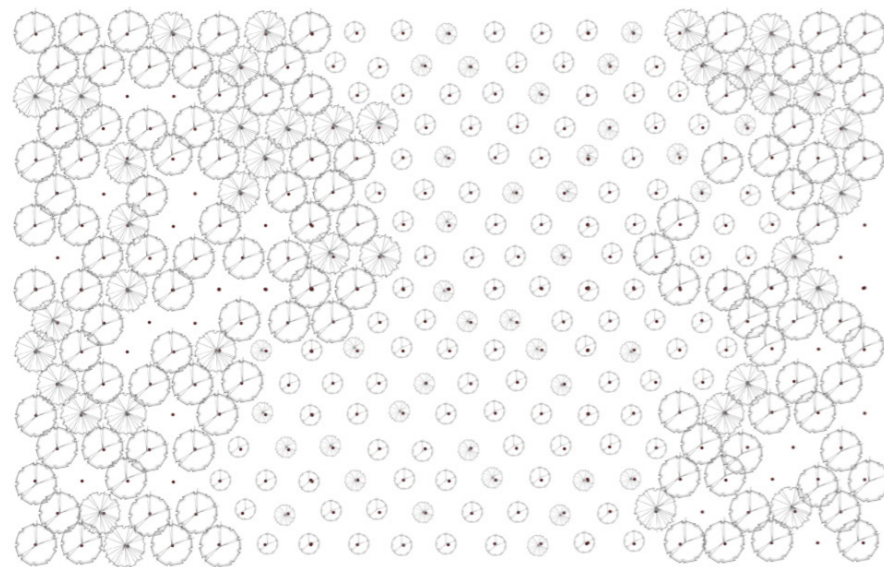
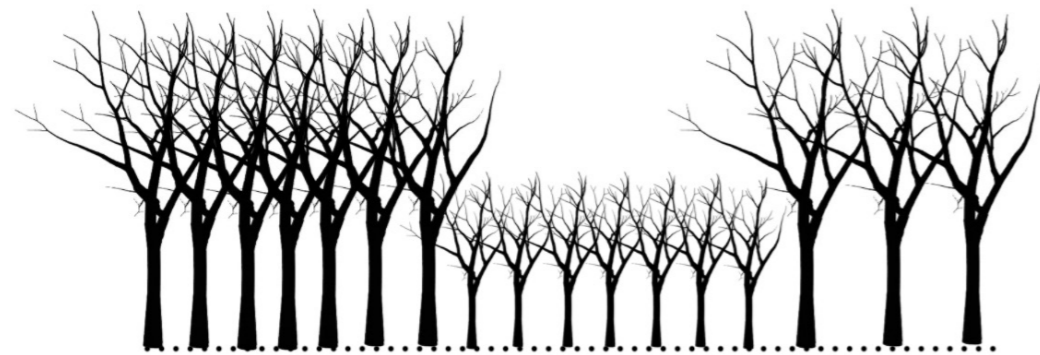
25 years old
10-15m height and 7m wide; trunk 25cm wide

Age: 25 years
Canopy: 7m
Height: 10-15m
Girth: 25cm
Thinning: every 5-10 years



40 years old
20-30m height and 10-15m wide; trunk 30-40cm wide

Age: 40 years
Canopy: 10-15m
Height: 20-30m
Girth: 30-40cm
Thinning: every 5-10 years



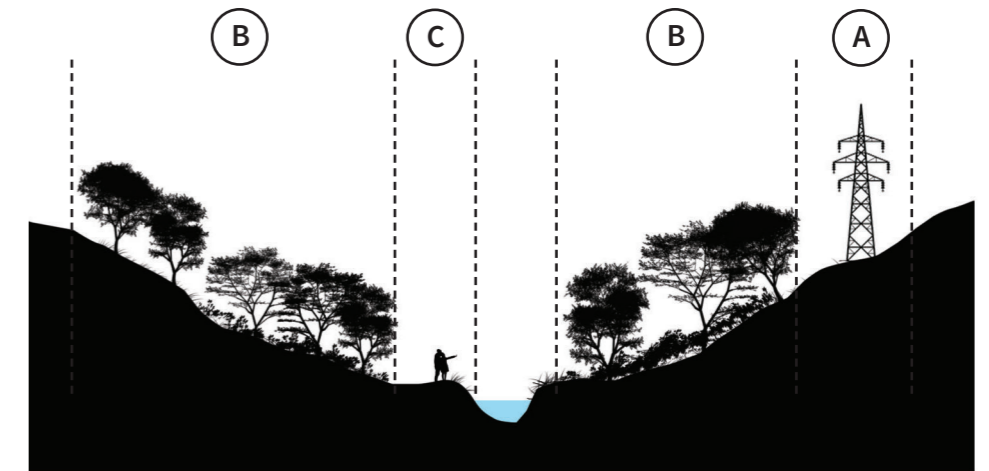
F3.9
Mixed Age Woodland
Establishment Diagram

25 and 10 year old
Planting carried out at 15 year intervals to ensure diversity of age of woodland for ecological benefits.
Above shows indicative woodland at 25 and 10 years of age.

F3.10
Footpath Creation Treatment 1
Indicative Section

A. Wayleave
B. Wet Woodland/ Riparian zone
This is the transition zone between trees and the open area of the wayleave/ open space.
C. Footpath on water's edge on valley/ glen floor

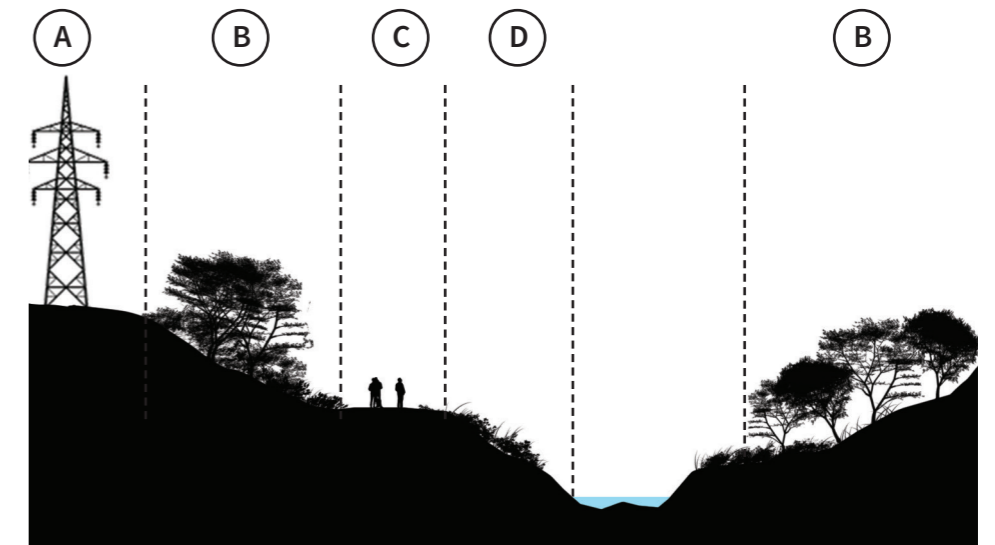
This treatment will be deployed in areas where footpaths are proposed directly adjacent to the water's edge.



F3.11
Footpath Creation Treatment 2
Indicative Section

A. Wayleave
B. Wet Woodland/ Riparian zone
This is the transition zone between trees and the open area of the wayleave/ open space.
C. Footpath away from water's edge on lower slope sides
D. Herb/ Wetland zone

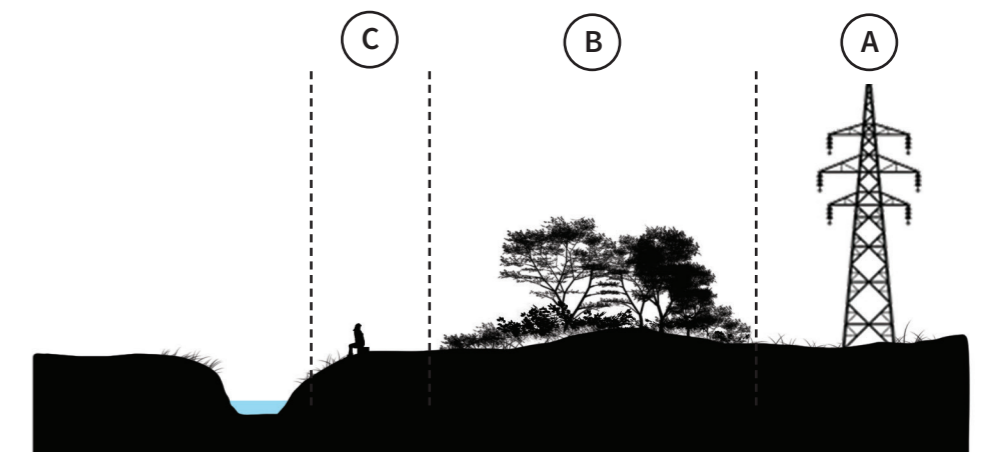
This treatment will be deployed in areas where footpaths are proposed to lower slope sides in close proximity to water's edge.



