

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 5: Dalinlongart Hill, Dalinlongart
Forest and Ardnadam Forest (Towers 64-77)



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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 the **Volume 2 – Environmental Impact Assessment (EIA) Report** specifically **Chapter 3: Description of the Proposed Scheme** and **Chapter 12: Forestry** for full details of the Proposed Development.

The location of the Proposed Development is shown in **Volume 3, Figure 1.1 Site Location**.

2 Purpose of this Woodland Report

As part of the Environmental Impact Assessment (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 state-owned landholdings. The landholding property boundaries are identified in **Figure 12.1.5 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 5) of the development comprises three adjacent properties under two separate ownerships, namely Dalinlongart Hill public sector ownership and Dalinlongart and Ardnadam Forests both under private ownership.

The area is located one to three kilometres from Sandbank and forms part of the extensive complex of commercial forestry immediately to the west of Dunoon extending south along the Forth of Clyde and north to Ballochyle overlooking Holy Loch.

The wider forest area and group of properties in question are well serviced by existing hard metalled forest road infrastructure accessible from the B836 to the north. The main vehicle access points are located at national grid reference 'NS 133 813' and 'NS 141 818'.

4 Development Requirements

4.1 Overhead Line

With reference to **Figure 12.1.5 Forestry Project Felling Map**, the sections of OHL applicable to each property are Tower 62 to 64 (Dalinlongart Hill), Tower 65 to 69 (Dalinlongart Forest) and Tower 70 to 76 (Ardnadam Forest) where the OHL route terminates at Dunoon sub-station.

The 132 kV OHL standard tower dimensions for the project have a width of 10m 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 new overhead lines (OHLs), resilience and maintenance of OHLs, or protection of electrical plant as required by the Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002 regulations 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 outage¹. 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 12.1.5 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.

In the case of Dalinlongart and Ardnadam Forests, the future clear felling plans of the landowner have been reviewed using Scottish Forest Open Source data.

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

The Dalinlongart and Ardnadam commercial conifer forest is serviced from the B836 public road by a well-constructed network of hard metalled forest roads, 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 12.1.5 Forestry Project Felling Map** 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.

In the majority of cases, access tracks to individual tower sites will be confined to the OHL operational corridor. In the few cases where new access track routes fall outside the OHL operational corridor, the width required to be cleared is 20m wide (10m either side of centreline), see **Figure 12.1.5 Forestry Project Felling Map**, thus increasing the impact of woodland removal in these areas.

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 \(ukfisa.com\)](https://www.ukfisa.com)

5 Woodland Characteristics

The Dalinlongart and Ardnadam section of the Proposed Development comprises three adjacent properties within a wider commercial forestry complex **Figure 12.1.5 Forestry Project Felling Map**. The forest area is impacted from just east of Tower 63 to part way between Towers 75 and 76.

The woodland affected by the development is predominantly an area of commercial conifer plantation with several small areas of native broadleaved woodland coinciding with minor water courses. The plantations have undergone significant restructuring in recent years in accordance with an approved Long Term Forest Plan or Felling Permission as part of ongoing commercial timber production on the property. Woodland management is carried out through a regime of clear felling and replanting, the dominant tree species being Sitka spruce *Picea sitchensis*. The age of the conifer crops range from young plantation (circa. 6 years old) to mature woodland (circa. 40 years old). Pockets of windblow occur within the mature plantations.

The forest area is generally dominated by peaty gleys with peaty podzols on steeper ground at higher elevations. However, the development route coincides mostly with brown earth soils around the lower slopes of Dalinlongart Hill with some areas peaty and mineral gley soils.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.

NatureScot's AWI revealed no woodland categorised within this section as either Ancient (of semi-natural origin), Long –Established (of plantation origin) or other (on Roy map).

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). The NWSS includes two areas of native woodland (0.86ha) associated with the Allt a' Chromain and another un-named burn, intersecting the development between Towers 73 and 75.

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

The conifer woodland contains no Plantations on Ancient Woodland Sites (PAWS) or other designations.

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



Plate 1 – Dalinlongart Hill – View from Tower 64 looking north towards Tower 63



Plate 1 – Looking north-east across young spruce crop towards Tower 71

estimated Yield Class of 16 to 20. The land has been cultivated for planting and the trees are establishing well.

