Arbsystem

Arboricultural Survey, Impact Assessment and Method Statement

as per BS5837:2012 Trees in relation to design demolition and construction- Recommendations
at

30 Elsworthy Road,
London,
NW3 3DL

File Ref: ASIAMS151.1

Ross Fountain Dip. Arb L4 (ABC)
15.09.22

Contents

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1. Summary

1.1 Instruction

1.1.1 Arbsystem were instructed to carry out an Arboricultural Survey and prepare an Arboricultural Impact Assessment (AIA) and Arboricultural Method Statement (AMS) by Daphna and Daniel Jowell, at 30 Elsworthy Road, London, NW3 3DL. This report contains:

1.2 Arboricultural Survey (AS)

1.2.1 A tree survey as per the requirements for BS5837:2012 was carried out. Existing significant trees within 30 Elsworthy Road and neighbouring land that were deemed necessary for consideration were recorded within the Arboricultural survey (AS). The results of the survey are presented within this report.

1.3 Arboricultural impact assessment (AIA)

1.3.1 The Arboricultural Impact Assessment (AIA) examines the relationship between trees and adjacent features (present & proposed). It examines how the trees and features will interact, influence and impact each other.

1.3.2 The purpose of the AIA study is to determine whether the proposed development will adversely affect the established trees and whether these trees will be the cause of nuisance to the proposed development.

1.4 Arboricultural method statement (AMS)

1.4.1. A method statement has been created to incorporate the proposed development and prevent or minimise impact from the proposed development and the construction process upon the retained trees.

2. Introduction

2.1 Development proposals

2.1.1 It is understood the proposals are an addition of a studio in the rear garden at 30 Elsworthy Road.

2.2 Site, location and details

2.2.1 The site comprises a semi-detached dwelling, a front garden and driveway to the southeast of the dwelling and a private rear garden to the northwest.

2.2.2 The site is within the area of Primrose Hill, London, and within the London borough of Camden. The property is located at grid reference TQ 27361 84098.

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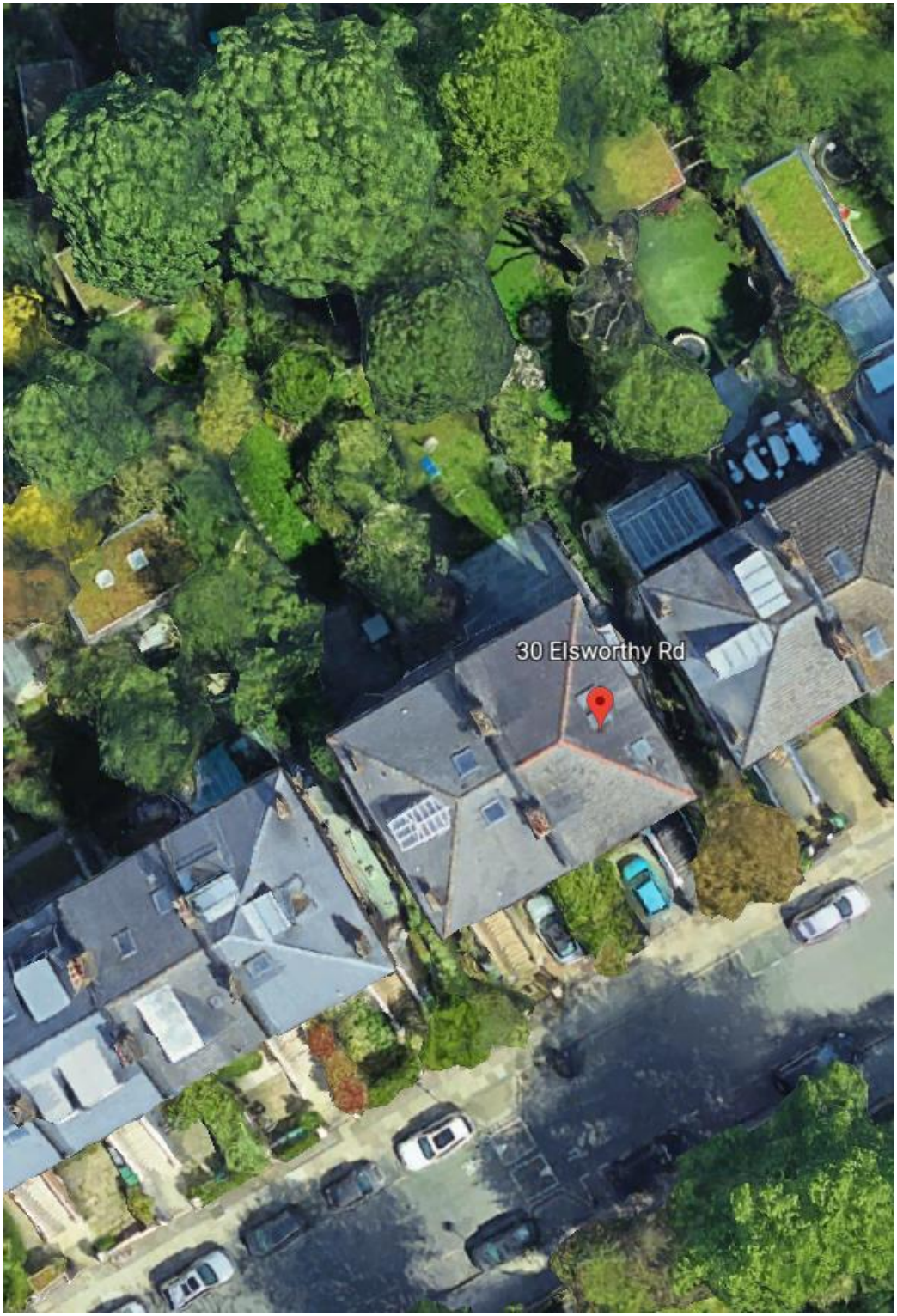

Figure 1. Aerial view of 30 Elsworthy Road (Google Earth 2022)

2.2.3 The area immediately surrounding the site is suburban in character.

2.2.4 The site is within the Elsworthy Road Conservation Area.

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2.2.5 The London Borough of Camden's records show a London Plane with a tree preservation order (TPO) in the front garden and near the boundary with 32 Elsworthy Road. Although this part of the property was not closely inspected, no London Plane trees were evident at the time of inspection.

