



BS 5837:2012 Arboricultural Impact Assessment and Arboricultural Method Statement

Kirkgate Lane Solar- Cable Route
for:

Ethical Power Development (EPD)

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Project:	Kirkgate Lane Solar- Cable Route
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1.0 Non-Technical Summary

1.1 Arboricultural Survey

1.1.1 The site is a linear 2m wide and approximately 1.9km proposed cable route corridor along the public road network, starting at Kirkgate Lane and St. Peter's Church in the East, continues along Church Lane toward West Mead in the West and then turns south on to Lund Hill Lane where it connects to a substation approximately 700m southwest.

1.1.2 A tree survey in accordance with BS 5837:2012 was carried out by Enzygo Ltd. in November 2023, recording 17 trees, 17 tree groups, four woodland groups and two hedgerows along the proposed cable route and within 15m. They are predominantly mature groups and individual trees typical for rural roads and include species such as ash, oak and sycamore. Due to their maturity and location along the roads, the majority are assessed as being of moderate to high value.

1.1.3 On Kirkgate Lane, to the East of St Peter's Church, tree groups are protected by Tree Preservation Order.

1.2 Development Proposals

1.2.1 The Client proposes the installation of a cable route which connects the proposed solar field in Felkirk in the East with an existing substation in Royston, approximately 1.2km to the West. The cable route would follow existing public highways, as described above. The installation would adopt an "open trench" methodology.

1.3 Arboricultural Impact Assessment

1.3.1 Due to the cable route being installed in existing public highways, no tree or hedgerow removal will be required to facilitate the development. It is assumed that open trenching within the footprint of existing roads will not have a detrimental effect on Root Protection Areas, with root distribution likely to be concentrated in soft verges on either side of the road.

1.3.2 Unless adequate protective measures are provided to *BS 5837 (2012) Trees in relation to design, demolition and construction* and in accordance with this report, operations linked to the development may have an adverse indirect effect on retained trees on site.

1.4 Arboricultural Method Statement

1.4.1 Protective measures include the erection of a Protective Barrier alongside each phase or section of the works, on either side of the tree lined sections of the roads.

2.0 Objectives

2.1 Introduction

2.1.1 Enzygo Limited [Enzygo] have been commissioned by Ethical Power Development (EPD) to prepare an Arboricultural Impact Assessment and Arboricultural Method Statement for the installation of a cable route from a proposed solar field in Felkirk in the East to the substation North of Royston in the West

2.1.1 This report should assist both the client, their design team and decision makers in understanding the impact of the development proposals both on trees on and in close proximity to the site and subsequent effects on the wider landscape and which measures should be in place to adequately protect retained trees.

2.2 Structure of the Report

2.2.1 **Chapter 2.0** provides a brief description of the site and its location as well as a summary of the existing Arboricultural Survey report on which this report is based.

2.2.2 **Chapter 3.0** gives a brief description of the development and details the direct and indirect impact the proposals are expected to have on existing trees.

2.2.3 **Chapter 4.0** provides full details of any methodologies to be adopted in order to adequately protect any retained trees during construction and safeguard the health and safety of the trees in the future. It further makes recommendations for the mitigation of any adverse arboricultural impact.

2.3 Site Overview

2.3.1 The site is located approximately 2km west of South Hiendley and 2.5km northeast of Royston within the administrative boundaries of Wakefield City Council. It is a linear 2m wide and approximately 1.9km proposed cable route corridor along the public road network which starts at Kirkgate Lane and St. Peter's Church in Felkirk in the East, continues along Church Lane toward West Mead in the West and then turns south on to Lund Hill Lane where it connects to the substation approximately 700m southwest.

2.3.2 The route is well used by cars as well as Heavy Goods Vehicles, especially from the junction of Church Lane and Raven Lane west of St Peter's Church. The western end of the Church Lane section is part of the Barnsley Boundary Walk.

2.4 Arboricultural Survey

2.4.1 A tree survey in accordance with BS 5837:2012 was carried out by Enzygo Ltd. in November 2023, recording 17 trees, 17 tree groups, four woodland groups and two hedgerows along the proposed cable route and within 15m. They are predominantly mature groups and individual trees typical for rural roads and include species such as ash, oak and sycamore. Due to their maturity and location along the roads, the majority are assessed as being of moderate to high value.

2.4.2 On Kirkgate Lane, to the East of St Peter's Church, tree groups are protected by Tree Preservation Order.

2.4.3 The report includes a full tree survey schedule which describes each tree in accordance with BS 5837:2012 clause 4.4.2.

2.5 Project Description

2.5.1 The Client proposes the installation of a cable route which connects the proposed solar development in Felkirk in the East with an existing substation in Royston, approximately 1.2km to the West. The cable route would follow existing public highways, starting at Kirkgate Lane and St. Peter's Church in the East, continuing along Church Lane toward West Mead in the West and then turning south on to Lund Hill Lane where it would connect to a substation approximately 700m southwest. The installation would adopt an "open trench" methodology, with the trench alignment located entirely within the footprint of the highway.

