Scottish & Southern Electricity Networks

TRANSMISSION

Dunoon to Loch Long 132 kV OHL Rebuild

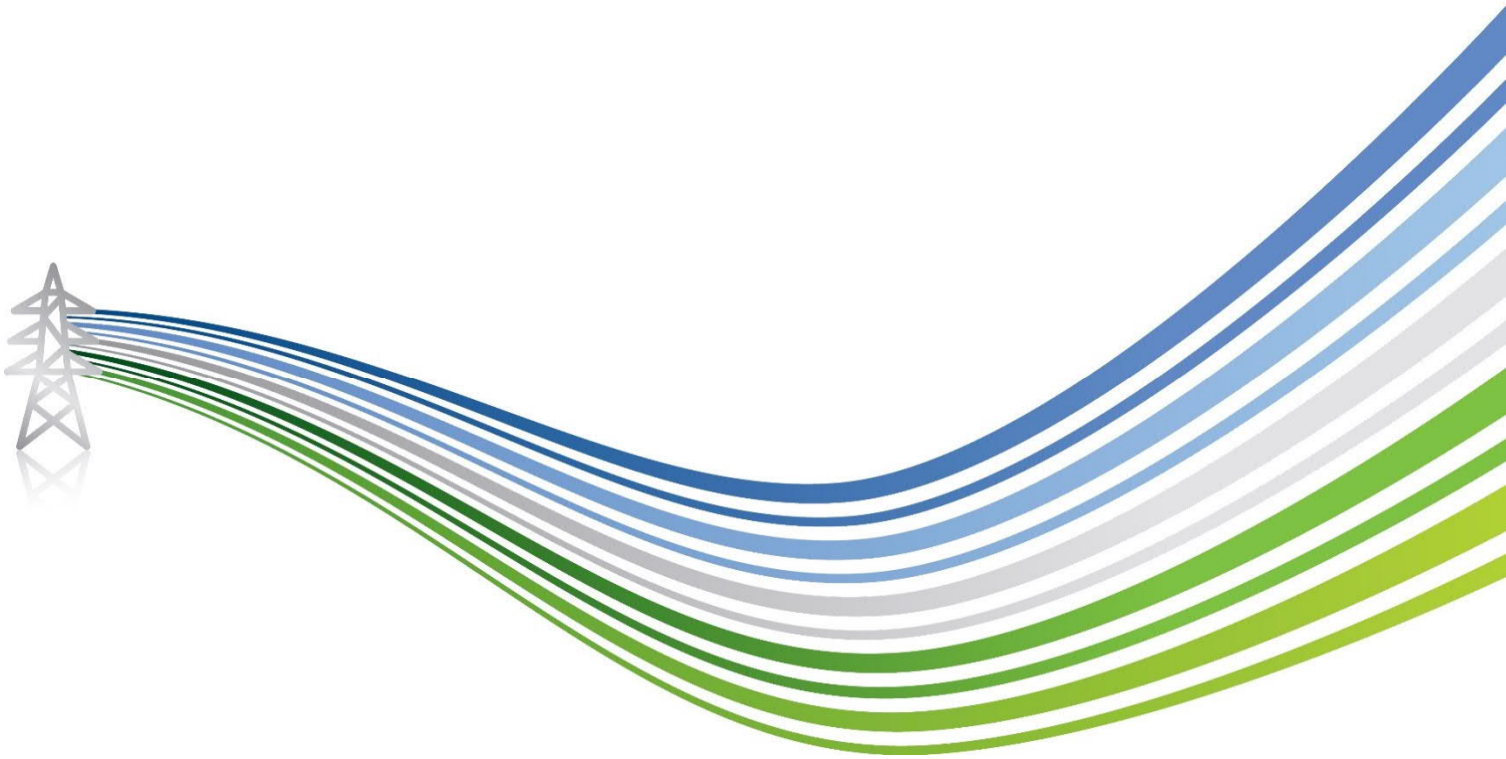
Environmental Impact Assessment Report

Volume 4 | Technical Appendix

Appendix 12.1 - Overhead Line (OHL) Woodland Report

Section 1: Forest and Land Scotland (The Knap, Glenfinart Forest)