2.2.6 This site is not a site of specific scientific interest.

2.2.7 The Geology of Britain viewer https://geologyviewer.bgs.ac.uk/ has been used to check the prevailing soil type in the area. This indicates that the underlying bedrock comprises of clay, silt and sand– London Clay Formation. No superficial deposits are recorded.

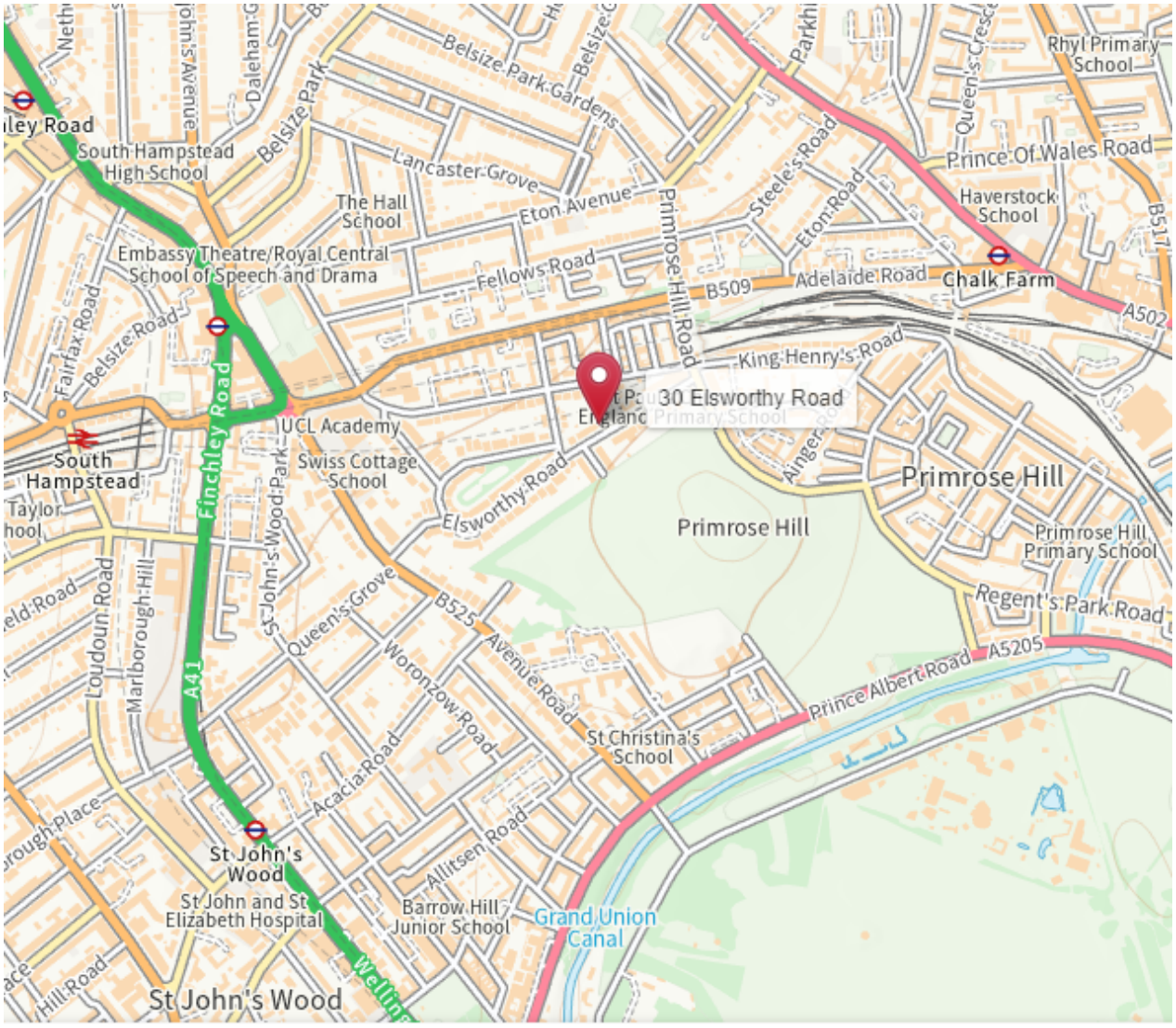

Figure 2. 30 Elsworthy Road and the surrounding area (ordnance Survey 2022)

2.3 Planning status

2.3.1 It is understood that this report is in support of a planning application to add a studio to the rear garden as set out in ***2.1.1*** of this report**.**

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2.4 Scope of this study and limitations

2.4.1 The purpose of this report is to assess the trees in and around the site and to consider the proposals in relation to those trees. This report aims to enable appropriate planning to ensure a well-considered approach to the design and implementation processes is achieved regarding the trees.

2.4.2 This report is not concerned with the health and safety risks these trees could pose, other than determining the categorisation and establishing acceptable levels of risk for the proposed land use, nor is it to decide whether planning permission should or should not be granted.

2.4.3 The surveying was carried out from ground level. No aerial inspections, decay detection or further arboricultural testing has taken place at the time of writing this report.

2.4.4 No ecological or soil surveys have taken place.

2.4.5 The trees within neighbouring land- N001 and N002 have not been inspected. Their trunk measurements and therefore RPA's, have been estimated and the trees have not been categorised. As the expected RPAs of these trees are within the RPAs of other trees- T002 and T004 in particular, it has not been deemed necessary to measure or categorise these trees.