5.1 Dalinlongart Hill

The first property in this section, Dalinlongart Hill (under private sector ownership), begins just south-east of Tower 63 and extends to just east of Tower 64 **Figure 12.1.5 Forestry Project Felling Map**.

The previous commercial crop in this area has been felled within the last five years and not restocked. During this fallow period, the site has colonised with vegetation (mainly grasses and rush) and forest residues left from the harvesting have started to rot down. There are several small remnant blocks of mature Sitka spruce (circa. 40 years old) next to the ownership boundary at the west end that are poorly grown and/or windblown. The estimated net volume of the standing trees is 265m³ per hectare.

Two further small areas of poorly grown spruce (circa. 30 years old) have been retained next to the eastern boundary. The trees have nominal standing volume.

A minor water course containing scattered native trees crosses the operational corridor between Towers 63 and 64. A further fragment of native woodland is located on the ownership boundary. These areas of native woodland total some 0.08ha.

5.2 Dalinlongart and Ardnadam Forests

The two adjacent properties, Dalinlongart and Ardnadam Forests (under the same private ownership), extend southwards from east of Tower 65 to part way between Towers 75 and 76, see **Figure 12.1.5 Forestry Project Felling Map**.

At Dalinlongart Forest, the area from the western property boundary east of Tower 65 through to the eastern property boundary mid-way between Towers 70 and 71 consists entirely of young Sitka spruce restocking with integrated open ground (circa. 4 to 7 years old). These crops have an



Plate 3 - Mature Sitka spruce from forest road on north side of Tower 71

There are two small fragments of mid-rotation Sitka spruce (circa. 20 years old) by the roadside just south of Tower 70 with an estimated net standing volume of 150m³ per hectares.

The adjacent property of Ardnadam Forest starts mid-way between Towers 70 and 71 and contains commercial tree crops dominated by Sitka spruce varying from young to mature. The section between here and Tower 72 contains young Sitka spruce restocking (circa. 7 years old) with an estimated Yield Class of 18 and a narrow strip of mature spruce along the northern edge (circa. 40 years old) straddling a minor burn. The latter area has an estimated net standing volume of 700m³ per hectare.



Plate 4 – View of Tower 72 from forest road with showing young spruce crop and adjacent windblown stand on right

The sloping ground below the forest road between Towers 72 and 73 mostly contains a stand of severely wind damaged Sitka spruce (circa. 40 years old), approximately half the area on the west side comprising unstable standing trees interspersed with windblown trees. The damage has occurred over a number of years and much of the blown timber is likely to have limited market value. The Yield Class is approximately 20 and estimated net volume of standing trees is 250m³ per hectares.

The section from here to east of Tower 74 has been restocked with Sitka spruce (circa. 7 years old). Overlooking Sandbank below, the plantation is established on moderately steep, uneven ground bisected by two burns containing fragmented native woodland species, a small part of which (0.16ha) is encompassed by a third landownership called Ardnadam.

These areas of native woodland are connected to a wider network of predominantly native woodland associated with the Allt a' Chromain and associated burns that flow into the reservoir below.



Plate 5 – View towards Towers 72 to 74 from forest road, Allt a' Chromain burn in mid ground with native woodland component visible. Mature stand of Sitka spruce and Japanese larch in background.

Adjacent to the lower section native woodland, a block of mature Sitka spruce and Japanese larch (circa. 40 years old) occupies the area either side of Tower 75. This is a well grown stand of trees of approximately Yield Class 20 with some



Plate 6 – Alternative view towards Towers 72 to 74 showing young spruce crop.

windblow on the southern edge. Felling is scheduled for the second felling phase (2021-26) of the current Long Term Forest Plan. The trees are generally of good form and condition with a high volume of marketable timber. The estimated net standing volume of this stand is 700m³ per hectare.

The woodland impact assessment included appraisal of woodland exposure to windblow resulting from the removal of mature trees within the operation corridor. **Figure 12.1.5 Forestry Project Felling Map** identifies proposed management felling out with the operational corridor to achieve suitable wind-firm felling boundaries and reduce impacts on forest management and forest landscape.

The total area of management felling proposed is 9.26ha of commercial conifer woodland. This felling is not included within the scope of the Proposed Development (for the purpose of the application for consent under Section 37 of the Electricity Act 1989). This additional felling is subject to landowner agreement and it is the responsibility of the landowner to consult Scottish Forestry and obtain appropriate felling consent.