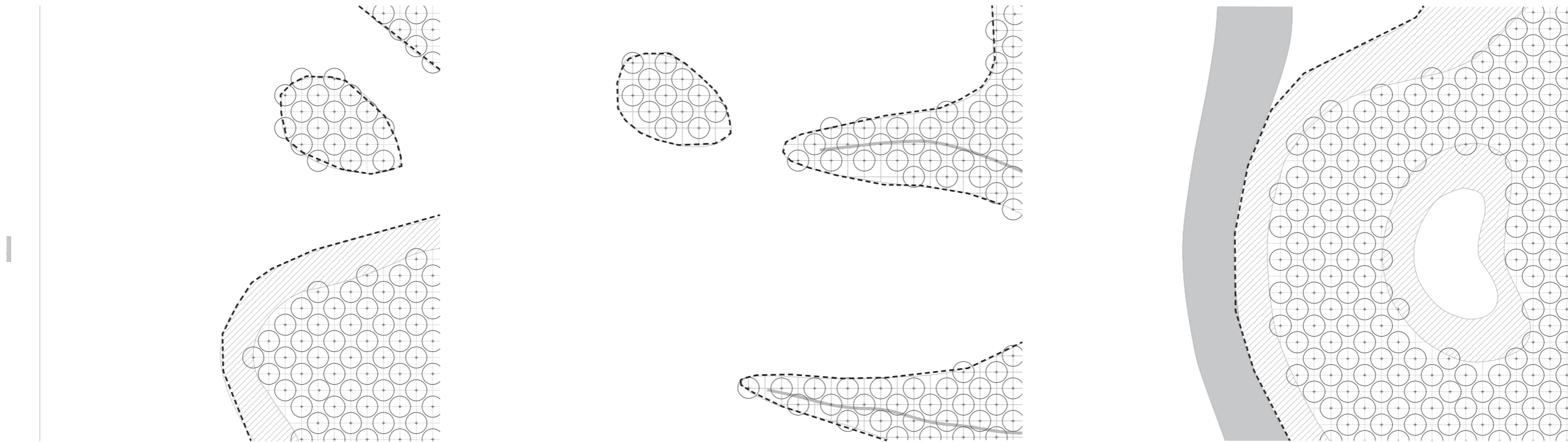
F3.12
Footpath Creation Treatment 3
Indicative Section

A. Wayleave
B. Wet Woodland/ Riparian zone
This is the transition zone between trees and the open area of the wayleave/ open space.
C. Footpath away from water's edge on lower slope sides

This treatment will be deployed in areas where footpaths and viewpoints are proposed to open space/ open water.



F3.13
Woodland Edge Indicative Planting Structure

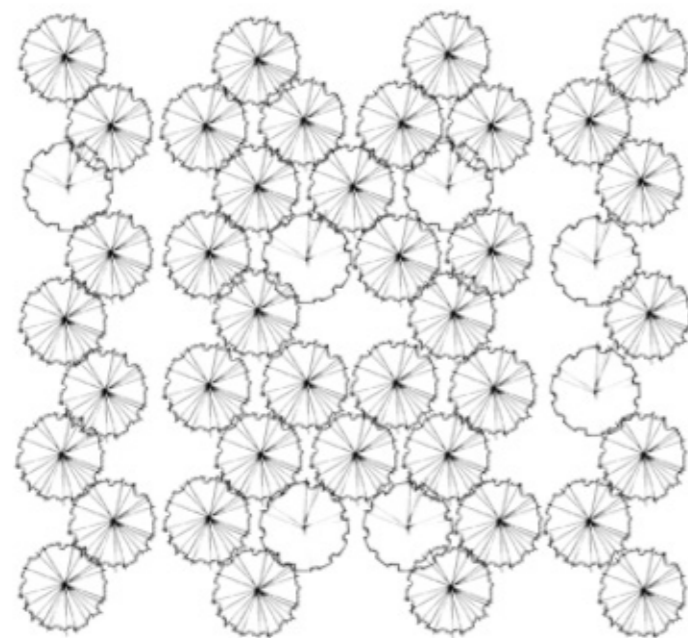


A. Wayleave with habitat island
Woodland planting to interior. Dashed black line indicates extents of area to be fenced during establishment. The hatched area illustrates area not to be planted but to allow for natural regeneration to form shrub zone.

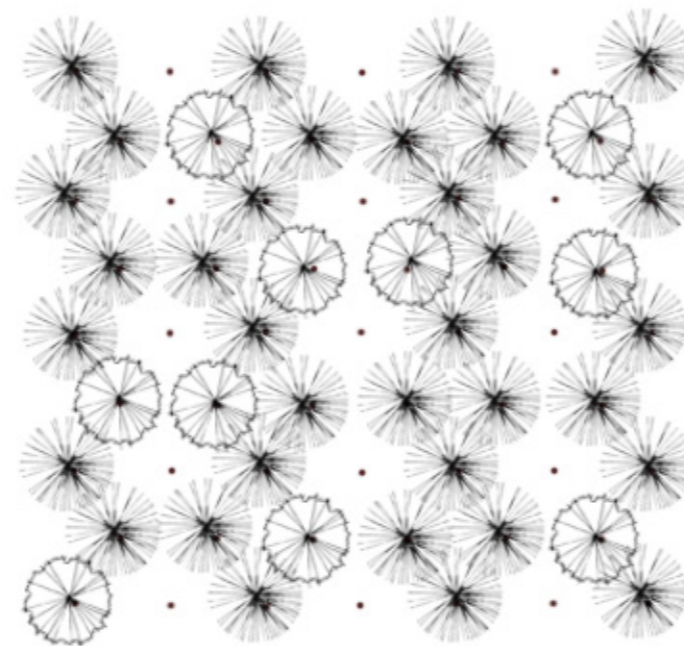
B. Upland slope with tributaries and habitat island
Woodland planting to upland edge to follow natural hollows and depressions. Dashed black line indicates extents of area to be fenced during establishment.

C. Water edge with woodland glade
Woodland planting to interior with areas left unplanted to form glades within the woodland mosaic. Dashed black line indicates extents of area to be fenced during establishment. The hatched area illustrates area not to be planted but to allow for natural regeneration to form shrub zone.

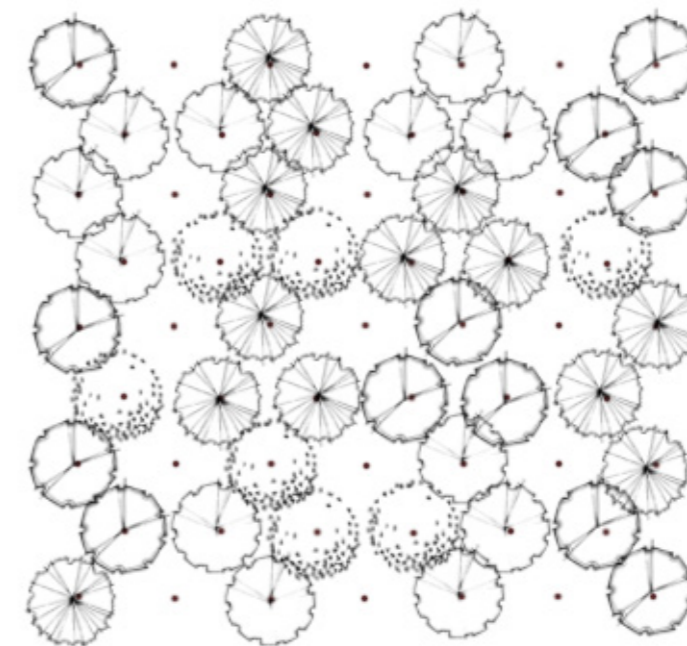
F3.14
Indicative Woodland Structure (25 years old)



A. Native Birch/ Ash/ Oakwoods



B. Native Pinewood



C. Wet Woodland

4 Concept Development/Optioneering

General

4.1

Findings from the site appraisal and stakeholder consultation feedback have informed the development of conceptual plans for landscape enhancement and broad principles of alternative Forest Design in this area. Various options have been developed, focusing on wayleave design and the potential to enhance biodiversity and recreation opportunities. These options provide different solutions for mitigating the visual effects of the overhead line, but may also present wider opportunities and benefits, such as flood alleviation.