2.5 Abbreviations used in this report

2.5.1 Abbreviations - General abbreviations used in this report:

- RPA (root protection area).
- DBH (diameter at breast height- which is classified as 1.5m above ground level).
- agl (above ground level).
- TPO (tree preservation order).
- AC (Arboricultural consultant- an appointed consultant who oversees the tree related matters)
- N, E, S, W (compass point direction and combination of points i.e. NE= North east).
- G001- identifier of group of trees.
- N001- identifier of individual tree within neighbouring land.
- T001- identifier of individual tree.

3. Arboricultural survey

3.1 Methodology

3.1.1 The trees were inspected from ground level by consultant arboriculturalist Ross Fountain on 1st of August 2022.

3.1.2 Categorisation was made, and measurements were taken in accordance with the recommendations set out in *BS5837:2012*. Canopy spreads were measured and plotted to the four compass points. Where direct access was not possible measurements have been estimated.

3.1.3 The surveyed trees are colour coded on the accompanying tree survey drawing according to their relevant BS category.

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3.1.4 The tree data collected was used to show the current canopy spread and shading of the surveyed trees and to calculate the standard Root Protection Area (RPA). These are plotted on the accompanying plans (ASIAMS151- M01, M02 and M03).

3.1.5 The standard RPA used is defined by the formula in paragraph 4.6 from the BS 5837:2012 and may be refined by considering current on-site constraints to root activity such as buildings, underground structures, earthworks, and hard paving.

3.2 Survey results- summary

3.2.1 The detailed results of the tree survey are provided in the Tree Survey Data (Appendix).

3.2.2 There were 11 individual trees and woody plants and 1 Group surveyed within or near to the site.

3.2.3 In general the trees and woody plants were of moderate to low quality, with the majority classified in the low-quality category C. The 2 trees within neighbouring land- N001 and N002 have not been classified as a full inspection of these trees has not been carried out.

3.2.4 Some minor pruning has been specified to enable the development.

3.2.5 Decay detection has been recommended for T004 following the observation of a fungal fruiting body at the base of the tree during the survey.

3.3 The Survey Key

3.3.1 Ref – The identification number given to the tree. The previous numbers assigned by the topographic data has also been provided.

3.3.2 Species – Common/English and botanical name of the tree.

3.3.3 Feature **–** type of feature, including: tree, group, hedge and number of stems where applicable.

3.3.4 Measurements:

- Height – Height of each tree in metres
- Stem diameter – Diameter of the stem at 1.5 metres above ground level
- Spread – Crown spread in four compass points
- Crown clearance – height in metres above ground level of the lowest part of the canopy
- Lowest branch – height and direction of the lowest branch.
- Life stage – maturity
- Remaining Contribution – considered life expectancy in years

3.3.5 General observations – observations recorded during the survey

3.3.6 RPA – Radius in metres and full **R**oot **P**rotection **A**rea in square metres

3.3.7 Physiological condition – the condition in relation to the functions of the tree as an organism

3.3.8 Structural condition – the condition in relation to the structure of the tree and structural integrity

3.3.9 Recommendations – Recommendations based upon findings

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3.3.10 Category – categorisation of the tree as per BS5837:2012, with colours presented on the tree survey map in the appendix (ASIAMS143-M01):

- A - Tree of high quality with an estimated life expectancy of at least 40 years
- B – Tree of moderate quality with an estimated life expectancy of at least 20 years
- C – Tree of low quality with an estimated life expectancy of at least 10 years
- U – Tree of low quality that is in such a condition that it cannot be retained as a living tree for longer than 10 years and therefore may be unsuitable for retention.

In addition to the categorisation letter, a number is attributed to category A, B and C trees. These numbers relate to the following qualities and values:

- 1- Mainly arboricultural qualities
- 2- Mainly landscape qualities
- 3- Mainly cultural values, including conservation

4. Arboricultural impact assessment (AIA)

4.1 Objectives

4.1.1 To assess the proposals in relation to the trees in and around site, particularly where works are proposed to be carried out in close proximity to the retained trees.

4.1.2 To determine whether the proposed works can be carried out successfully without adversely affecting the trees, both in the short and long term.

4.1.3 To determine whether the trees will have adverse impacts on the proposed development, both in the short and long term.

4.1.4 To assess if any alterations to the design or mitigation is necessary due to conflicts between retained trees and the proposed development.

4.2 Items for consideration

4.2.1 Direct impacts from tree losses, in terms of direct visual impact, environmental impact and impact on the landscape character of the area.

4.2.2 Root disturbance caused by demolition, excavation & construction.

4.2.3 Installation of services in close proximity to the retained trees and associated damage.

4.2.4 Grade/ground level and surface alterations that may have implications for tree root systems.

4.2.5 New planting- design of the scheme and associated landscape operations

4.2.6 Sunlight shading of buildings or exterior amenity areas (such as gardens, patios etc.), which may lead to pressure to prune or fell.

4.2.7 Physical encroachment by roots, tree stems and branches. Allowance for future tree growth.

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4.2.8 Likelihood of indirect damage to the proposed development caused by retained trees.

4.2.9 Health, safety and nuisance items e.g. leaves, fruit and residues, which may lead to pressure to prune or fell.

4.2.10 Location of welfare/office buildings & materials storage.

4.2.11 Likelihood of damage to retained trees caused by the likely development activities and prevention through tree protection measures.

4.2.12 Whether access pruning is required prior to enable access and prevent damage to retained trees.

4.2.13 Other tree works required to reduce risk to suitable levels given the proposed land use.

4.3 Results of Analysis- Summary

4.3.1 There are no tree losses necessary to enable the proposals.

4.3.2 The removal of some small and young woody plants are necessary to enable the proposed development. As these plants are young and are of low quality their removal is insignificant.