2.5.2 Further details regarding the proposed development can be found in the information submitted with the planning application.

3.0 Arboricultural Impact Assessment (AIA)

3.1 Development proposals

3.1.1 This AIA is based on the development proposals as shown on Ethical Power Development's (EPD) Draft Cable Route Plan (drawing ref. EPD-0021-GA-PVC-04 -MASTER-01 dated 2nd October 2023). It is understood that the cable will be laid in an open trench, with the cable route installed in phases/sections to be determined. Construction Phase Management Plans have not been seen.

3.2 Direct and indirect effects of cable installations

3.2.1 Due to the cable route being installed entirely within the footprint of the highway, no trees will require removal to facilitate the development.

3.2.2 Due to the regular use of the highway by HGVs, the clear canopy above the highway is generally considered high enough to facilitate the movement of any construction vehicles without accidental damage to overhanging branches.

3.2.3 It is expected that the subbase of the highway is of such depth and compaction levels that it is unlikely that any significant tree roots will be found during excavation.

3.3 Residual impact of development on retained trees

3.3.1 Unless adequate protective measures are provided to *BS 5837 (2012) Trees in relation to design, demolition and construction* and in accordance with this report:

- Cable installation operations, including material storage and plant movement near the roadside trees and woodland may cause accidental damage of tree trunks and low hanging branches.
- Vehicle and plant movement during the installation may further cause ground compaction which could lead to irreversible damage of tree roots and the rooting environment within the RPA of retained trees.

3.4 Recommendations

3.4.1 All methodologies specified in the Arboricultural Method Statement (AMS) in Chapter 4.0 should be implemented to ensure any retained trees are adequately protected during site set-up and the cable installation operations.

3.4.2 All site managers and site operatives should be aware of the potential impact of the works on retained trees and follow the protection methodologies specified in the AMS in Chapter 4.0.

- 3.4.3 Where construction compounds are required, these should be strategically located as to not require tree removal. This could be in laybys or within sections of the verge which are not affected by Root Protection Areas or overhanging canopies.

4.0 Arboricultural Method Statement (AMS)

This AMS should be read in conjunction with Appendix 1 – Tree Protection Plan.

4.1 Site meetings

4.1.1 To ensure all site managers and operatives are aware of the impacts the development may have on existing trees and of the methodologies to be adopted to minimise the impact, a pre-start meeting should be arranged with the Project Arboriculturist.

4.2 Protective Barrier

4.2.1 In order to avoid encroachment of the works associated with the cable installation into the soft verges, a protective barrier should be erected prior to commencement of any works (or phase or section of any works) on site to create a sacrosanct Construction Exclusion Zone (CEZ). The alignment of the fence should follow the existing kerb line on either side of the road, or the edge of each construction compound, as necessary.

4.2.2 The protective barrier should be installed in accordance with *BS 5837:2012 Figure 2 Default specification for protective barrier* which consists of a horizontal and vertical scaffold framework that should be braced to resist impact from construction plant and vehicles. Please refer to Appendix 2 – Protective barrier to BS5837:2012 for further information and a detailed specification.

4.2.3 All weather notices should be firmly attached to the barrier to inform any site operatives of the purpose of the fencing, e.g. “Construction Exclusion Zone- No access”.

4.2.4 Where the development is proposed in more than one phase or section, the extent of the fencing may be limited to the length of each section, but at all times extending a minimum of 10m beyond the start and finish of each section.

4.2.5 The protective barrier must not be removed or realigned unless in accordance with this report or until all construction work has been completed and all construction vehicles and plant have departed from site.

4.3 Temporary Ground Protection

4.3.1 Where construction access is justified within the Root Protection Area (RPA) of retained trees, for example where construction compounds are required in soft verges, the ground should be protected from disturbance, distortion and compaction by installing Temporary Ground Protection in accordance with of paragraph 6.2.3 of BS 5837:2012.

4.3.2 The Temporary Ground Protection should be capable of supporting any traffic entering the area and may comprise the following:

- For pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame or on top of a compression resistant layer (e.g. 100mm depth of woodchip), laid onto a geotextile membrane;
- For pedestrian-operated plant (up to 2t gross weight) proprietary, inter-linked ground protection boards placed on top a compression-resistant layer (e.g. 150mm depth of woodchip), laid onto a geotextile membrane;
- For wheeled or tracked construction traffic (>2t gross weight) an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

4.3.3 Temporary Ground Protection should only be removed on completion of all construction work and following the departure of all construction vehicles and plant from site. Following removal, the ground should be reinstated without disturbance of the underlying soil.