4.2

Two options for forest restructuring have been developed; one focusing on the route of the overhead line itself, and the other examining the potential for this approach to be adopted at a larger scale, throughout the Loch Ard Forest. Options for enhancing recreational routes include the consideration of an upgraded loop through currently less accessible parts of the forest, development of a new route for pedestrians and cyclists along the aqueduct, and minor re-routeing of the Rob Roy Way long distance footpath. Analysis of each option has been carried out to ascertain the strengths and weaknesses, and assist in determining the most suitable option, or options, to take forward and develop further to outline design stage.

Option 1A

4.3

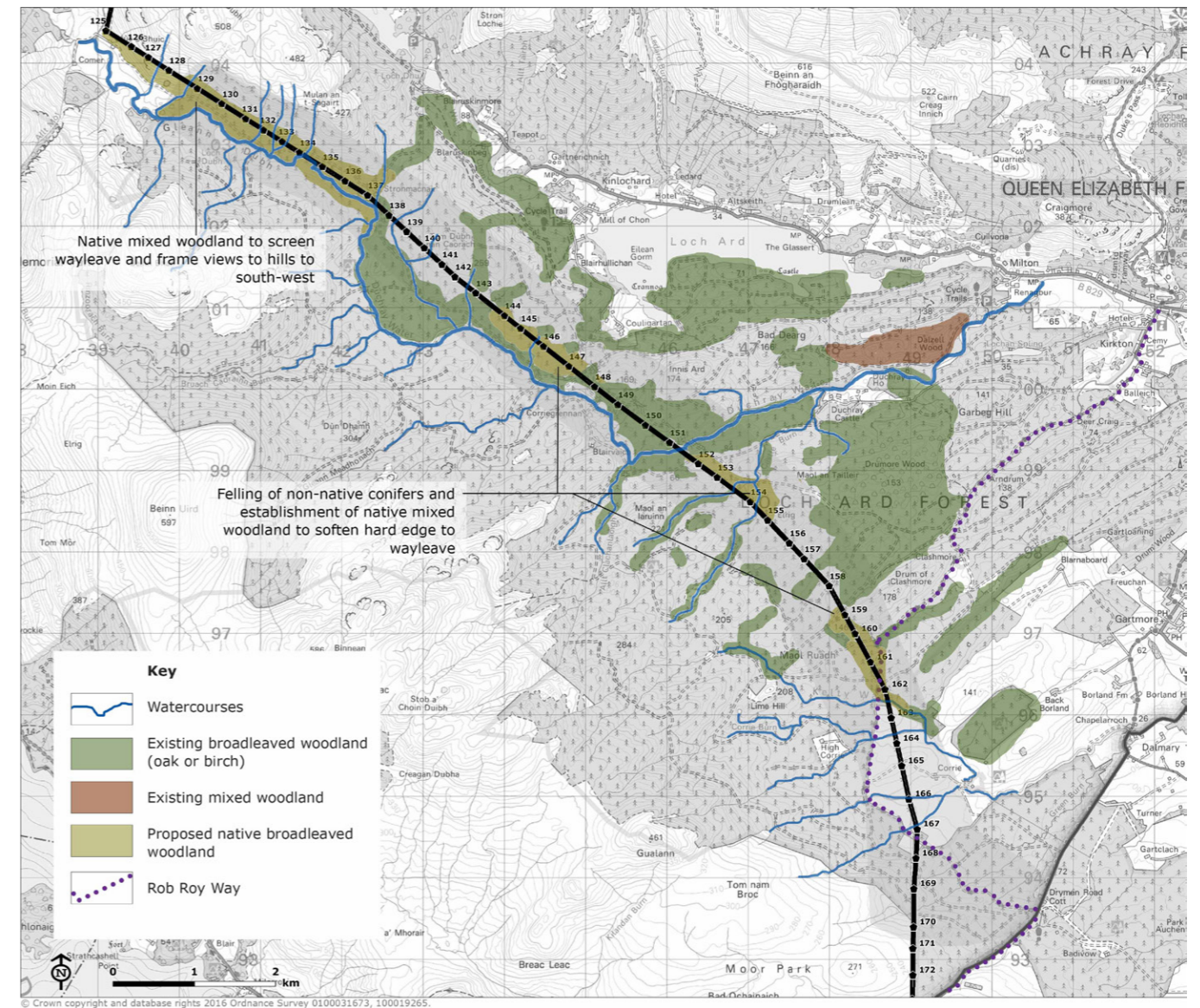
This option explores the potential for a scalloped forest edge to soften the existing wayleave, by extending the required 40 m offset either side of the line into the existing forestry. Reshaping the wayleave corridor will give the open ground of the wayleave a less linear form and help it integrate better with the landscape. The area to be felled would ideally respond to the underlying landform and landscape features such as the Duchray Water, although the consequences of felling on windthrow would need to be considered. The addition of native mixed broadleaf and coniferous woodland will further soften the forest edge, and create areas of permanently retained woodland. This new woodland would create a 'spine' through the forest, connecting existing areas of broadleaved woodland and facilitating the movement of wildlife through Loch Ard Forest.

It is anticipated that this option will improve views from iconic hill summits such as Ben Lomond to the south-west. The native woodland planting could also be used to frame views to key landscape features, directing them away from the overhead line.

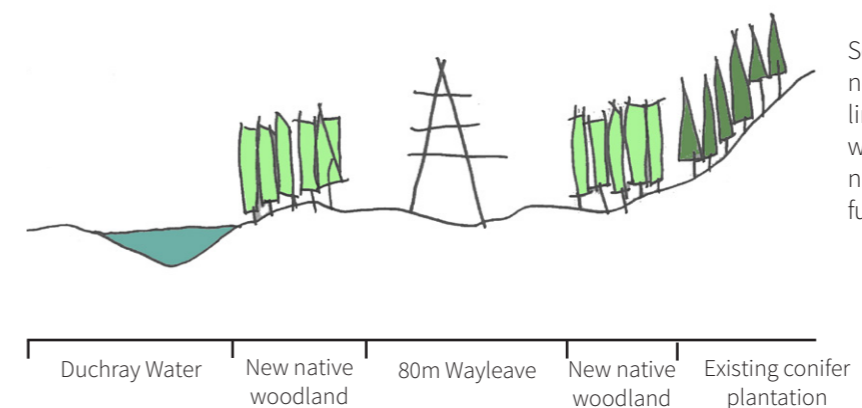
The opposite plan shows a typical section of the line; it presents a principle which could be applied to the Loch Ard forest as a whole, rather than a detailed design for a specific section of the line. The felling line would likely follow existing compartment boundaries or tracks, to avoid windthrow as a result of removing part of a compartment. New planting would likely follow contours or other natural features; this would be identified following more detailed site appraisal and consultation with Forestry Commission Scotland. Species selection and method of establishment would be dependent upon site conditions.