4.3.3 Although there is some risk of root disturbance caused by demolition, excavation, construction and service installation, the construction methods and prohibitions and precautions within RPAs as set out in the AMS means the risk of impact will be controlled and at a suitable level.

4.3.4 A scheme to provide the methodology and guidance to minimise or prevent potential impacts on retained RPAs or above ground tree structures, is set out in the Arboricultural method statement (AMS).

4.4 Results of Analysis- general

4.4.1.1 There are no tree losses to enable the proposals.

4.4.1.2 Some removal or relocation of small, young woody plants listed in G001 are necessary to enable the proposed development. This is to enable locating the studio. See picture 3 in the appendix. The plants are young or small and are of low to moderate quality and their removal is insignificant in terms of visual impact and environmental impact and do not impact the character of the area. As the plants are young and small, they can be readily replaced. This is advised over relocation except for the camelia and rose which are both very small plants. In general replacement is preferable in comparison to relocation due to the potential damage caused to roots of retained trees that may occur in digging up enough of the transplanted root system for the plant to be viable in its new location.

4.4.2 There is some risk of root disturbance caused by demolition, excavation and construction. The construction methods and prohibitions and precautions within RPAs as set out in the AMS means the risk of impact of the removal of the existing concrete slab, support for the studio and installation of services will be controlled and at a suitable level. Also, the removal of the concrete slab and application of mulch under the proposed studio along with the removal of some plants competing for water and nutrients will provide some mitigation and potentially positive overall impact of the scheme. The removal of the concrete slab and application of mulch, along with the void below the studio will mean that gaseous exchange is likely to be improved under the proposals and the risk of additional future compaction will also be reduced.

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4.4.3 New services will be required to connect to the studio, including electricity and water supply, and waste drainage from the toilet. These services have been carefully considered as they intersect several RPAs. If the guidance, prohibitions and precautions for the installation of new services that is provided in the AMS is followed, the impact of service installation is expected to be low.

4.4.4 There are no significant landscaping or surfacing changes within the RPA's of retained trees, therefore no impact is expected.

4.4.5 No new planting scheme has been supplied as no tree removals have been deemed necessary. Only small woody plants and shrubs require removal and some of these can be transplanted.

4.4.6 Shading by the existing trees to the proposed development is considered to create insignificant impact given the nature of the proposals and the proposed land use. As the retained trees causing shading are mature the current shading is not anticipated to significantly increase. Although T005 is not a very large woody plant, it is likely to be the most significant in terms of shading. This is due to the position and canopy density of T005, which is south of the southeast facing window, and its dense evergreen foliage. However, as T005 is near to the proposed studio is likely to require pruning to avoid contact, the shading aspect of this tree is unlikely to be very significant. Also, the benefit of all year-round privacy that T005 will provide is likely to offset potential shading issues. Therefore, the pressure to prune or fell the retained trees due to shading is considered to be low.

4.4.7 The impact of physical encroachment by parts of the retained trees upon the proposed development is considered to be low. The pruning of the low canopy of tree N001 will ensure that the branches will not encroach on the new studio. The clearance of the canopies of N001 will be straight forward to maintain. The risk of encroachment and potential impact from root expansion will be minimised by the construction method and trial investigation to assess rooting activity.

4.4.8 Given the recorded soil type comprising of clay, silt and sand (underlying bedrock), the trees and woody plants in the area of the development and the proposals, the risk of indirect impact is possible but considered to be low. It is expected the project engineer will provide suitable foundation specifications accordingly. Therefore, any potential risk of impact from shrinkable soil is considered to be manageable.

4.4.9 There will be minimal impact on the proposed development by health and safety nuisances such as leaves, fruit and residue. Falling leaves and debris from several trees may cause minor impact through built up material on the roof and within the water collection system. However, this impact can be minimised through periodic cleaning and maintenance and leaf/ gutter guards.

4.4.10 There is some space for skips, storage of materials and welfare facilities on the driveway and rear garden outside the RPAs of the retained trees. These should be located as per the prohibitions and precautions within RPAs. Additional space is available on Elsworthy Road.

4.4.11 The likelihood of damage cause by the development to the retained trees is considered to be low and protection measures are provided in the AMS.

4.4.12 Minor pruning has been recommended to tree N001 to enable access and prevent damage to this tree.

4.4.13 Decay detection has been recommended to T004 after the observation of a fungal fruiting body at the base of the tree with the appearance of Ganoderma Australe.

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4.5 Conclusions of AIA

4.5.1 There is no significant impact expected upon the retained trees through the proposed development.

4.5.2 If the conditions and prohibitions in the AMS are followed the likelihood of indirect or direct damage to the retained trees is considered to be low. Therefore, it is considered the proposed works can be carried out successfully without adversely affecting the trees, both in the short and long term.

4.5.3 It is considered the retained trees will not have adverse effects on the proposed development, both in the short and long term.

4.5.4 A minor alteration has been made to the design to minimise impact. This was through the switching of position of the toilet and shower within the studio to minimise the impact of the toilet drainage by bringing it slightly closer to the house. No additional alterations or additional mitigation has been recommended as it has been considered a low impact scheme. Protection measures have been provided in the AMS.

5. Arboricultural Method Statement (AMS)

5.1 Overview

5.1.1 The key protection issues associated with this project in relation to the existing trees, in the short, medium, and long term, are the requirement for:

- The protection of tree habitat
- The protection of the retained trees from damage to the above and below ground structures
- The protection of the soil structure and prevention of damage to tree root systems by chemicals and other noxious substances/materials.
- The protection of the proposed built structures from impacts caused by the retained trees

5.2 Introduction

5.2.1 The AMS sets out the management and protection details in support of the planning proposal, and they must be implemented to ensure successful tree retention.