Towers 1 to 18



Scottish & Southern Electricity Networks
TRANSMISSION

Contents:

1 Introduction

This Technical Appendix (TA) presents information relevant to the Dunoon to Loch Long 132 kV Overhead Line (OHL) Rebuild (hereafter referred to as the 'Proposed Development'), which is being constructed to replace an existing 132 kV OHL between the same points ("the Existing Line"). It should be read in conjunction with **Chapter 3: Description of the Proposed Development** and **Chapter 12: Forestry** of the Environmental Impact Assessment (EIA) Report. The location and layout of the Proposed Development are shown in **Figure 1.1 Site Location** and **Figure 3.1 Site Layout** of the EIA Report.

2 Purpose of this Woodland Report

As part of the EIA process, it was identified that the OHL construction and the access tracks required to construct the Proposed Development would cross a number of woodland areas within private or public sector landholdings. The landholding property boundaries are identified in **Figure 12.1.1 Forestry Project Felling Map**.

This document provides a conceptual assessment of the woodland areas that are affected by the Proposed Development, including the requirement of woodland removal and management recommendations to mitigate the impact of the woodland removal.

Field surveys of the woodland areas have been undertaken and have been used to determine the various woodland characteristics in order to identify the woodland removal required and recommended. This document also sets out the area quantity in hectares (ha) to be compensatory planted to ensure no net loss of woodland is achieved.

3 Woodland Property

This section (known for the purposes of the forestry assessment as Section 1) of the Proposed Development comprises a substantial area of commercial conifer woodland owned by Forest and Land Scotland (FLS), extending south from the Loch Long crossing point through The Knap, part of the wider Glenfinart Forest area, as far as the Clunie Burn. From here, it joins the FLS managed Stronvochlan Wood section near Ardentinny which is the subject of assessment in the woodland report for **Section 2**.

The area is located approximately 22 kilometres north of Dunoon. The woodlands at The Knap, Glenfinart Forest form part of an extensive complex of commercial forestry within the Argyll Forest Park extending south along the shores of Loch Long, merging with Benmore Forest near Kilmun by Holy Loch and stretching north-west along Glen Finart to Loch Eck.

The Knap is serviced by existing forest road infrastructure accessible from the minor public road at Ardentinny village. The main vehicle access point for construction and forest management purposes is located at national grid reference 'NS 184 881'.

4 Development Requirements

4.1 132kV Overhead Line

With reference to **Figure 12.1.1 Forestry Project Felling Map**, the section of OHL relevant to this report encompasses proposed Towers 1 to 18 within The Knap area of Glenfinart Forest. Towers Ex. 14 and Ex.15 do not form part of the EIA.

The proposed OHL standard tower dimensions for the project have a width of 10 m cross-arm to cross-arm, i.e. from outside conductor to outside conductor. In addition to this, the safety Vicinity Zone from each conductor is a 3.5 m radius around the conductor.

The OHL infrastructure and minimum safety clearance distance is therefore 17 m (8.5 m either side of the OHL centreline) and this has been utilised to calculate the area of the operational corridor occupied by

infrastructure. In some cases, such as angle towers the requirement may be slightly in excess of this distance, however the average minimum distance has been used in this assessment.

The study area for this assessment is based around the Operational Corridor (OC). The Applicant defines the area in which it has rights to remove woodland for the purposes of creation of OHLs, resilience and maintenance of OHLs, or protection of electrical plant as required by the Electricity Safety, Quality and Continuity Regulations (ESQCR)(2002) and The Electricity Act 1989. The OC is defined with reference to the distance at which a tree could fall and cause damage to the overhead line, resulting in a supply outage[1]. As a result, the final corridor width would be based on the safety distance required to allow for a mature tree falling towards the OHL at the mid-point on an OHL span between two towers, taking account of topography and tree height at maturity. Where the OC passes through areas of native woodland, it is noted that the width of woodland removal is likely to be reduced due to the lower height of the tree species present. The proposed OC illustrated in **Figure 12.1.1 Forestry Project Felling Map** has been based on the likely height of the woodland at maturity and therefore, varies in width according to the woodland type present.