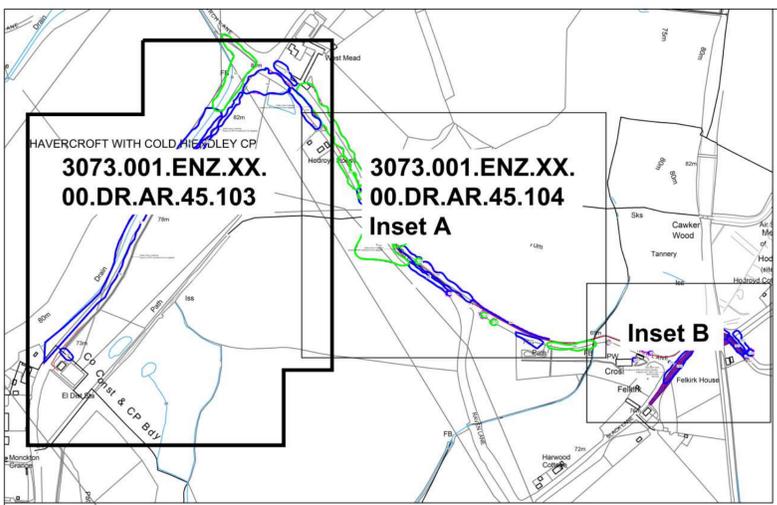
4.4 Installation of Utility Apparatus

4.4.1 It is understood that the entire length of the proposed cable route will be laid within the footprint of the existing highway and that open trenching will be acceptable.

4.4.2 Underground services which require excavations should be located outside the Root Protection Areas (RPA) of retained trees, or outside the Tree Protection Zone as shown in Figure 1 of the *National Joint Utility Group (NJUG) Volume 4- Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees* (NJUG Volume 4), whichever is greater. Refer to Appendix 3 – NJUG Tree Protection Zone.

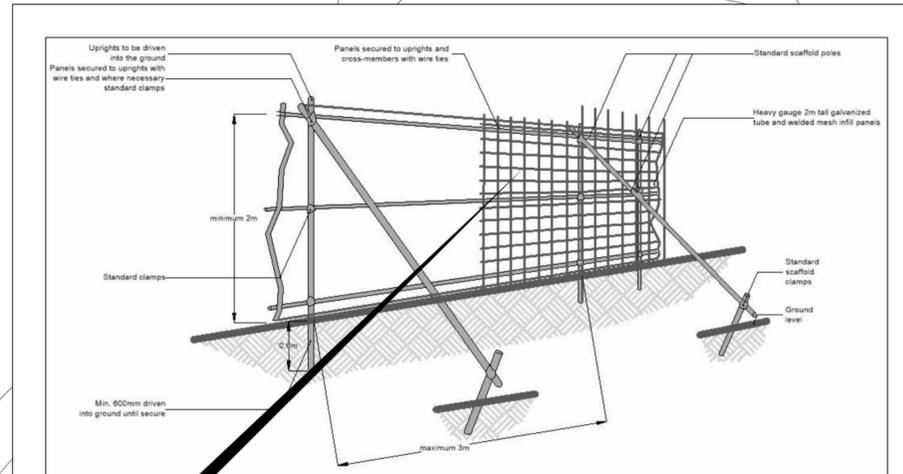
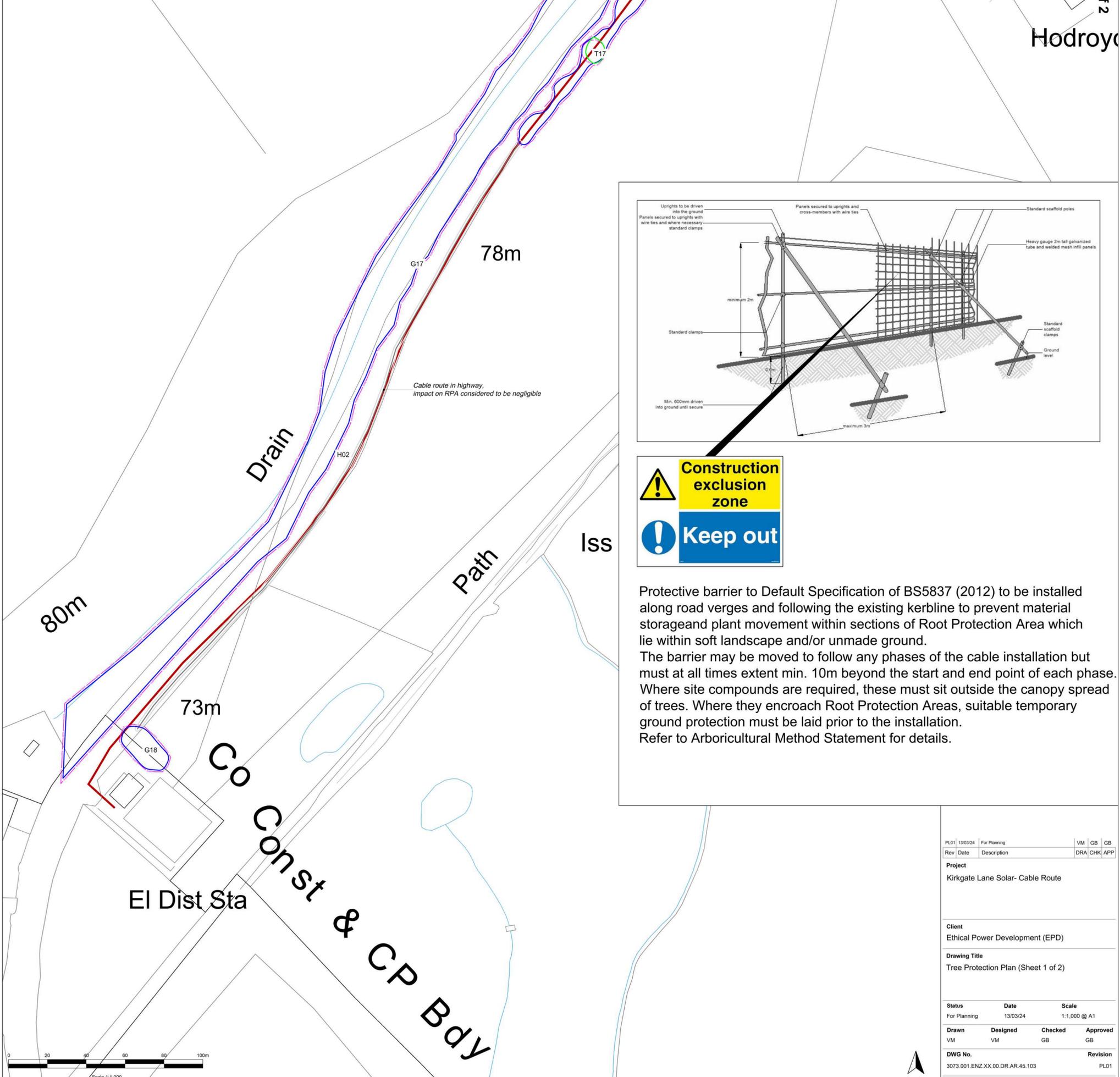
4.4.3 Where the location of underground services within the RPA is justified, trenchless solutions should be applied in accordance with *BS 5837:2012 Clause 7.7.2* and *NJUG Volume 4*.