Option 1A

Plan



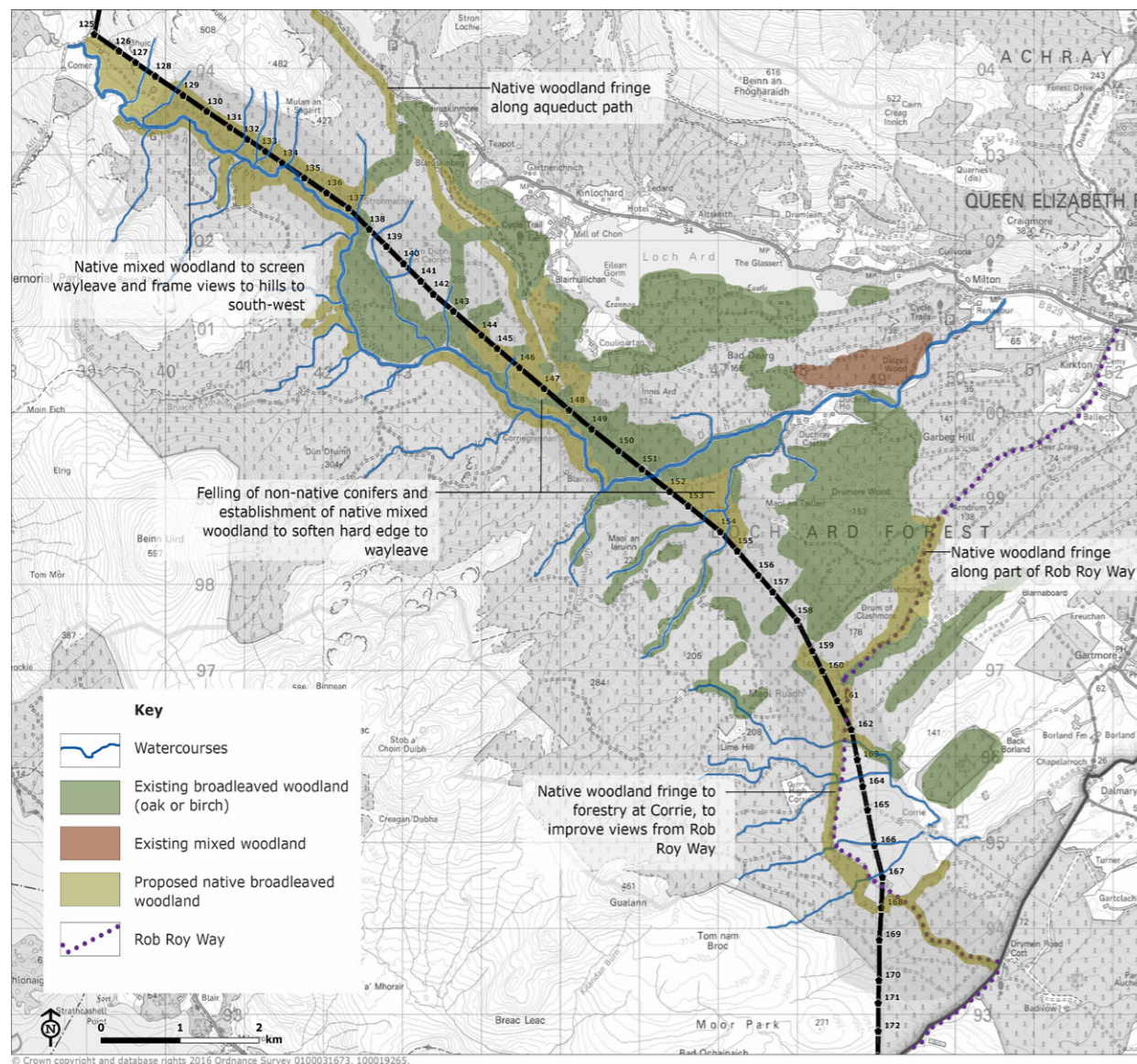
Section



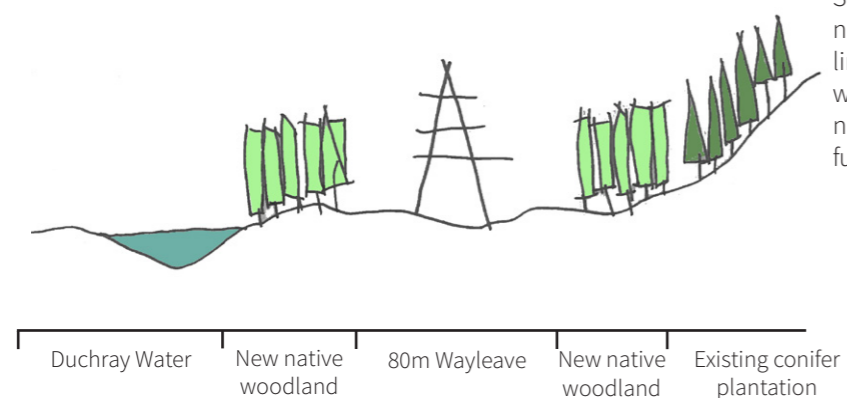
Section showing the felling of non-native trees to create a less linear area of open space along the wayleave, and the introduction of native broadleaved woodland to further soften the forest edges.

Option 1B

Plan



Section



Section showing the felling of non-native trees to create a less linear area of open space along the wayleave, and the introduction of native broadleaved woodland to further soften the forest edges.

Option 1B – Forest Restructuring (wayleave, water courses and key routes)

4.4

This option would extend the approach identified for Option 1A to a wider area, with the potential for landscape scale change in Loch Ard Forest. The woodland ‘spine’ along the route of the overhead line would be extended out along the Duchray Water and some of its tributaries, and along key recreational routes. This would allow for further connections to existing areas of broadleaved woodland.

It is anticipated that this option will have similar visual benefits to Option 1A, i.e. potential for screening of the line and reduction of the prominence of the existing linear wayleave. Landscape benefits would extend to the wider Loch Ard Forest, with further opportunities for connecting existing areas of woodland via new and enhanced wildlife corridors.

The opposite plan shows a typical section of the line; it presents a principle which could be applied to the Loch Ard forest as a whole, rather than a detailed design for a specific section of the line. The felling line would likely follow existing compartment boundaries or tracks, to avoid windthrow as a result of removing part of a compartment. New planting would likely follow contours or other natural features; this would be identified following more detailed site appraisal and consultation with Forestry Commission Scotland. Species selection and method of establishment would be dependent upon site conditions.

Option 2A - Paths (circular loop)

4.5

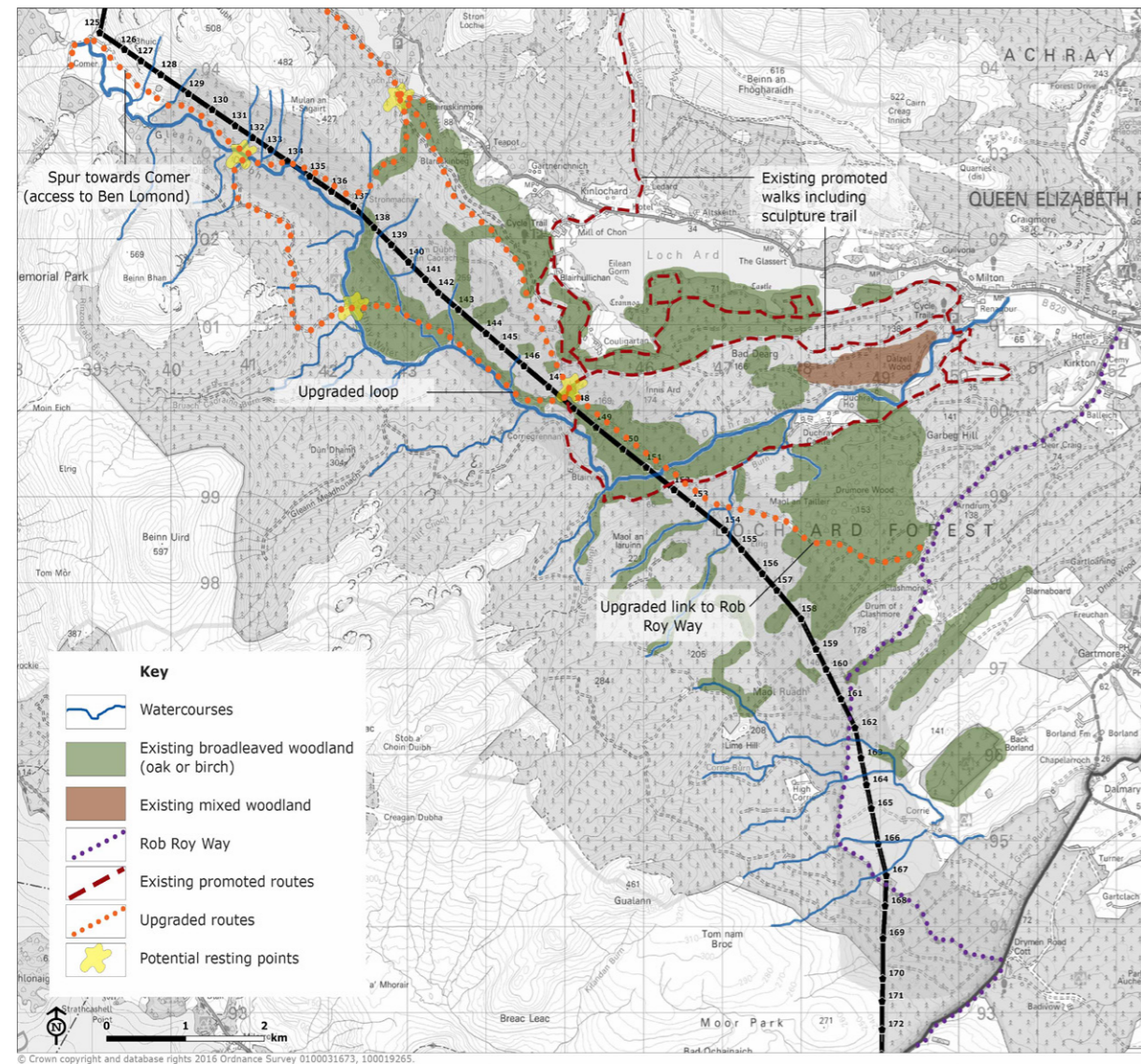
This option focuses on the creation and promotion of a circular route through the forestry, with connections to Loch Katrine, the Rob Roy Way and possibly to Comer, a starting point for walks into the hills to the south-west, including Ben Lomond. A new network of paths would also connect to existing trails on the south side of Loch Ard, including the sculpture trail. Existing forest tracks could be upgraded to provide an accessible surface for walkers, cyclists and horse riders. The route would require improvements to way marking and there would be an opportunity to create resting / picnic area at key viewpoints (indicative locations are shown on the plan). New planting at strategic locations would be undertaken in tandem, to screen views of the line and frame views to key landscape features (e.g. views towards Ben Lomond).