The future restructuring plans for the forestry property has been partially reviewed with reference to scheduled felling coupes. However, FLS's Forest Landscape Design Plan, approved in late 2022, was not available to review at the time of writing.

The OC width that has been assessed and identified for the safe build and energisation of the new OHL through the areas of commercial conifer woodland is 81 m (40.5 m either side of the OHL centreline).

The OC width that has been assessed and identified for the safe build and energisation of the new OHL through the areas of native broadleaved woodland is 60 m (30 m either side of the OHL centreline). This has been assessed as a maximum OC width required at these woodland locations, with the potential of further narrowing of the OC prior to construction to allow greater tree retention.

4.2 Access Track Route Design

Situated within the wider commercial conifer forest of Glenfinart, The Knap is serviced from the minor public road between Ardentinny and Loch Eck by a network of hard metalled forest roads that are regularly used for timber haulage. These forest roads will form part of the main vehicle access route for the Proposed Development including associated forestry works **Figure 12.1.1 Forestry Project Felling Maps** and will be subject to maintenance and upgrade works as part of the construction work scope.

General access track tree maintenance work may be required along the existing forest road in preparation for the civil engineering access track upgrade works.

Access tracks to individual tower sites will be confined to the OHL operational corridor were possible. However, in areas where the nature of the terrain or ground conditions dictate the requirement to build new access track routes that falls outside the OC, the width required to be cleared is 20m wide (10m either side of centreline) **Figure 12.1.1 Forestry Project Felling Maps**, thus increasing the impact of woodland removal in that area.

Stump removal and mulching of young trees and forest residue will be required for the installation of new access tracks and at each tower location for the formation of a construction compound and temporary crane pad.

[1] As specified by the 'Red Zone' set out in paragraph 41 of the Forest Industry Safety Accord. (2020) Safety Guide 804 Electricity at Work: Forestry. [pdf] Available at: FISA 804 (ukfisa.com)

5 Woodland Characteristics

Rising steeply from the banks of Loch Long, The Knap and wider forest are managed by FLS primarily as commercial conifer plantations. However, the forest estate is a valuable tourist destination within the Argyll Forest Park and promoted as such by FLS with a carpark at Ardentinny Beach, waymarked walking trails and numerous mountain biking opportunities in the surrounding forest. The carpark and waymarked trails are well removed from the immediate area of the Proposed Development.

Much of the current tree cover at The Knap dates from the 1980's and 1990's with older elements from the 1950's and earlier. Woodland management is carried out through a regime of clear felling and replanting, the dominant commercial conifer species being Sitka spruce *Picea sitchensis* with other species including Scots pine *Pinus sylvestris*, Douglas fir *Pseudotsuga menziesai*, Norway spruce *Picea abies*, larch *Larix ssp* and western hemlock *Tsuga heterphylla*. Thinning is not usually undertaken due to windthrow risk.

The wider Glenfinart Forest contains significant elements of native broadleaved woodland including oak *Quercus ssp* and birch *Betula ssp*, some mature and some planted or regenerated over the last few decades.

Long-term forest management must routinely contend with the challenges of *Phytophthora ramorum,* a highly infectious tree disease that mainly affects larches, and the spread of invasive non-native species within the forest, specifically *Rhododendron ponticum* and western hemlock, both of which regenerate freely in the warm, wet climate.

The Knap and wider FLS owned Glenfinart Forest is impacted by numerous Statutory Plant Health Notices (SPHN) intended to control the spread of *Phytophthora ramorum*. Felling permission for such areas are secured by FLS through the recently approved Forest Landscape Design Plan or by formal amendments to this and previous plans. Due to the sheer number of sites affected by SPHN's regionally, the key operational issue associated with the clearance of these sites is availability of suitable harvesting contractors equipped to work the steep slopes typical of the region.