5.2.2 The AMS provides guidance on the typical range of processes that are involved during development and attempts to ensure that suitable methods of implementation are carried out.

5.2.3 The AMS also aims to provide an overview of the development process and attempts to address any potential issues and conflicts that may arise and provide acceptable solutions, resolving them in line with current industry best practices.

5.2.4 An arboricultural sequencing of events schedule is provided in the appendix of this report and is to be used in conjunction with the AMS to ensure continued tree protection, to avoid potential breaches of planning and delays to the development. The arboricultural sequencing of events and site monitoring should be integrated into the planning of the development.

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5.3 Development methodology and mitigation

5.3.1 The removal of small, young woody plants within G001 should be carried out by felling and grubbing out (severing roots close to the trunk of the removed plant if necessary) or cutting to ground level and poisoning with ecoplugs where regrowth is likely. Though stump grinding is not expected given the size of the removed plants, this can be carried out if necessary. However, this should be minimised to around 5cm in depth and carefully localised to the specific stump removed, to avoid damage of roots of retained trees. Where small plants are to be relocated- such as the rose or camelia, a root ball containing earth should be carefully transported to a pre-dug square hole that is preferably located outside of RPAs of retained trees. Any roots outside the root and soil root ball should be cut cleanly with a sharp hand tool- such as secateurs. The root ball should be wrapped to avoid break up during transportation and planted in the pre-dug hole as soon as possible. The hole should be backfilled, avoiding excessive compaction and the plant watered liberally. If relocation within RPA is crucial, this would be possible however a trial hole would need to be carefully dug and plants relocated if rooting activity was found. Planting within an RPA would need to be monitored by the project AC and practices governed by the restrictions as set out in ***5.4 Prohibitions and precautions within*** *RPAs* of this report.

5.3.2.1 The concrete slab in the NW section of the garden should be demolished with hand tools and hand power tools (such as pneumatic breakers) rather than excavation machinery, that would risk damaging tree roots and soil structure below.

5.3.2.2 If rooting activity is discovered and exposed in the removal of the concrete slab the AC should be contacted. In this case soil and mulch may be required to be applied to the area to avoid root damage occurring. Any exposed roots should temporarily be covered with hessian and kept damp to avoid desiccation or any sudden changes in temperature, see ***5.4 Prohibitions and precautions within RPAs.***

5.3.2.3 Due to the RPAs within the area where the studio is located, ground screws are to be used as support for the structure. The diameter of the ground screws should be minimised, and number and size of the screws specified by the project engineer and provided to the AC for agreement. The frame base should be planned so that the position of the ground screws can be flexible. Alternatively, the ground screws can be installed, and the frame base planned around the position of the ground screws.

5.3.2.4 Installation of the ground screws should be carried out following investigation. Investigation can take place through drilling a trial hole if the drill bit has a blunt leading end. It is recommended that the diameter of the drill bit is 45mm. Alternatively, careful excavation with hand tools should be carried out to assess rooting activity where the ground screw installations are planned. The excavation should be to a depth of 600mm and as narrow as practicable. Where the blunt drill meets resistance or if roots of 50mm diameter or greater are discovered the position of the ground screw should be altered. If the blunt drill meets no resistance to 1000mm, or not roots uncovered in the excavation then the screws can be installed as planned. If roots of between 25mm and 50mm are uncovered, but can be worked around without damage, the screws can be installed as planned. Exposed roots should be covered by immediately backfilling the trial hole or being immediately wrapped with hessian and kept damp to prevent desiccation or rapid temperature changes. Any backfilling should be carefully carried out to avoid direct damage to roots and excessive compaction of the soil around them. Either method shall be supervised and observed by the project AC.

5.3.2.5 The studio will be supported upon the ground screws and suspended above ground level to allow air movement, continued gaseous exchange and some natural migration of organic matter. It is understood that the standard void height below the studio is 100mm +/- 20mm and this void should be practicably maximised.

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5.3.2.6 Mulch shall be applied under the studio, prior to its construction. Where applying mulch, this should be clean, well composted and added in a layer between 2 and 3 inches deep. Mulching is likely to have multiple benefits including localised better long-term soil structure and root health.

5.3.2.7 The water collection system shall feed a water butt, rather than a soakaway, to prevent any further excavation within RPAs, unless there is a reason why a soakaway would be beneficial. In this instance this installation would need to be planned and agreed by the project AC. Adding a connection with a controllable flow to a length of porous pipe laid under the proposed studio would be beneficial due to providing additional water availability to roots. However, this has not been specified as necessary, as the existing concrete slab and plants in G001 would have reduced the water availability to the roots of trees anyway and the difference in water availability is not thought to be very significant.

5.3.3.1 No service drawings have been provided at the time of this report; however, it is understood that new services will be required to connect to the studio, including electricity and water supply, and waste drainage from the toilet. Some investigations will need to take place to minimise the impact of this installation on the retained trees. Hand excavation and investigation should take place in the main lawn, where there appears to be an area of concrete or hard standing just below the turf (see picture 2). If the depth of this material and the concrete slab means that the services can be installed through these areas of the RPAs without generally disturbing the soil below this would be suitable. Further, hand excavation would need to be carried out in areas not containing historical hard standing in the line of the service run. Hand excavation would need to be overseen by the project AC. If the areas of hardstanding are not of sufficient depth to enable correct installation of the services without disturbing soil, or, there is significant rooting activity in areas between the hardstanding, then an alternative method would need to be used. As a retrieval pit can't be located outside of RPAs a trenchless installation is not possible, so the alternative would be to hand dig a trench within the RPAs with roots exposed and protected and then service ducting threaded below the roots. Alternatively trial excavations can take place through or soil displacement with an air spade. Using ducting for services that must be threaded through existing rooting activity is good practice because it reduces the need to excavate in the future. Where a hand dug option is agreed, any roots uncovered during the excavations will be dealt with as described in *5.4 Prohibitions and precautions within RPAs*. Soil should be temporarily piled on ground protection boards prior to backfilling. Backfilling within RPAs should be carefully carried out to avoid direct damage to roots and excessive compaction of the soil around them.