It is anticipated that this option would bring more people into underused parts of the forest. Improvements to planting around key stopping points would help to screen the line and direct views away from it.

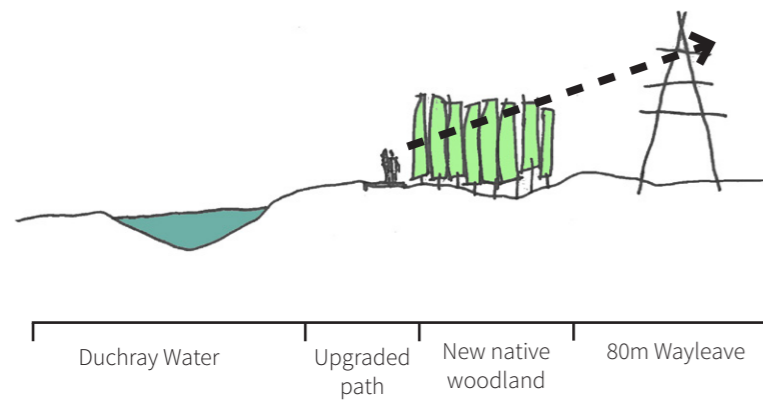
The following plan shows a potential route for the circular loop; the exact route would be identified following further site appraisal and consultation with landowners and other stakeholders.

Option 2A

Plan



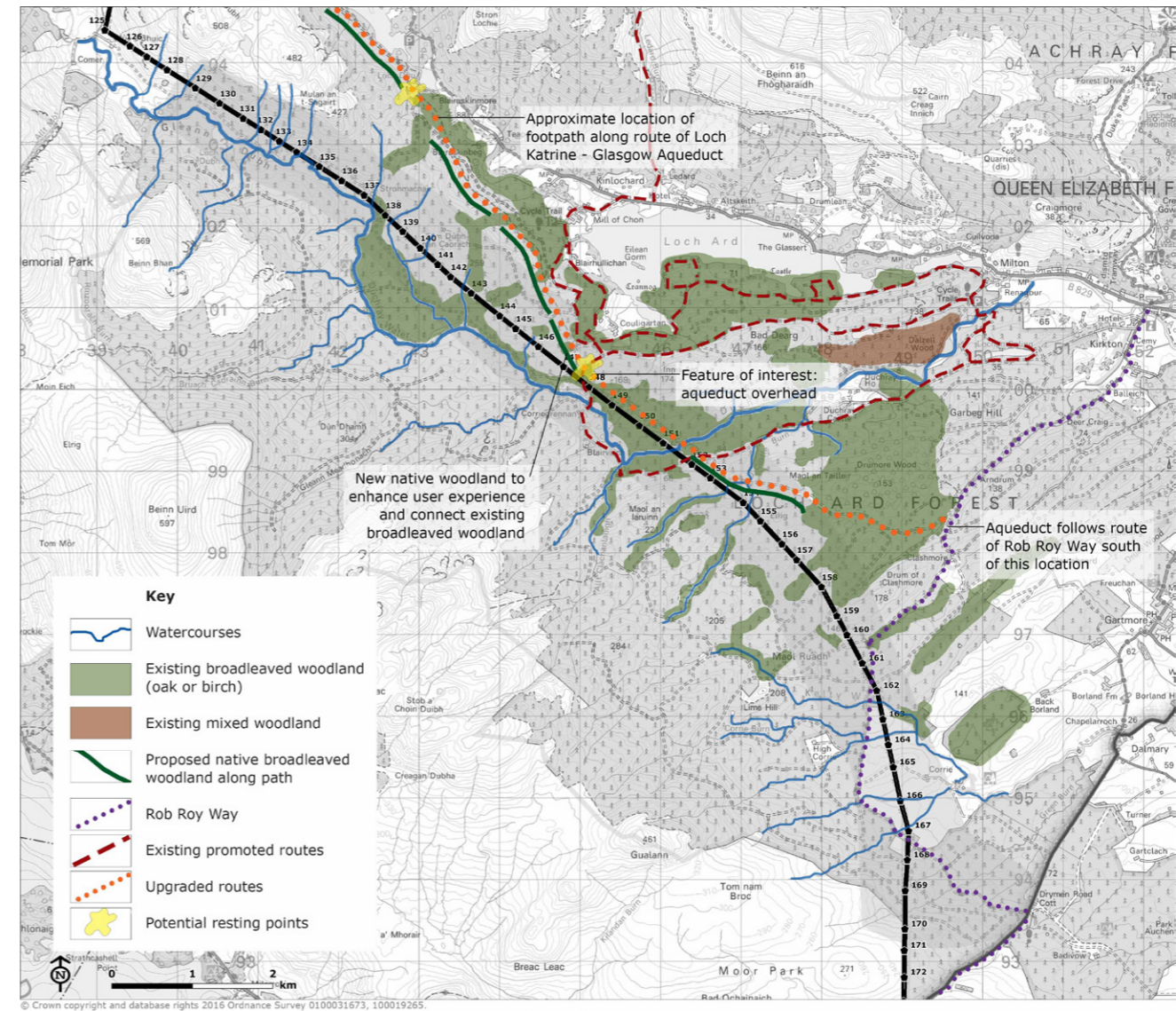
Section



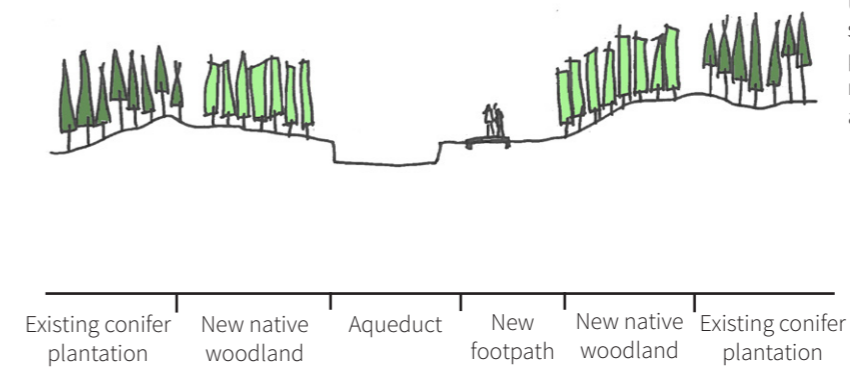
Indicative section through the path showing suggested path treatment, new planting and framed views to key landscape features.