The Proposed Development crosses the extremely steep and frequently rocky slopes above Loch Long, coinciding mainly with mineral gleys with localised areas of peaty podzols and brown earths.[2]

A desk based study of the woodland areas was conducted utilising open source data from NatureScot's Ancient Woodland Inventory (AWI) and Scottish Forestry's Native Woodland Survey of Scotland (NWSS), to identify native woodland and environmental classifications.

Nature Scot's AWI revealed an area of Ancient Woodland (of semi-natural origin) within the operational corridor between Towers 1 and 2, part of an extensive area extensive area extending down the shoreline of Loch Long. Small fragments also exists between Towers 5-7 and 17-18.

The Scottish Forestry NWSS classifies native woodland types in four categories, native woodland, nearly-native woodland, open land habitat and Plantations on Ancient Woodland Sites (PAWS). In this case, the NWSS identifies fragments of PAWS reflecting the areas of AWI detailed above. Small areas of native woodland are recorded between Towers 1-2, 18-19 and at Tower 5.

In total, there are 0.52ha of Ancient Woodland to be removed within the OC, comprising 0.26ha of Ancient Woodland (of semi-natural origin) and 0.36ha of Other 'Roy' woodland. The total area of PAWS (ancient woodland sites containing exotic commercial conifers) is 3.42ha.

The operational corridor has been reduced to a width of 60m for broadleaved woodland to increase opportunities for retention.

[2] Scottish Government Scotland's Soil website https://map.environment.gov.scot/Soil_maps

5.1 The Knap, Glenfinart Forest

This report focuses on the section of the Proposed Development from Towers 1 to 18.