5.3.3.2 The service installation route and method should be verified and approved by the project AC before implementation. The options for the installation have been provided in ***5.3.3.1*** and have been reached from the preference order for techniques used: a) trenchless, b) Broken trench (hand-dug) and c) Continuous trench (hand-dug) as per the NJUG guidelines- *Volume 4, NJUG Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees*.

5.3.4 There are no significant landscape or surface changes proposed that require methodology or mitigation. Where replacing hard standing this should be replaced with soil that is similar to that already present and not excessively compacted.

5.3.5 No new planting has been recommended therefore no methodology or mitigation has been provided except for the guidance in ***5.1.1***

5.3.6 Shading by the existing trees to the proposed development is considered to create insignificant impact given the nature of the proposals and the proposed land use therefore no methodology or mitigation has been provided.

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5.3.7 Pruning of the low canopy of tree N001 trees will ensure that the branches will not encroach on the new studio. This pruning is addressed in ***5.8 Access pruning***. The risk of encroachment and potential impact from root expansion will be minimised by the construction method and trial investigation to assess rooting activity.

5.3.8 Given the recorded soil type comprising of clay, silt and sand (underlying bedrock), the trees and woody plants in the area of the development it is expected the project engineer will provide suitable foundation specifications accordingly.

5.3.9 The potential nuisance of leaf drop causing issues with the rainwater collection system will be mitigated using equipment such as leaf guards/ gutter guards or similar.

5.3.10 There is some space for skips, storage of materials and welfare facilities on the driveway and rear garden outside the RPAs of the retained trees. These should be located as per the prohibitions and precautions within RPAs. Additional space is available on Elsworthy Road.

5.4 Prohibitions and precautions within RPAs

5.4.1 No linear mechanical excavation without prior written agreement from the Arboricultural Consultant (AC).

5.4.2 No excavation, including soil displacement or hand digging without a written method statement from the main contractor having first been approved in writing by the AC

5.4.3 No excavation without arboricultural site monitoring unless agreed by the AC.

5.4.4 No lowering of or raising of soil levels unless agreed in writing with the AC.

5.4.5 No construction of a sealed hard surface.

5.4.6 No storage of plant or materials, unless on ground protection or the driveway hardstanding. This excludes storage of potentially harmful substances which cannot be stored on ground protection or hardstanding unless with prior planning and written agreement from the AC.

5.4.7 No storage or handling of any chemicals including cement washings, unless the AC approves site-specific protection and mitigation.

5.4.8 No vehicular access or machinery outside areas of ground protection without prior written agreement from the AC.

5.4.9 No fire lighting.

5.4.10 If any other investigative excavation is required within or near to RPAs of retained trees that is not considered in this report, this should be planned and agreed with the AC. Trial excavations can be carried out through careful hand digging or soil displacement with an air spade. Exposed roots should be immediately wrapped with hessian to prevent desiccation or rapid temperature changes. Roots under 25mm may be pruned using a sharp hand tool following consultation with the AC. Roots over 25mm or equivalent sized clumps of roots require consultation with the AC who will be able to advise on whether the roots can be cut.

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5.5 Further precautions when working near retained trees

5.5.1 Any mixing or storage of cement and other substances injurious to tree health, must be at least 10 metres from the RPAs unless specific mitigation is agreed before works go ahead.

5.5.2 All site operations shall be carefully planned to prevent any contact with any parts of the trees retained.

5.6 Tree Protection fencing

5.6.1 The proposed scheme involves construction activities near retained trees.

5.6.2 Tree protection fencing has not been specified to create a construction and storage exclusion zone as the RPAs of T002 and T004 cover the whole width of the garden and the working area.

5.6.3 Although it is not practicable to install tree protection fencing around all trees, the same restrictions apply to all trees and RPAs as set out in *5.4 Prohibitions and precautions within RPAs* of this report.

5.6.4 Potentially harmful substances should not be stored or mixed on RPAs, including RPAs covered by the existing driveway without planning, protection measures (such as bunded areas) and prior written agreement with the AC.

5.7 Ground protection measures

5.7.1 Although it is expected that light trafficking will take place during the works, compaction is still possible, particularly in periods of wet weather. Therefore, ground protection is specified through part of the RPAs to provide a compaction resistant route to the rear of the garden. The ground protection will consist of a line of ground protection mats, joined lengthways, laid on top of 150mm of woodchip, laid on a geotextile membrane. The ground protection should be laid on the lawn on the western half of the garden, leaving the area of historic hard standing in the lawn uncovered and accessible (see picture 1). This protection is suitable for loading of up to 2 tonnes.

5.7.2 If loads exceeding 2 t are necessary the project AC should be contacted so suitable temporary ground protection can be specified, which is likely to consist of a cellular confinement system such as Cellweb ® TRP system or ArborRaft tree root protection system. The ArborRaft system has the advantage that it does not need filling with stone, which means in some scenarios its positioning is more flexible and the units are easier to move or reuse.

5.7.3 The temporary ground protection should be positioned in the location shown in the Tree Protection Plan, ref: ASIAMS151- M03 in the Appendix. Mixing should not be carried out on this temporary ground protection unless a bunded area is created and run off precautions followed to avoid soil contamination.

5.7.4 The loading capacities of the ground protection system specified should be carefully observed and not exceeded throughout the development.

5.7.5 If any vehicle over 3.5 t in weight is required on the driveway this should be agreed with the AC in writing so it can be assessed whether temporary ground protection on the driveway is required.