6 Windthrow Risk Impact

The development route coincides mostly with brown earth soils around the lower slopes of Dalinlongart Hill between Towers 63 and 71 with peaty gleys from Towers 71 to 75.

The mature woodland sites affected by the Proposed Development are classified as moderately exposed for wind hazard purposes. The local climate is classified as warm and moist.

These factors suggest site conditions with moderate to limited flexibility for the management and growth of trees crops. The management felling identified in **Figure 12.1.5 Forestry Project Felling Maps** 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 young and mature conifers within the OHL operational corridor. Additionally, the impact of wind-throw on native broadleaves is likely to be minimal due to their size, structure and general sheltered locations.

7 Woodland Management Impact

The OHL alignment will create additional challenges for the future management of the forest as it dissects existing management coupes. The constraint associated with the introduction of the OHL into the forest environment will be reduced by regular maintenance of the OC, which will avoid the incidences of "Red Zone" trees.³

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 hazard in respect of future timber haulage.

The OHL alignment may be restrictive to future in-forest machinery access. The requirement for dedicated forestry machine OHL crossing points will be discussed with the Landowner and if required will be identified

³ As specified by the 'Red Zone' set out in paragraph 41 of the Forest Industry Safety Accord (FISA) Safety Guide 804 Electricity at Work: Forestry (2020) [FISA 804 \(ukfisa.com\)](https://www.ukfisa.com)

once the OHL has been constructed, thus providing a safe OHL crossing point(s) for future working within the woodland.

The Proposed Development will result in the permanent removal of existing mature and young conifer woodland and broadleaved woodland from the OC. This will reduce the productive forestry land available for planting within the woodland property area, as the OC will required 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 its de-commissioning.

During the construction phase, there will be a level of disruption to the undertaking of routine forestry management activities by the Landowner on the woodland property. This will be project managed through communication and agreement with them.

8 Mitigation Opportunities

A reduced operational corridor 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 requirements of the development project and in particular the safety of OHL wiring operations.

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 (those areas outwith the OC that require to be felled) areas 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 tree crop	4.05
	Young conifer plantation	12.99
	Native broadleaved woodland	0.89
Access Track Corridor	Mature conifer plantation	0.21
	Young conifer plantation	0.0
	Native broadleaved woodland	0.26
Total		18.4

Table 9.2 Compensatory Planting

Compensatory Planting Area	Mixed conifer or mixed broadleaves	18.4
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Table 9.3 Woodland Removal Impact of Infrastructure

Total Loss of Woodland Area		18.4
Total Compensatory Planting Area		18.4
Total Net Loss of Woodland Area		0.0

Table 9.4 Woodland Removal for Management Felling

Item	Woodland Type	Area
Management Felling	Mature conifer tree crop	9.04
Replanting/Restocking	Predominantly conifer	9.04
Net Loss of Woodland Area		0.0

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 CoWRP⁴ objective of no net loss of woodland.

⁴ The Scottish Government's Policy on Control of Woodland Removal, Forestry Commission (2009)