5.0 Appendix 1 – Tree Protection Plan



Location map- not to scale

HAVERCROFT WITH COLD HIENDLEY CP



Protective barrier to Default Specification of BS5837 (2012) to be installed along road verges and following the existing kerbline to prevent material storage and plant movement within sections of Root Protection Area which lie within soft landscape and/or unmade ground. The barrier may be moved to follow any phases of the cable installation but must at all times extent min. 10m beyond the start and end point of each phase. Where site compounds are required, these must sit outside the canopy spread of trees. Where they encroach Root Protection Areas, suitable temporary ground protection must be laid prior to the installation. Refer to Arboricultural Method Statement for details.



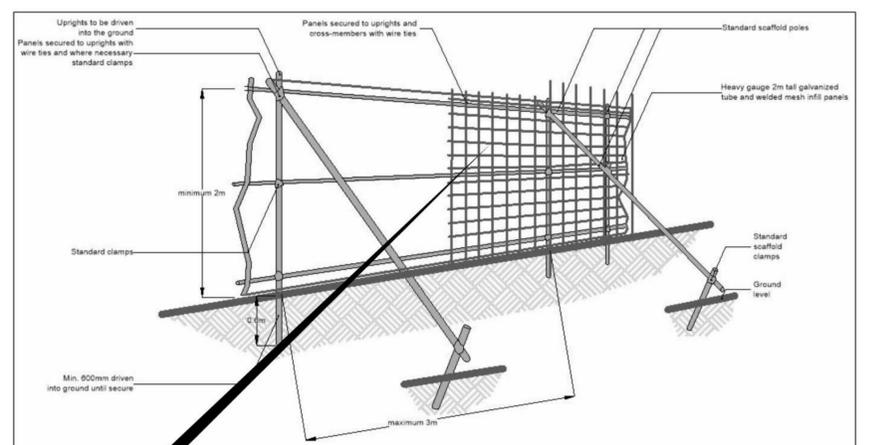
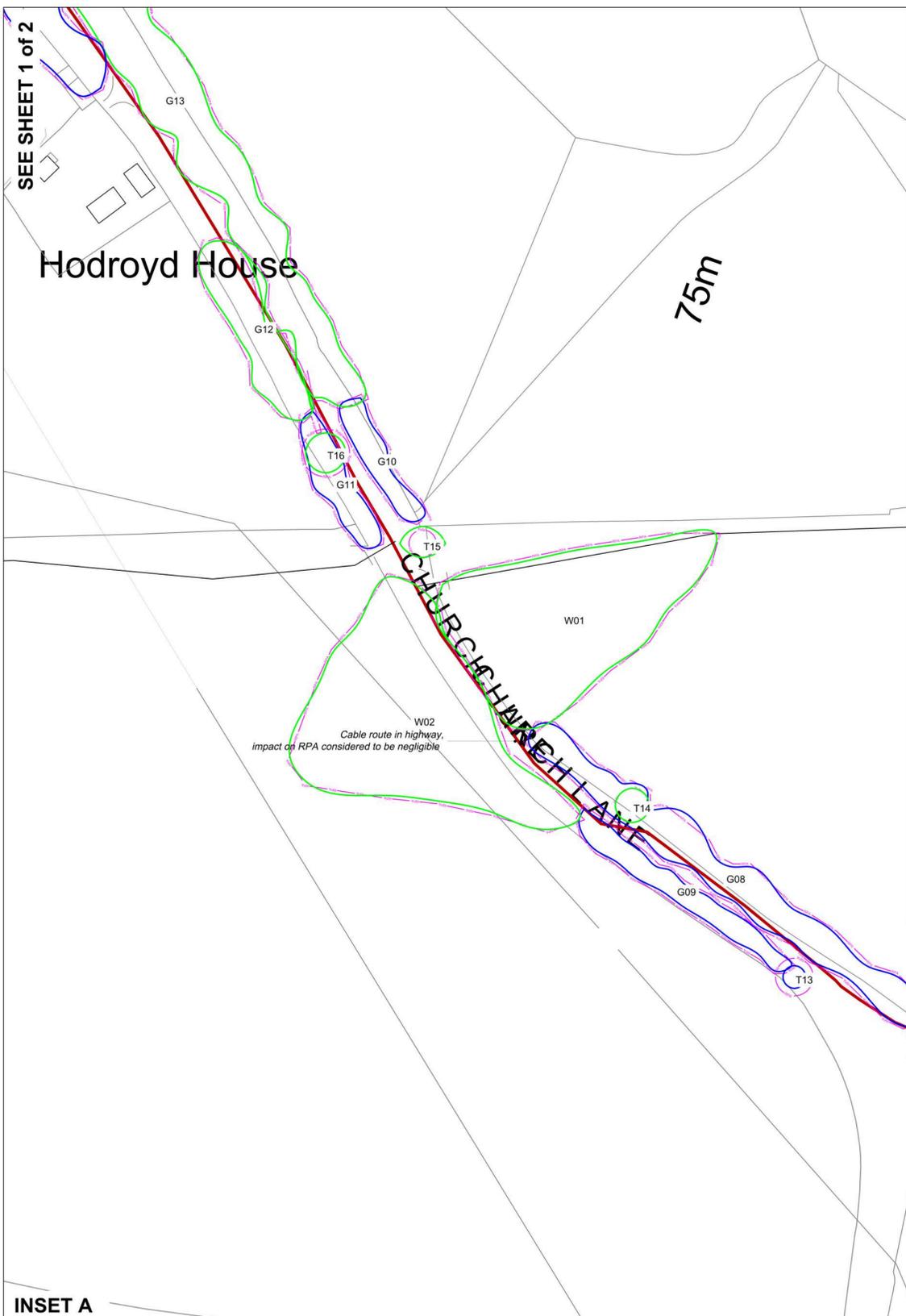
KEY - Tree Protection Plan

	Tree Category A		Root Protection Area (RPA)
	Tree Category B		
	Tree Category C		
	Tree Category U		

- NOTES
- Do not scale for from this drawing for construction purposes
 - This drawing is to be read in conjunction with all relevant drawings and documents associated with the project
 - All surveyed information including levels and layout is provided by others
 - All existing and proposed dimensions, levels and locations to be checked and verified by the main contractor on site prior to the commencement of the works and any anomalies reported to the engineer.

PL01	13/03/24	For Planning	VM	GB	GB
Rev	Date	Description	DRA	CHK	APP
Project Kirkgate Lane Solar- Cable Route					
Client Ethical Power Development (EPD)					
Drawing Title Tree Protection Plan (Sheet 1 of 2)					
Status	Date	Scale			
For Planning	13/03/24	1:1,000 @ A1			
Drawn	Designed	Checked	Approved		
VM	VM	GB	GB		
DWG No.					Revision
3073.001.ENZ.XX.00.DR.AR.45.103					PL01