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5.8 Pruning

5.8.1 Access pruning has been deemed necessary to N001. This tree should be lifted to 3.5m above ground level. These recommendations are provided in ***1. Tree survey data*** in the appendix.

5.8.2 Pruning or other remedial action may be required to T004 following the decay detection investigation which has been recommended following the observation of a fungal fruiting body at the base of the tree during the survey.

5.8.3 Any changes to the project that require pruning may only be conducted following written consent from the AC and a notification of works to the LPA if live wood requires pruning on a tree over 75mm in diameter at 1.5m above ground level. All tree work must be undertaken in accordance with BS3998:2010 and current best arboricultural practices.

5.8.4 Under no circumstances may construction contractors prune any trees. All tree pruning must be undertaken by suitably qualified and insured arboricultural contractors, under the guidance of the AC.

5.9 Other precautions and mitigation

5.9.1 None anticipated

5.10 Contingency plans

5.10.1 A general contingency plan for this project should be prepared by the main contractor for controlling such things as chemical/fuel spillage, runoff from cement washings, sewage or water leaks, site collisions and emergency access into or adjacent to tree protection areas. The plan must be agreed by the project AC before commencement.

6. Enquiries

Any enquiries relating to this report should be addressed, in the first instance, to Ross Fountain, Arbsystem, Kelvedon House, Guildford Road, London, SW8 2DN.

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7. Appendix

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1. Tree Survey data

Ref.	Species	Feature	Measurements	General Observations	RPA	Phys. Cond.	Struct. Cond	Recommendations	Ret. Cat.
T001	Olive *(olea europaea)*	Tree	Height (m): 4 Stem Diam (mm): 70 Spread (m): 1N, 1.5E, 2S, 1.5W Crown Clearance (m): 1.5 Lowest Branch (m): 1.5(S) Life Stage: Early Mature Rem. Contrib.: 10+ Years	Bark and cambium wounds to the trunk.	Radius: 0.8m. Area: 2 sq m.	Good	Good		B1
T002	Red Horse Chestnut *(Aesculus x carnea)*	Tree	Height (m): 18 Stem Diam (mm): 720 Spread (m): 6N, 5E, 7S, 6W Crown Clearance (m): 6 Lowest Branch (m): 8(NW) Rem. Contrib.: 30+ Years	Minor epicormic growth and cankering on trunk. Cavity at main union at 5m, facing S. Depth and extent of cavity hard to assess from ground level, though does not appear to be currently very significant. Tree is affected by leaf blotch.	Radius: 8.6m. Area: 232 sq m.	Fair	Fair		B1
T003	Olive *(olea europaea)*	Tree	Height (m): 3 Stem Diam (mm): 70 Spread (m): 0.5N, 0.5E, 1S, 1W Crown Clearance (m): 0.5 Lowest Branch (m): 0.5(E) Life Stage: Early Mature Rem. Contrib.: 10+ Years	Minimal basal flare, could have been planted too deeply. Has historically lost its central leading stem.	Radius: 0.8m. Area: 2 sq m.	Fair	Fair		B1
T004	Sycamore *(Acer pseudoplatanus)*	Tree	Height (m): 21 Stem Diam (mm): 750 Spread (m): 8N, 8E, 9S, 8W Crown Clearance (m): 3.5 Lowest Branch (m): 5(N) Life Stage: Mature Rem. Contrib.: 10+ Years	Ffb with the appearance of Ganoderma Australe at the E/SE side of the basal region. Some deadwood, generally in the lower canopy.	Radius: 9.0m. Area: 254 sq m.	Fair	Fair	Carry out further decay detection to investigate extent of the decay. Carry out recommendations and remove deadwood over 2.5cm in diameter.	C1
S001	Concrete *(Slab base)*	Group		Slab base for existing shed	Area: 20 sq m.				Not Recorded
N001	Leyland Cypress *(Cupressocyparis leylandii X)*	Tree	Height (m): 8 Stem Diam (mm): 350 Spread (m): 2.5N, 2.5E, 2.5S, 2.5W Crown Clearance (m): 3 Lowest Branch (m): 3(S) Life Stage: Early Mature Rem. Contrib.: 20+ Years	Neighbouring tree with Dbh and position estimated. No inspection of the base or trunk. Uncategorised.	Radius: 4.2m. Area: 55 sq m.			Lift low branches to necessary height to allow installation of new structure. Likely to be a lift to 3.5m agl.	Not Recorded