11 List of Appendices

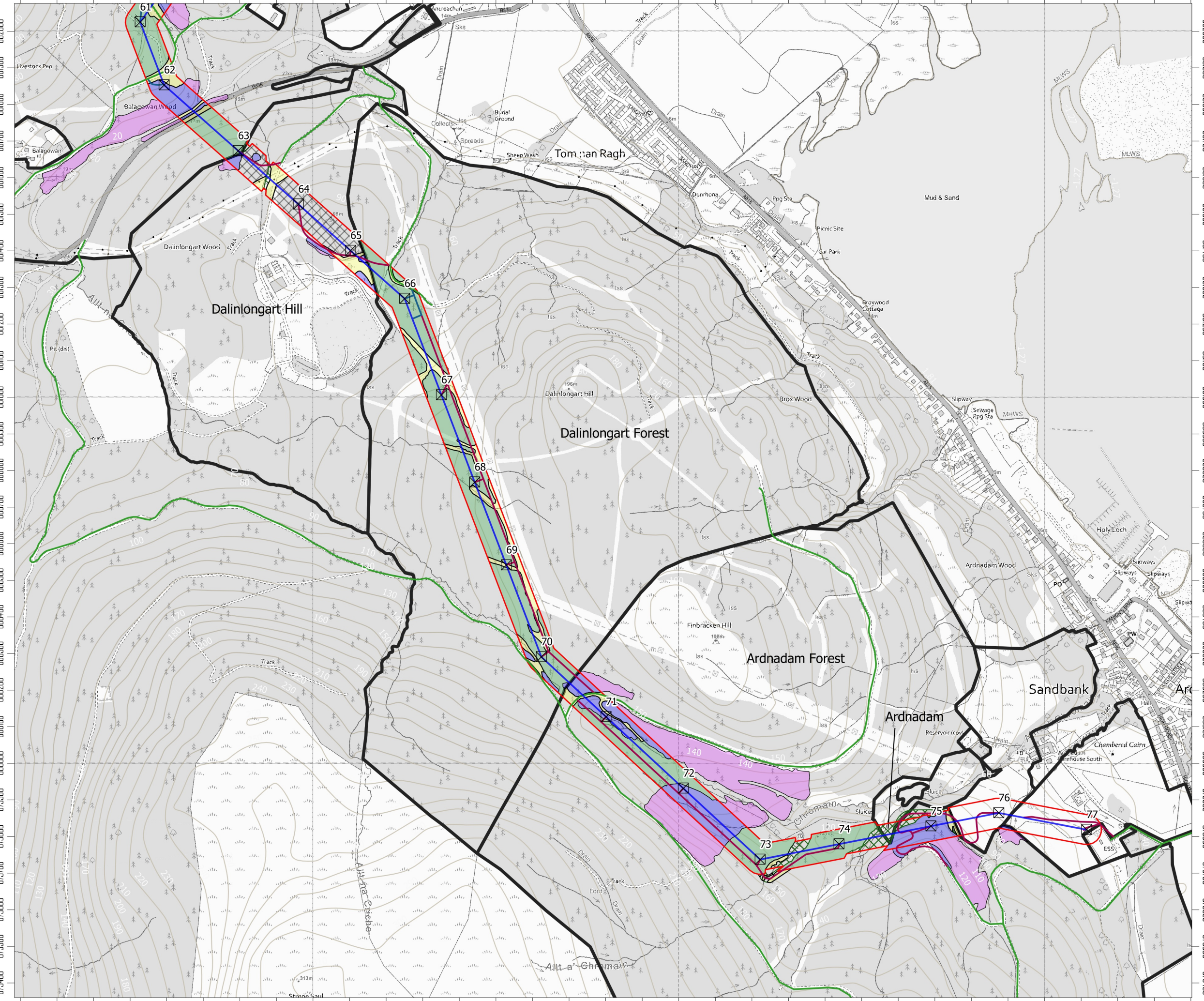
Figure 12.1.5 - Forestry Project Felling Map

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TRANSMISSION

Dunoon to Loch Long 132kV OHL Rebuild

Figure 12.1.5 Dalinlongart Hill, Dalinlongart Forest and Ardnadam Forest Forestry Project Felling Map

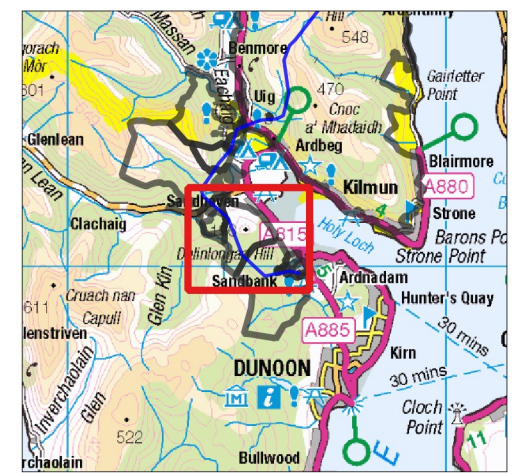


Key

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

Proposed Powerline Tree Removal

- Mature Conifer - 81m Operational Corridor and 20m Track Corridor
- Young Conifer (<15 years old) - 81m Operational Corridor and 20m Track Corridor
- Native Woodland - 60m Operational Corridor and 20m Track Corridor
- Management Felling
- Felled
- Open Ground or Other Land
- Existing Track
- Proposed Retained Access Track
- Proposed Access - Temporary



Galbraith

N

Scale	1:10000
Size	A3
CRS	EPSG 27700 / British National Grid

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