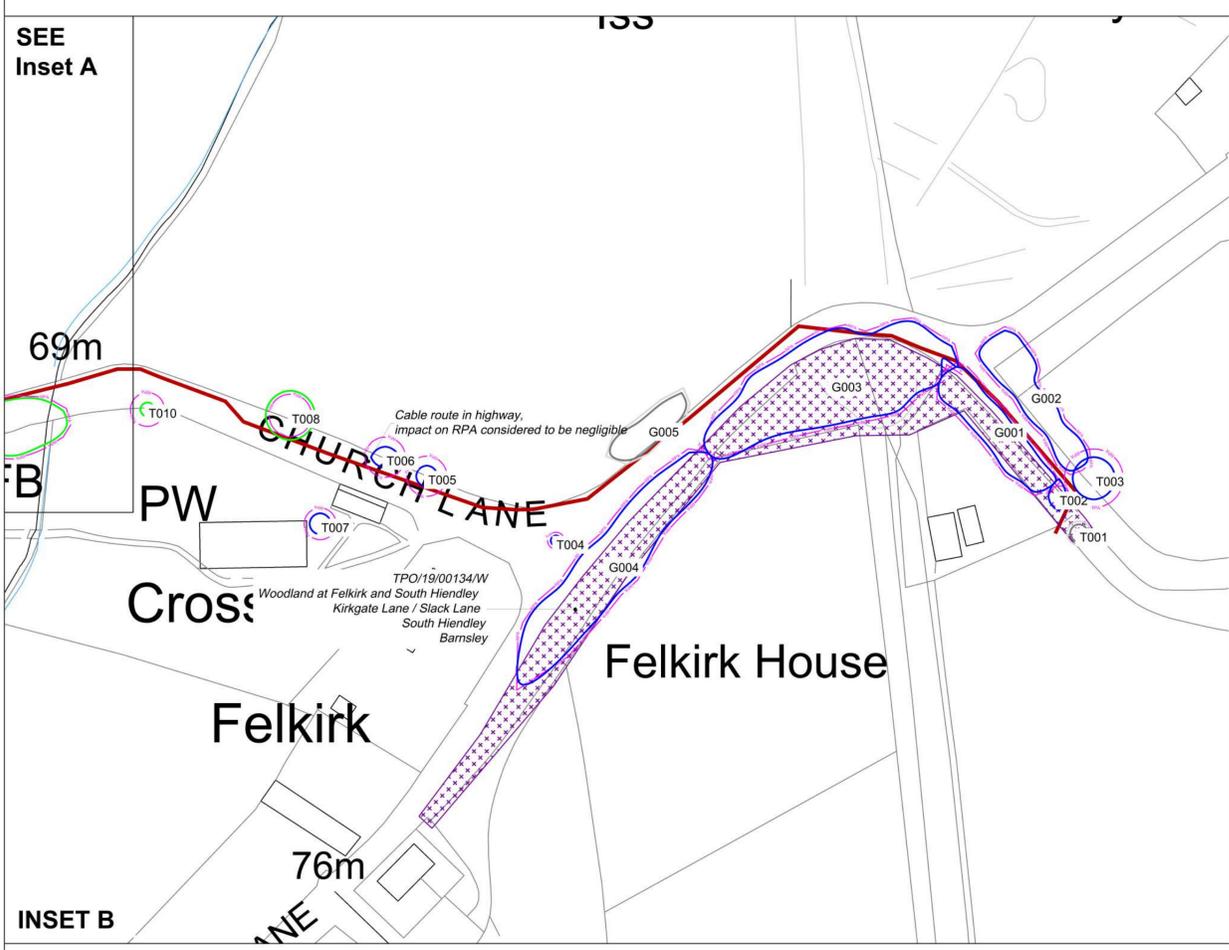




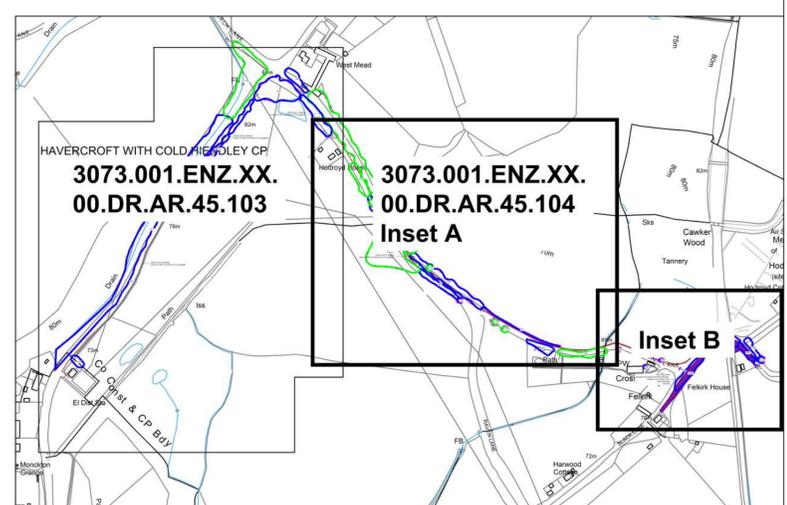
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The barrier may be moved to follow any phases of the cable installation but must at all times extent min. 10m beyond the start and end point of each phase. Where site compounds are required, these must sit outside the canopy spread of trees. Where they encroach Root Protection Areas, suitable temporary ground protection must be laid prior to the installation. Refer to Arboricultural Method Statement for details.