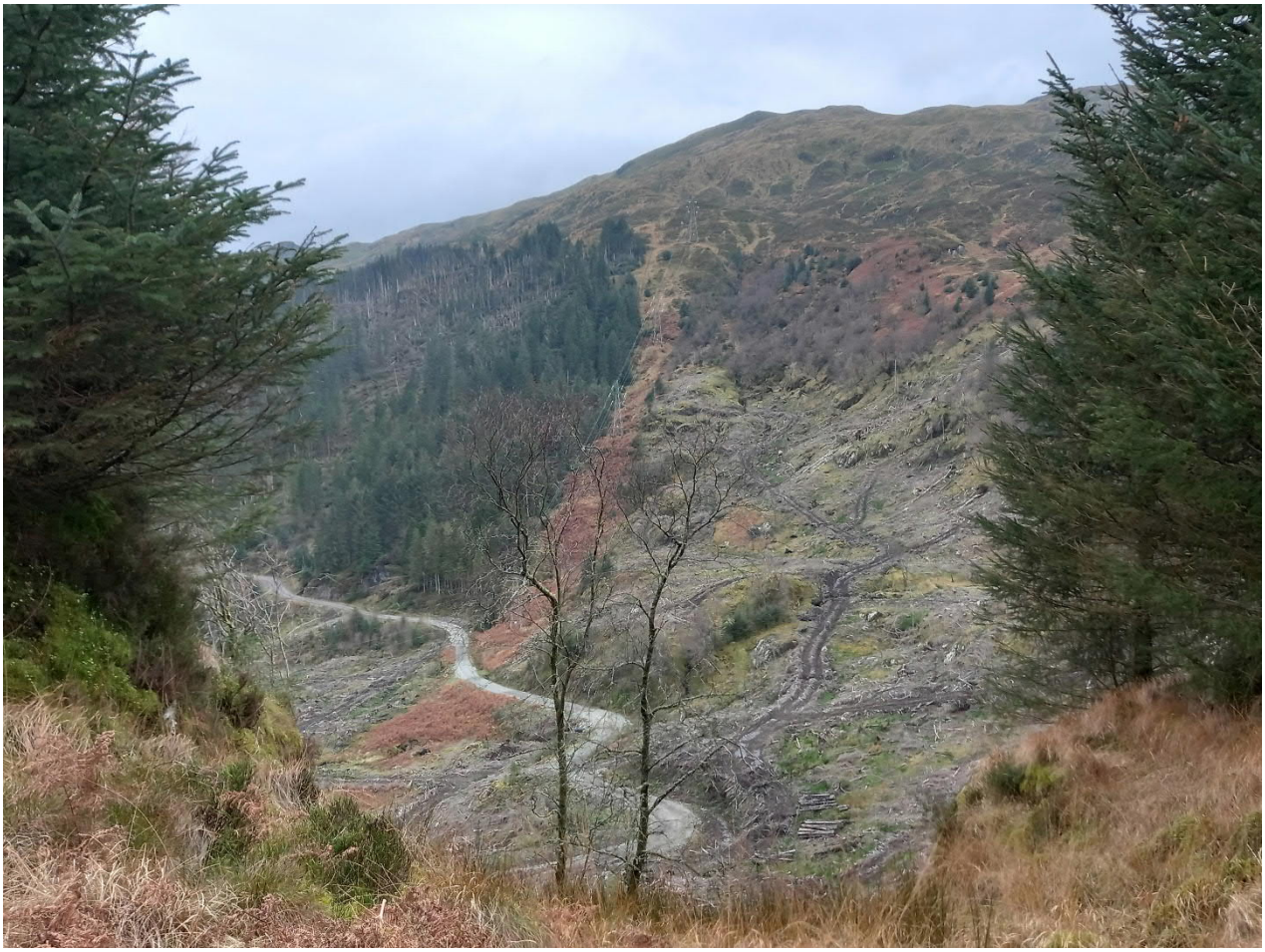


Plate 1 – Looking west from Tower 3 to Towers 4 and 5.

The area between proposed Towers 1 and 2 is occupied by a young crop of mixed conifer including Sitka spruce, western hemlock and larch in addition to open ground and a small area of young birch. The conifer crop was planted in 2004 and is poorly grown with an estimated yield class of 4.

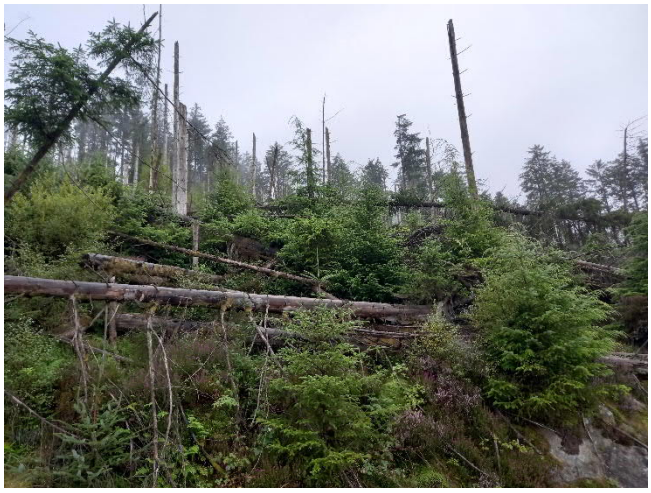


Plate 2 – Windblow looking towards Tower 6.

The section from just east of Tower 2 to west of Tower 3 contains mixed conifer regeneration approximately 10 to 15 years old. The stocking is variable and long-term timber quality is likely to be poor, with late of absent canopy closure likely to result in excessive branching and poor form.

Between Towers 3 and 5, the Proposed Development passes through a recently felled area and crosses the route of the existing OHL mid-way between Towers 4 and 5. There is a small clump of scrubby birch near Tower 4 next to the track.

The operational corridor then crosses an extensive area of windblown Sitka and Norway spruce between Towers 5 and 7. Planted in 1950, this area blew down over 5 years ago and has not been harvested due to the operational constraints and expense of working on such steep and uneven terrain. Some small groups and individual trees remain standing, many with broken tops. The majority of the crop, however, is on the ground and has little or no commercial value due to rot.