Option 2B

Plan



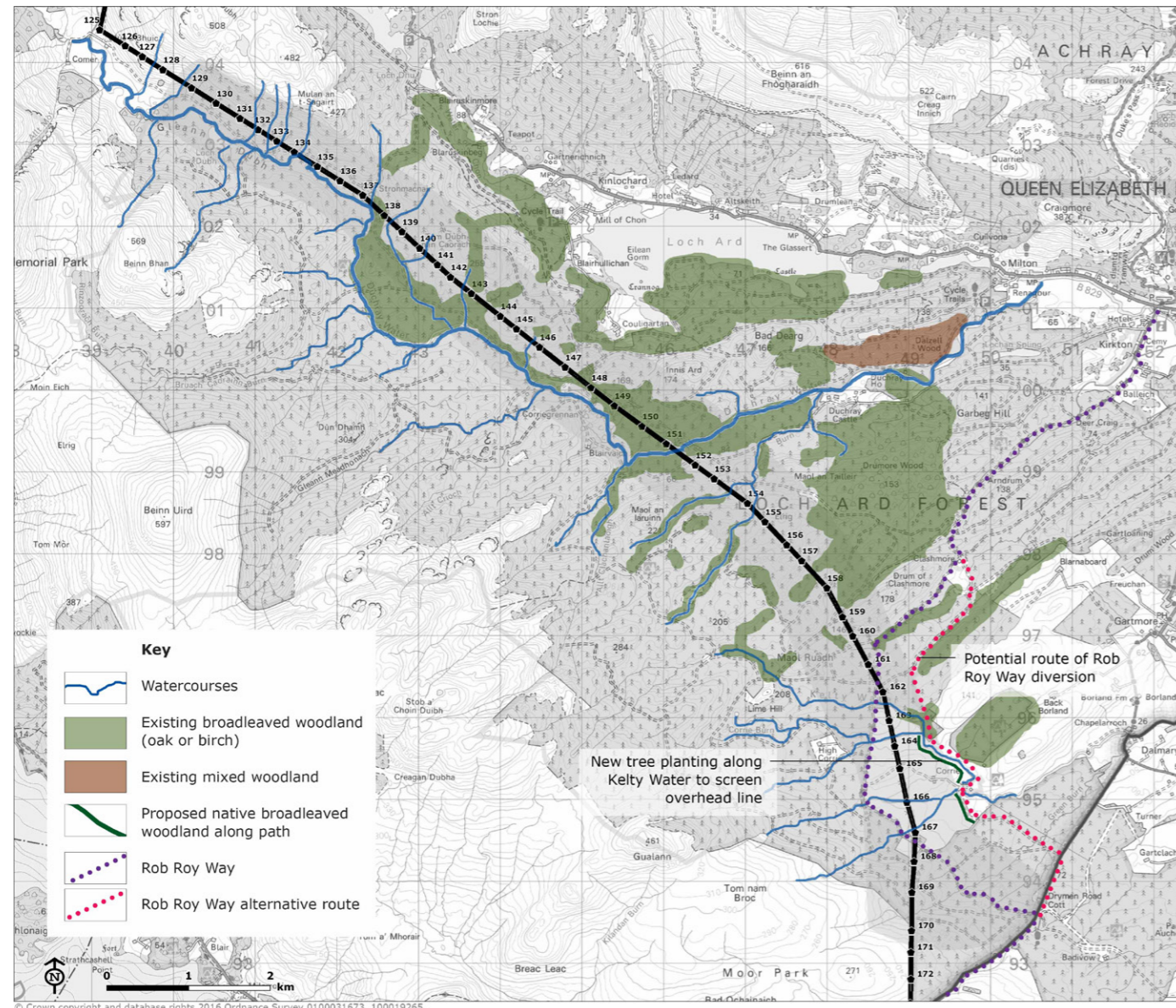
Section



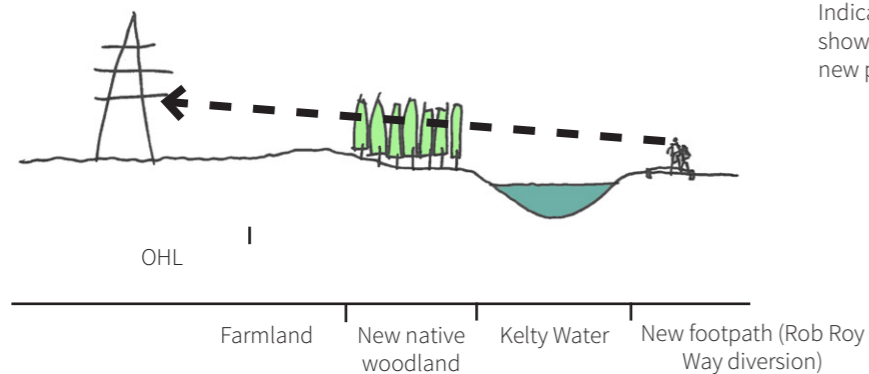
Indicative section through the path showing suggested path treatment, new planting and aqueduct.

Option 2C

Plan



Section



Indicative section through the path showing suggested path treatment and new planting.

Option 2B - Paths (aqueduct trail)

4.6

This option focuses on creating a new path along the route of the 19th century Loch Katrine – Glasgow aqueduct route, accessible to walkers, cyclists and horse riders. This would connect paths around Loch Katrine and Loch Ard with the Rob Roy Way. There would be an opportunity for native woodland planting to enhance the route, as well as the interpretation of historic/industrial heritage features along the route.

This option would not directly mitigate the visual impacts of the line but would improve recreational opportunities in Loch Ard Forest which was identified as a priority of stakeholders during consultation.

The opposite plan shows the proposed route for the new path along the aqueduct; the exact route would be identified following further site appraisal and consultation with landowners and other stakeholders.

Option 2C - Paths (re-routing of the Rob Roy Way)

4.7

This option focuses on re-routing the Rob Roy Way for a short section, to take it away from the overhead line. This would be undertaken in tandem with forest restructuring, to screen views of the line and enhance user experience.

This option would reduce visibility of the overhead line from a well-used path.

The adjacent plan shows an alternative route for the Rob Roy Way; the exact route would be identified following further site appraisal.

4 Concept Development/ Optioneering

Options Analysis

- 4.8 **Option 1A - Forest Restructuring (wayleave only)**
- Strengths**
- Provides screening of the line in views from forest tracks;
 - Reduces prominence of wayleave in views from surrounding hills;
 - Ecosystem services' benefits e.g. enhanced soil water retention / catchment management, improved wildlife corridors.
- Weaknesses**
- Reduction in areas of commercial forestry plantation;
 - Operational requirements may restrict felling locations;
 - Long timescales for new design strategy (as current Land Management Plan runs to 2026);
 - Long timescales for establishment of native woodland;
 - Costs associated with felling, replanting and protection of trees from grazing.
- Opportunities**
- Collaboration with the Strathard Project;
 - Habitat enhancement - creation of a mosaic of woodland and open spaces;
 - Framing of views towards key landscape features.
- Constraints**
- Tree diseases such as Chalara (Ash dieback);
 - Windthrow resulting from partial felling of compartments;
 - Unknown long-term effects of climate change.

- 4.9 **Option 1B - Forest Restructuring (wayleave, water courses and key routes)**
- Strengths**
- Provides screening of the line in views from forest tracks;
 - Reduces prominence of wayleave in views from surrounding hills;
 - Ecosystem services' benefits e.g. enhanced soil water retention / catchment management, improved wildlife corridors.
- Weaknesses**
- Reduction in areas of commercial forestry plantation – more land take required compared with Option 1A;
 - Operational requirements may restrict felling locations;
 - Long timescales for new design strategy (as current Land Management Plan runs to 2026);
 - Long timescales for establishment of native woodland;
 - Costs associated with felling, replanting and protection of trees from grazing - more costly than Option 1A due to larger areas of replanting required.
- Opportunities**
- Collaboration with the Strathard Project;
 - Habitat enhancement - creation of a mosaic of woodland and open spaces;
 - Framing of views towards key landscape features.
- Constraints**
- Tree diseases such as Chalara (Ash dieback);
 - Windthrow resulting from partial felling of compartments;
 - Unknown long-term effects of climate change.

- 4.10 **Option 2A - Paths (circular loop)**
- Strengths**
- Utilises existing forest tracks – limited land take required;
 - Provides connections to existing promoted routes such as the Rob Roy Way and sculpture trail around Loch Ard.
- Weaknesses**
- Costs associated with upgrading, way marking and creation of resting points;
 - Line potentially visible to greater numbers of people until new planting establishes.
- Opportunities**
- Creation of resting points / picnic areas at key viewpoints;
 - Promotion of the route e.g. in tourist literature;
 - Tie in with the Paths in the Park project.
- Constraints**
- Erosion of forestry and water board tracks through recreational use.