INSET A



INSET B



KEY - Tree Protection Plan

Tree Categories BS 5837 (2012)	Root Protection Area (RPA)
Tree Category A	Woodland at Felkirk and South Hiendley
Tree Category B	Kirkgate Lane / Slack Lane
Tree Category C	South Hiendley
Tree Category U	Barnsley
	TPO/19/00134/W
	Woodland at Felkirk and South Hiendley
	Kirkgate Lane / Slack Lane
	South Hiendley
	Barnsley

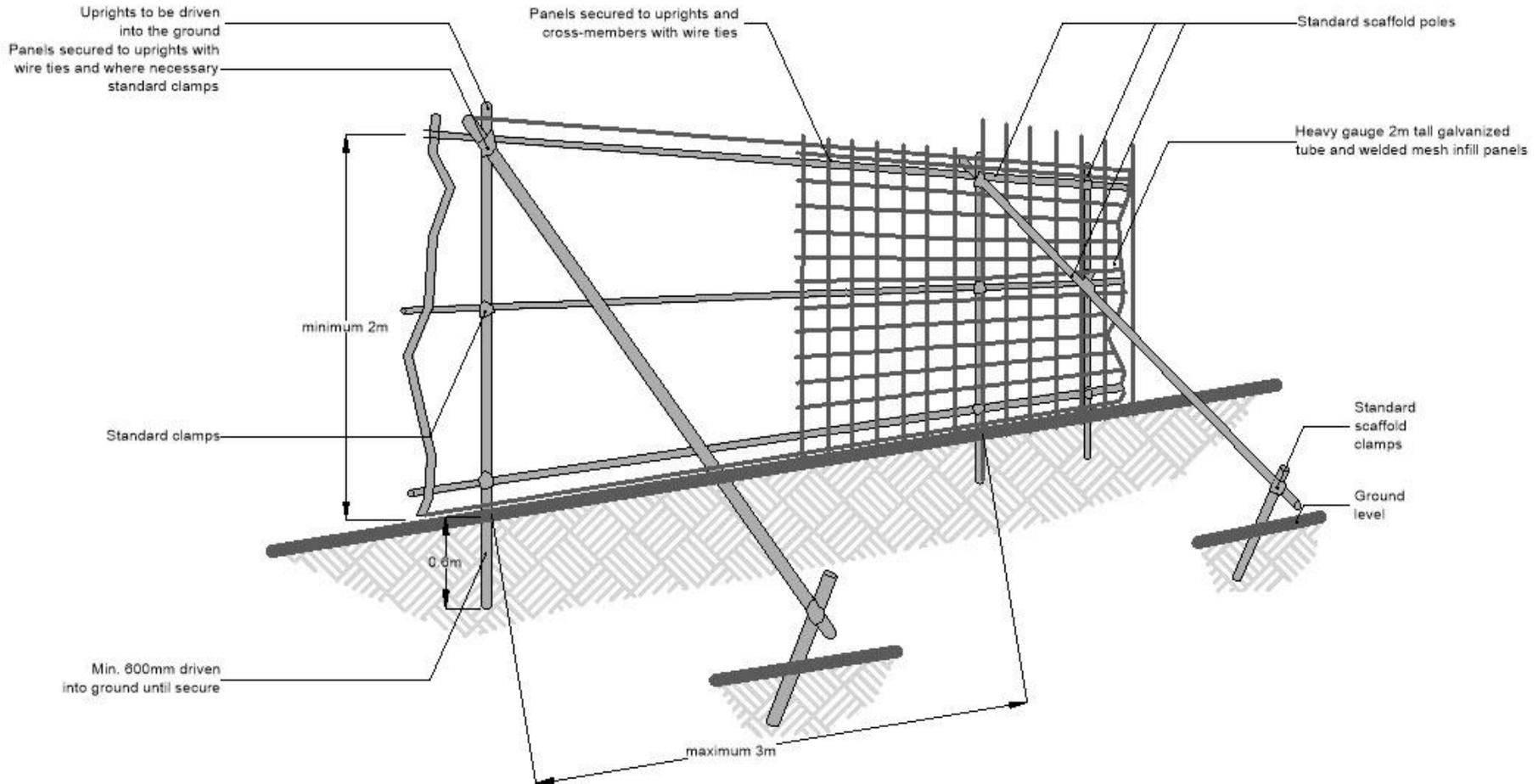
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Project					
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Tree Protection Plan (Sheet 2 of 2)					
Status					
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Drawn	Designed	Checked	Approved		
VM	VM	GB	GB		
DWG No.	Revision				
3073.001.ENZ.XX.00.DR.AR.45.104	PL01				