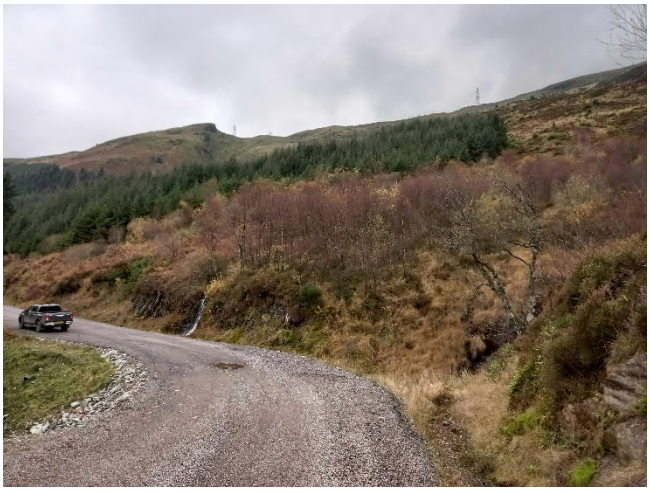


Plate 3 – Broadleaves between Tower 8 and Tower 9 with p95 Sitka spruce beyond.

Plate 4 – From Tower 11 looking towards Tower 8 in the distance and mid-rotation crops of Sitka spruce.

From Tower 7 to mid-way between Towers 8 and 9, the Proposed Development crosses an area of Sitka spruce planted in 1998 with a yield class of 10. This relatively slow growing crop is less than half way through its commercial rotation with an estimated volume of 85m^3 per hectare. Due the small diameter of the trees, this area largely contains low value timber product categories suitable for the pulp and chip markets.

From here, the route crosses an unproductive area of open ground with scattered conifers before crossing a mid-rotation crop of Sitka spruce planted in 1995 between Towers 9 and 12. This crop has not been measured but has an estimated yield class 12 to 14 with a standing volume of between 165m^3 and 210m^3 per hectare (Forest Research Forest Yield Models, 2016). Parts of this area have not established well resulting in variable stocking. This volume estimate is therefore likely to overstate the standing volume present across the across block. The relatively small average tree diameter limits the timber product categories to lower value small round wood, fencing and pallet logs with little or no sawlogs material present.

From here, the route passes through a crop planted in 1993 comprising a small area of native broadleaves just to the north of Towers 12 and Sitka spruce between Towers 12 and 14. Approximately half of this area is a well-established yield class 20 crop containing good quality marketable timber with a measured standing volume of 389m^3 per hectares. The central section is less productive at yield class 14 with an estimated volume of 240m3 per hectare.

Between Towers 14 and 15, the northern half of the OC crosses an area of unproductive open ground with scattered conifers and in the southern half impacts on a mature crop of Sitka spruce with occasional western hemlock. This area was planted in 1988 and is moderately well grown with a yield class of 14 and estimated standing volume of 307m^3 per hectare.

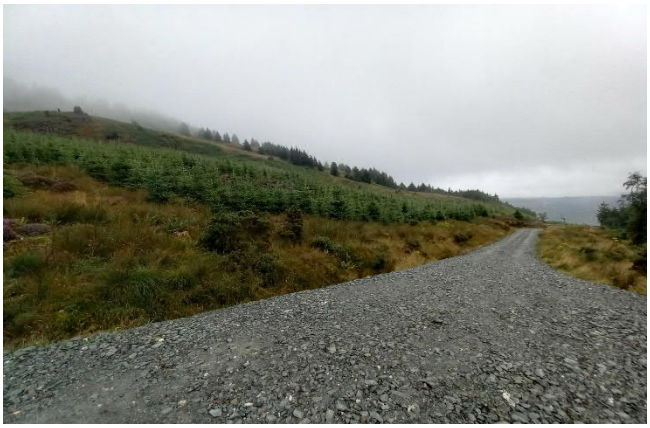


Plate 5 – Young crop of P15 Sitka spruce with area of scattered, unproductive conifers in background. Looking south-east towards Tower 15.