- 4.11 **Option 2B - Paths (aqueduct trail)**
- Strengths**
- Connection of paths around Loch Katrine to the Rob Roy Way and Loch Ard;
 - Spine of native woodland to connect existing areas of ancient and semi-natural woodland.
- Weaknesses**
- Does not directly mitigate visual effects of the line;
 - Potential loss of existing trees to accommodate construction of new path;
 - Feasibility of restoring the aqueduct would need to be investigated.
- Opportunities**
- Potential for historic interpretation;
 - Native woodland to enhance user experience.
- Constraints**
- Erosion of forestry and water board tracks through recreational use.
- 4.12 **Option 2C - Paths (re-routeing of the Rob Roy Way)**
- Strengths**
- Reduced visibility of the line from a well-used route;
 - Native woodland fringe to soften the edge of the plantation.
- Weaknesses**
- Potential landscape and visual effects associated with re-routeing the path;
 - Only benefits a short section of the route.
- Opportunities**
- Native woodland to enhance experience of route.

5 Outline Proposals

General

5.1

The outline proposals have been developed based on Option 1B from the optioneering process set out within the accompanying workbook. The proposals take into consideration the landscape and visual factors, and building upon the fundamental elements and guiding principles and concept design with a primary focus on the mitigation of the visual effects of the line but also the opportunities to tie in with ongoing projects in the Loch Ard Forest area, including the Strathard: a landscape to live, work and play project.

The proposal seeks to create enhanced routes through Loch Ard, which provide upgraded access and new routes along sections with reduced visibility of the transmission lines for users of East Loch Ard Forest and the Rob Roy Way. Therefore, the proposal develops upon the concepts explored in options 2A, 2B and 2C presented during the optioneering stage.

The outline design proposes the following mitigation measures for reducing visual impact of the lines on users of the East Loch Ard Forest:

- Felling and/or restructuring of non-native coniferous woodland and establishment of native broadleaf and mixed woodland along the route of the transmission line, Duchray Water and aqueduct;
- Improvements to surfacing and signage along existing forest tracks to promote a new loop with connections to the Rob Roy Way and Loch Katrine;
- Creation of a new promoted recreational route along the course of the 19th Century aqueduct; and
- Diversion of the Rob Roy Way combined with new planting to screen and filter views of the transmission line.

Key Benefits

5.2

- Provides screening of the transmission line in views from forest tracks;
- Reduces prominence of wayleave in views from surrounding hills (e.g. Ben Lomond);
- Ecosystem services' benefits e.g. enhanced soil quality Improved water retention / catchment management, improved wildlife corridors and habitat enhancement – through creation of a mosaic of woodland and open spaces;
- Opportunities to complement existing initiatives and projects (e.g. Strathard Ecosystems Services Project);
- Enhanced recreation provision within an underused area of the Loch Ard Forest (e.g. walking routes, maintain biking trails); and
- Potential framing of views towards key landscape features and away from the transmission line in key areas.