6.0 Appendix 2 – Protective barrier to BS5837:2012

6.1 Default specification for protective barrier

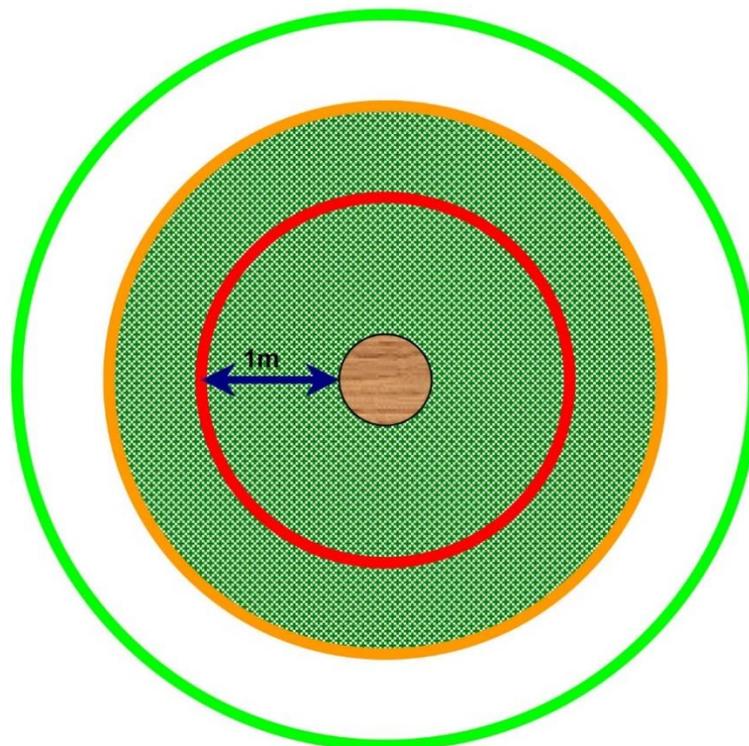


7.0 Appendix 3 – NJUG Tree Protection Zone



NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees

FIGURE 1 – Tree Protection Zone



Key



Trunk of tree



Canopy or branch spread



PROHIBITED ZONE – 1m from trunk. Excavations of any kind must not be undertaken within this zone unless full consultation with the local authority Tree Officer is undertaken. Materials, plant and spoil must not be stored within this zone.



PRECAUTIONARY ZONE – 4 x tree circumference. Where excavations must be undertaken within this zone the use of mechanical excavation plant should be prohibited. Precautions should be undertaken to protect any exposed roots. Materials, plant and spoil should not be stored within this zone. Consult with the local authority Tree Officer if in any doubt.



PERMITTED ZONE – outside of the precautionary zone. Excavation works may be undertaken within this zone, however caution must be applied and the use of mechanical plant limited. Any exposed roots should be protected.

8.0 Appendix 4 – Methodology

8.1 Introduction

8.1.1 This report and all methodologies adopted to carry out the Arboricultural Impact Assessment and Arboricultural Method Statement are based on recommendations outlined in *British Standard (BS) 5837:2012 Trees in relation to design, demolition and construction- Recommendations*. This was published by BSI Standards Limited and came into effect on 30th April 2012. It supersedes BS 5837:2005 which is withdrawn.

8.2 Arboricultural Impact Assessment (AIA)

8.2.1 Once the Tree Survey and Tree Constraints Plan has been prepared and a site layout is available, these are superimposed to establish the potential impact of the development, including the construction phase, on the existing tree stock.

8.2.2 The requirement for tree removal is ascertained where tree stems are located within or very close to proposed building footprints and hard landscape and/or within areas with significant proposed level changes and other works requiring soil movement (incl. excavations).

8.2.3 In a second stage an assessment is carried out of the impact both the construction operations and the development proposals may have of retained trees, including hard landscape in RPA, vertical structures and tree canopies

8.2.4 Using information provided by the client on construction operations, including site access, construction vehicle and plant movement and location of the site compound and material storage areas, the potential impact on both below and above ground parts of retained trees is assessed.

8.2.5 In addition to assessing the impact of the development on existing trees, Enzygo also include an assessment of the impact of existing trees on the future use of the site, including shading, spatial constraints and the use of gardens, open spaces, paths and roads. Potential conflicts between trees and the safety of the site have also been analysed.

8.3 Arboricultural Method Statement (AMS)

8.3.6 The Arboricultural Method Statement (AMS) gives an overview on all methodologies to be adopted to minimise the effects the development, including construction operations, are expected to have on retained trees.

8.3.7 The AMS further includes a full specification for all methodologies which are necessary to protect retained trees.

8.3.8 Methodologies include protective barriers installed to create a Construction Exclusion Zone (CEZ) around retained trees, temporary ground protection where Root Protection Areas (RPA) cannot be fully fenced off, access facilitation pruning where there are conflicts between parts of the canopy and the development, specialist construction methods for buildings within the RPA and any methodologies to be adopted for utilities within the RPA.



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