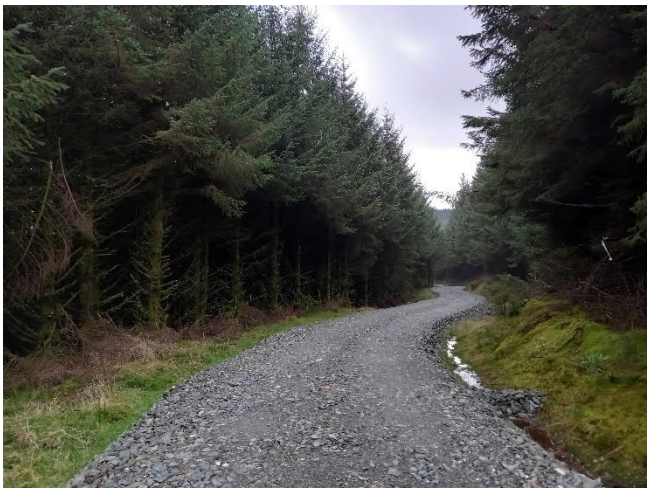


Plate 6 – Mature spruce crops near Tower 18

From Tower 15 to mid-way between Towers 16 and 17, the route crosses an area of young Sitka spruce planted in 2015 with an estimated yield class of 16. This crop is variable with poor stocking and patches of unplanted ground evident throughout.

Between Towers 16 and 17, the route crosses the forest road and enters an area of mature conifer planted in 1988 containing Sitka spruce, western hemlock and Japanese larch. This crop varies widely in quality and growth rate with a substantial element achieving yield class 18 (estimated standing volume of 470m3 per hectare) and others between yield class 8 and 10 (estimated standing volume 150m^3 to 200m^3 per hectare). The aggregated standing volume for the whole section is an estimated 312m^3 per hectare.

Just west of Tower 18, the Proposed Development leaves the mature conifer crop and impacts an area of mature birch next to the Clunie Burn. This timber has nominal value as firewood logs.

6 Windthrow Risk Impact

The Proposed Development crosses the extremely steep and frequently rocky slopes above Loch Long, coinciding mainly with mineral gleys with localised areas of peaty podzols and brown earths. The mature woodland sites affected by the Proposed Development are classified as moderately exposed in terms of wind hazard. The local climate is for the most part classified as warm and moist.

These factors suggest site conditions with limited flexibility for the management and growth of tree crops. The management felling identified in Figure **12.1.1 Forestry Project Felling Map** has been proposed to achieve suitable wind-firm boundaries and pragmatic forest management outcomes.

Therefore, increased windthrow risk is unlikely to result from removal of mature conifers within the OC. Additionally, the impact of wind-throw on native broadleaves is likely to be minimal due to their age, structure and generally sheltered locations.

7 Woodland Management Impact

Between Towers 5 and 18, the OHL alignment will severely constrain future management of the forest for timber production on the extremely steep slopes that predominate in this part of Glenfinart Forest due the

significant hazard associated with extracting timber from these slopes safely using cable cranes in close proximity to high voltage overhead powerlines.

This combination of factors and the absence of safe alternatives for timber extraction effectively renders commercial forestry unviable on the uphill side of any Proposed Development on this property. Following consultation with FLS, the Proposed Development has been re-routed above the forest road as much as possible to ensure that commercial forest management can continue on the downhill side of the road in future, allowing extraction of timber using suitable best practice methodologies for steep slope working.

In order to mitigate what will be a substantial change to the management of the forest, a joint initiative between the Applicant and FLS will undertake the removal of all commercial forestry crops above the Proposed Development and their replacement with predominantly native broadleaved woodland. This activity will extend to an area of land of at least 46.9 ha and effectively transform the long term management objective in this part of the forest from commercial timber production to biodiversity and amenity management, thereby enhancing the quality of the local woodland habitat networks.

Elsewhere, the OHL alignment will create additional challenges for the future management of the forest as it dissects existing management coupes and introduces an electrical hazard. The constraint associated with the introduction of the OHL into the forest environment will be reduced by regular maintenance of the operational corridor, which will avoid the incidences of "Red Zone" trees.

The OHL alignment crosses the forest road network and will be built to comply with statutory clearances above forest roads/access tracks, which will reduce the potential hazard in respect of future timber haulage.

The Existing Line is already an established feature in the northern section of the OHL route between the Loch Long crossing and Tower 4 and therefore unlikely to significantly restrict future in-forest machinery access in this area. However, the requirement for dedicated forestry machine OHL crossing points will be discussed with FLS and if required will be identified once the OHL has been constructed, thus providing a safe OHL crossing point(s) for future working within the woodland.