Key Challenges

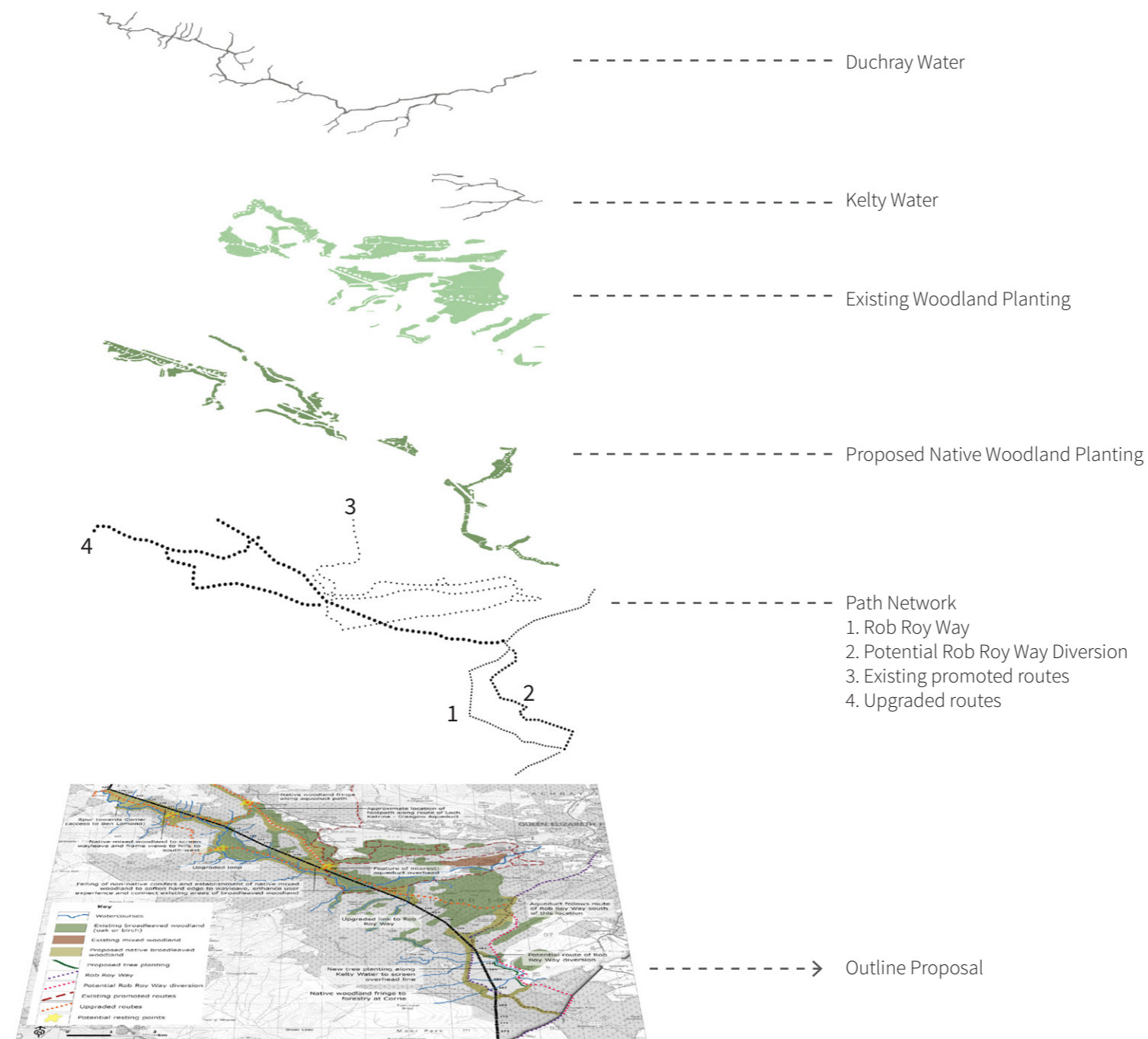
5.3

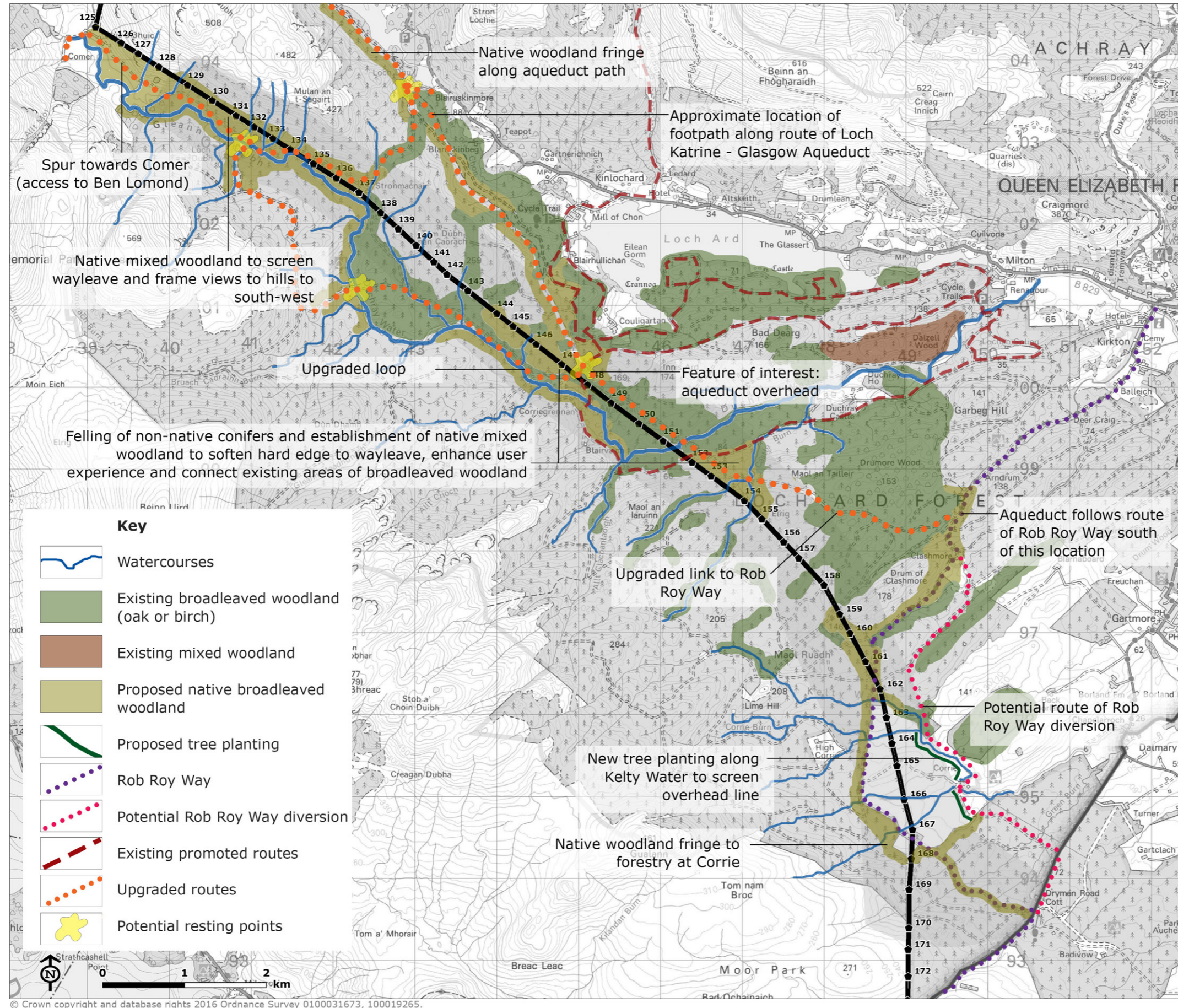
- Reduction in areas of commercial forestry plantation – relatively large and long-term land take required;
- Operational requirements may restrict felling locations;
- Long-term timescale for new design strategy (current Land Management Plan runs to 2026);
- Long timescales for establishment of native woodland, and mitigation of existing visual impacts associated with linear wayleave;
- Wind throw resulting from potential partial felling of compartments, leading to need for potentially larger land take; and
- Costs associated with felling, replanting and protection of trees from grazing – costly due to large areas of replanting required.

5.4

The introduction of extensive mixed and broadleaf native woodland will be implemented in line the Biodiversity Action Plan for the National Park (Wild Park 2020) which notes that expanding and restoring native woodland is one of the major goals for Forestry Commission land in the National Park. Appropriate woodland mixes of native species of trees and lower growing vegetation will be developed sympathetically, with reference to the geographical location, elevation, topography, soil type, hydrology and biodiversity of the specific area. Within the extensive area of the Loch Ard Forest the following woodland mixes are proposed, subject to more detailed survey and understanding of the areas to be planted:

F5.1 Proposal Component Diagram





6 Realisation Requirements

Implementation

6.1

The following is a brief summary of the key tasks that would be required to implement a project of the nature described. Reference has been made to current Forestry Commission guidance, including **‘Design techniques for forest management planning’** (2014);

- **Screening** - EIA ‘unlikely’ to be required;
- **Scoping and consultation (if EIA required)** – identify key user groups, legal and good practice requirements, requirements for EIA/ discussion with local authority, setting of management objectives;
- **Survey** – detailed site survey (e.g. legal, physical, biodiversity, historic environment, recreation, landscape, forest protection, timber production, red deer management, people, natural regeneration potential, species selection);
- **Analysis** – identify site constraints and opportunities, landscape character and landform analysis, potential NVC woodland types, historic environment;
- **Synthesis** – development of a design concept, followed by sketch designs then detailed designs for felling, new woodland areas, open spaces and paths;
- **Implementation** – felling, ground preparation, establishment of new planting (through natural regeneration, seeding or planting), path construction; and
- **Monitoring and review** – against management objectives, making changes if necessary.

It is anticipated that the works described above could be undertaken in a 5-10 year period.

Management and Maintenance

6.2

Detailed site survey will help to establish the maintenance requirements of the site. The following elements are likely to be a key consideration:

- Fencing of new areas of native woodland to protect from grazing;
- Management of regeneration of non-natives; and
- Maintenance of path surfacing, signage / way markers, resting areas.

Benefits to Landowners

6.3

The large scale conversion of non-native conifer woodland back to native woodland has been a Forestry Commission policy aim for many years. Some of the benefits (and drawbacks) are outlined below; these are summarised from the Forestry Commission Research Note **‘Converting planted non-native conifer to native woodlands: a review of the benefits, drawbacks and experience in Britain’** (August 2016):

- Broadleaved woodland allows more light to penetrate the forest floor, resulting in warmer soils and faster rates of nutrient cycling;
- More light to the forest floor can also improve the growth of ground vegetation (although these species can require higher levels of nutrients and soil water);
- More abundant shrub and herb layers are likely to increase nesting opportunities for woodland birds and favour insectivorous bats (although conifer plantations with a closed canopy are better for red squirrels);
- Species abundance and diversity can increase substantially, depending on site conditions;
- Public perception favours variations in tree height and space, rather than ‘unnatural’ symmetrical edges and low light penetration;
- Native woodlands provide a better habitat for natural enemies of insect pests;
- Diversification of timber can respond to new markets and extend economic opportunities;
- Opportunity to establish species which are better suited to site conditions (now and in the future) and more resilient to fire, pests and diseases.

6.4

In addition to the above, improvements to existing forest tracks may provide the following benefits. These are summarised from the SNH document **‘Constructed tracks in the Scottish Uplands’** (2013, updated 2015):

- Opportunity to reverse damage to natural heritage from poorly constructed or inadequately maintained tracks (eg drainage/ erosion, instability, landslips);
- Increased opportunities for recreation, likely to attract more visitors; and
- Easier access across estate.

Planting and Materials Indicative Costings

Costs of Creating and Managing Woodland

6.4

Forestry Commission Scotland provide extensive guidance and information about the creation, implementation and management of woodland, including the relative costs. The costs of creating and managing woodland varies, depending on the size of the proposed scheme, trees planted, and the purpose of woodland.

Factors to consider:

- Future access;
- Deer and rabbits;
- Environmental impact;
- Creation costs;
- Maintenance costs;
- Potential requirement for an Environmental Impact Assessment (EIA) for larger schemes;
- The character and views of the site will look like in the short-term and long-term; and
- Tree planting is usually carried out between October and March, avoiding frost and snow.

Things to consider when considering the cost of new woodland:

- Design costs: e.g. consultancy fees;
- Machinery costs;
- Site/ground preparation: ripping or mounding, establishment of low vigour grassy turf;
- Planting costs;
- Cost of material (seedlings etc.): trees from nurseries;
- Tree protection: spiral shelter, tube and stake and tie;
- Fencing: post and wire, post and rail, rabbit proof, deer proof;
- Labour; and
- Maintenance and upkeep: e.g. weed-free areas around the trees, replacements for failed trees, deer and rabbit control.



Planting

ITEM	QUANTITY	UNIT	RATE	COST
Tree planting (including shelter)	9155096	m ²	£3.50	£32,042,836
			Total	£32,042,836



Materials

ITEM	QUANTITY	UNIT	RATE	COST
Deer and Stock fencing	60745	lin/m	£20.75	£1,260,459
Footpath	5975	lin/m	£30.00	£179,250
Footbridge	8	lin/m	£1500.00	£12,000
Stiles	20	each	£125.00	£2,500
Waymarker post	10	each	£30.00	£300
Fingerpost	8	each	£60.00	£480
Interpretation board	4	each	£1200.00	£4,800

			Total	£1,459,789
Total Outline Project Cost				£33,502,625