In this northern section, the Proposed Development will result in the permanent removal of an area of existing mature and young conifer woodland and broadleaved woodland from the OC. This will reduce the productive forestry land available for planting as the OC will require to be kept clear of trees. However, this loss of ground will to some extent be ameliorated in the future as the operation corridor for the Existing Line is incorporated back into the forest area following it's de-commissioning.

During the construction phase, a level of disruption will be created for the undertaking of routine forestry management activities by Forestry and Land Scotland on the woodland property. This will be project managed through communication and agreement with the Landowner.

8 Mitigation Opportunities

A reduced OC width of 60m has been assessed for the areas of native broadleaved woodland. Prior to the construction phase these areas will be assessed for further selective felling to identify if greater tree retention can be achieved. This will be dependent on the scope of the construction activities and in particular the requirement to safely install the electrical conductor (cable).

The operational corridor woodland removal area is required for the construction and functioning of the new OHL infrastructure. Opportunities will be assessed for woodland replanting within the operational corridor, the identification of suitable areas cannot be guaranteed due to the requirement of maintaining the safe energisation of the OHL. Reference to **Appendix 12.5 Compensatory Planting Strategy**, will fully mitigate the operational corridor woodland removal area by replanting the area quantity (hectares) of woodland removed.

The management felling areas (those areas outwith the OC that require to be felled) will be replanted by the Landowner in accordance with the usual legal obligations associated with Scottish Forestry Felling Permissions.

9 Woodland Removal Impact

Table 9.1 Woodland Removal for Infrastructure

Item	Woodland Type	Area
OHL	Mature conifer plantation	18.64
	Young conifer plantation	4.20
	Native broadleaved woodland	1.31
Access Track Corridor	Mature conifer plantation	1.12
	Young conifer plantation	0.62
	Native broadleaved woodland	0.00
Total Woodland Removal		**25.89**

Table 9.2 Compensatory Planting		
Compensatory Planting Area	Mixed conifer or mixed broadleaves	25.89

Table 9.3 Woodland Removal Impact of Infrastructure		
Total Loss of Woodland Area		25.89
Total Compensatory Planting Area		25.89
Total Net Loss of Woodland Area		**0.00**

Table 9.4 Woodland Removal for Management Felling		
Item	**Woodland Type**	**Area**
Management Felling	Mature conifer tree crop	46.90
Replanting/Restocking	Native woodland	46.90
Net Loss of Woodland Area		**0.00**
Note. Felling approval is via Scottish Forestry Felling Licence application process or Long Term Forest Plan application or amendment process.		

10 Compensatory Planting

Compensatory planting to achieve the area quantity (hectares) of woodland removal will be provided for the OHL and access track operational corridor area and will be in accordance with the Scottish Government's CoWRP[3] objective of no net loss of woodland

[3] The Scottish Government's Policy on Control of Woodland Removal, Forestry Commission (2009)

11 List of Appendices

Figure 12.1.1 - Forestry Project Felling Map

Key (Continued)

- Scattered Trees (Non-Commercial)
- Windblow
- Management Felling
- Retained Native Broadleaves
- Felled
- Open Ground or Other Land
- Existing Track
- Proposed Retained Access Track
- Proposed Access - Temporary

Forestry and Land Scotland
(The Knap, Glenfinart Forest)

Glenfinart Forest

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Figure 12.1.1
The Knapp, Glenfinart Forest
Forestry Project Felling Map

Created On: 27/01/2023

Key

- Property Boundary
- Proposed OHL Alignment
- Proposed Tower Position
- Operational Corridor

Proposed Powerline Tree Removal

- Mature Conifer - 81m Operational Corridor and 20m Access Track Corridor
- Young Tree - Removal 81m Operational Corridor
- Native Woodland - 60m Operational Corridor
- Native (AWI) Removal within 60m OC

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Scale 1:10000

Size A3 CRS EPSG 27700 / British National Grid