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Ref.	Species	Feature	Measurements	General Observations	RPA	Phys. Cond.	Struct. Cond	Recommendations	Ret. Cat.
N002	Sycamore *(Acer pseudoplatanus)*	Tree	Height (m): 20 Stem Diam (mm): 680 Spread (m): 4.5N, 3.5E, 5S, 5W Crown Clearance (m): 7 Lowest Branch (m): 7(S) Life Stage: Mature	Neighbouring tree with Dbh and position estimated. No inspection of the base or trunk. Uncategorised. Tight bifurcated union at approx. 5m agl. Previously reduced.	Radius: 8.2m. Area: 211 sq m.				Not Recorded
G001	Mixed species *(Mixed species)*	Group		Mixed group of shrubs including camelia, rose and buddleia.	Area: 2 sq m, plus a 1m buffer.	Fair	Fair	Clear area for proposed structure. The Smaller shrubs such as camelia and rose can be careful dug up and replanted if desired.	C1
T005	Laurel Cherry*(Prunus laurocerasus)*	Tree	Height (m): 5.5Stem Diam (mm): 180Spread (m): 2.5N, 2.5E, 2.5S, 2.5WCrown Clearance (m): 2Lowest Branch (m): 2.5(S)Life Stage: MatureRem. Contrib.: 20+ Years	Minor deadwood. Good vitality.	Radius: 2.2m.Area: 15 sq m.	Good	Good		B1
T006	Rowan *(Sorbus aucuparia)*	Tree	Height (m): 3 Stem Diam (mm): 180 Spread (m): 0.5N, 0.5E, 0.5S, 0.5W Crown Clearance (m): 0.5 Lowest Branch (m): 0.5(W) Life Stage: Early Mature Rem. Contrib.: 10+ Years	Regrowth/ basal growth from tree that has partially died or previously been heavily reduced.	Radius: 2.2m. Area: 15 sq m.	Fair	Fair		C1
T007	Pyracantha *(Pyracantha sp.)*	Tree	Height (m): 5 Stem Diam (mm): 270 Spread (m): 2.5N, 2.5E, 2.5S, 2.5W Crown Clearance (m): 1.5 Lowest Branch (m): 1.5(N) Rem. Contrib.: 10+ Years	Some epicormic growth in lower canopy. Historic stem constriction in east section of canopy	Radius: 3.2m. Area: 32 sq m.	Good	Fair		B1
T008	Olive *(olea europaea)*	Tree	Height (m): 3 Stem Diam (mm): 60 Spread (m): 0.5N, 1E, 1S, 0.5W Crown Clearance (m): 1.5 Lowest Branch (m): 1.5(E) Life Stage: Early Mature Rem. Contrib.: 10+ Years	Slightly loose in the ground.	Radius: 0.7m. Area: 2 sq m.	Good	Good		B1
T009	Tree of heaven *(Ailanthus altissima)*	Tree	Height (m): 12 Stem Diam (mm): 430 Spread (m): 3N, 3E, 3S, 3W Crown Clearance (m): 4 Lowest Branch (m): 4(W) Life Stage: Mature Rem. Contrib.: 20+ Years	Basal expansion growth is causing deformation of the nearby boundary wall. Mid and upper canopy obscured by neighbouring shrubs and wisteria.	Radius: 5.2m. Area: 85 sq m.	Fair	Fair		B1

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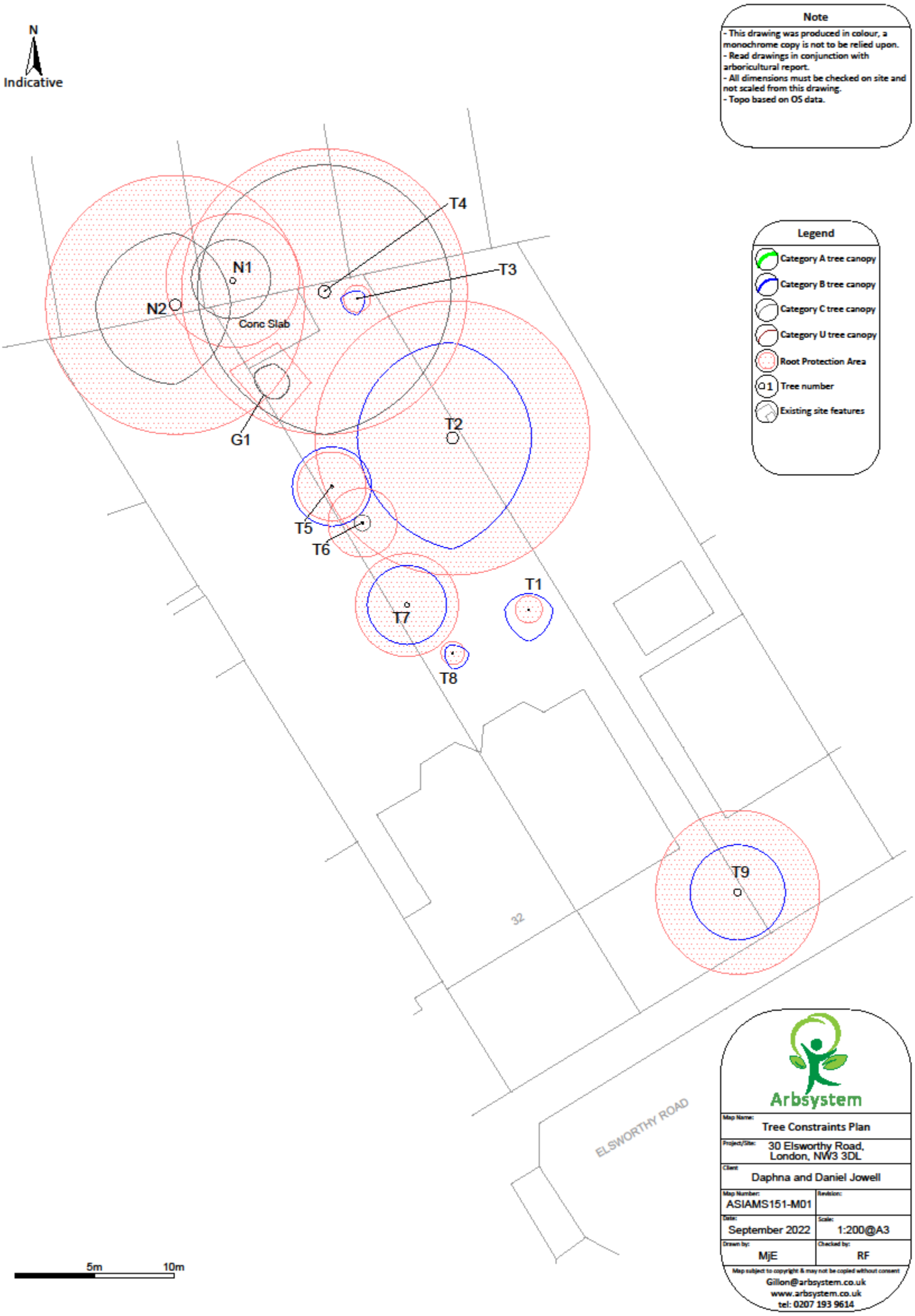
2. Tree constraints plan



Tree constraints plan- ASIAMS151-M01

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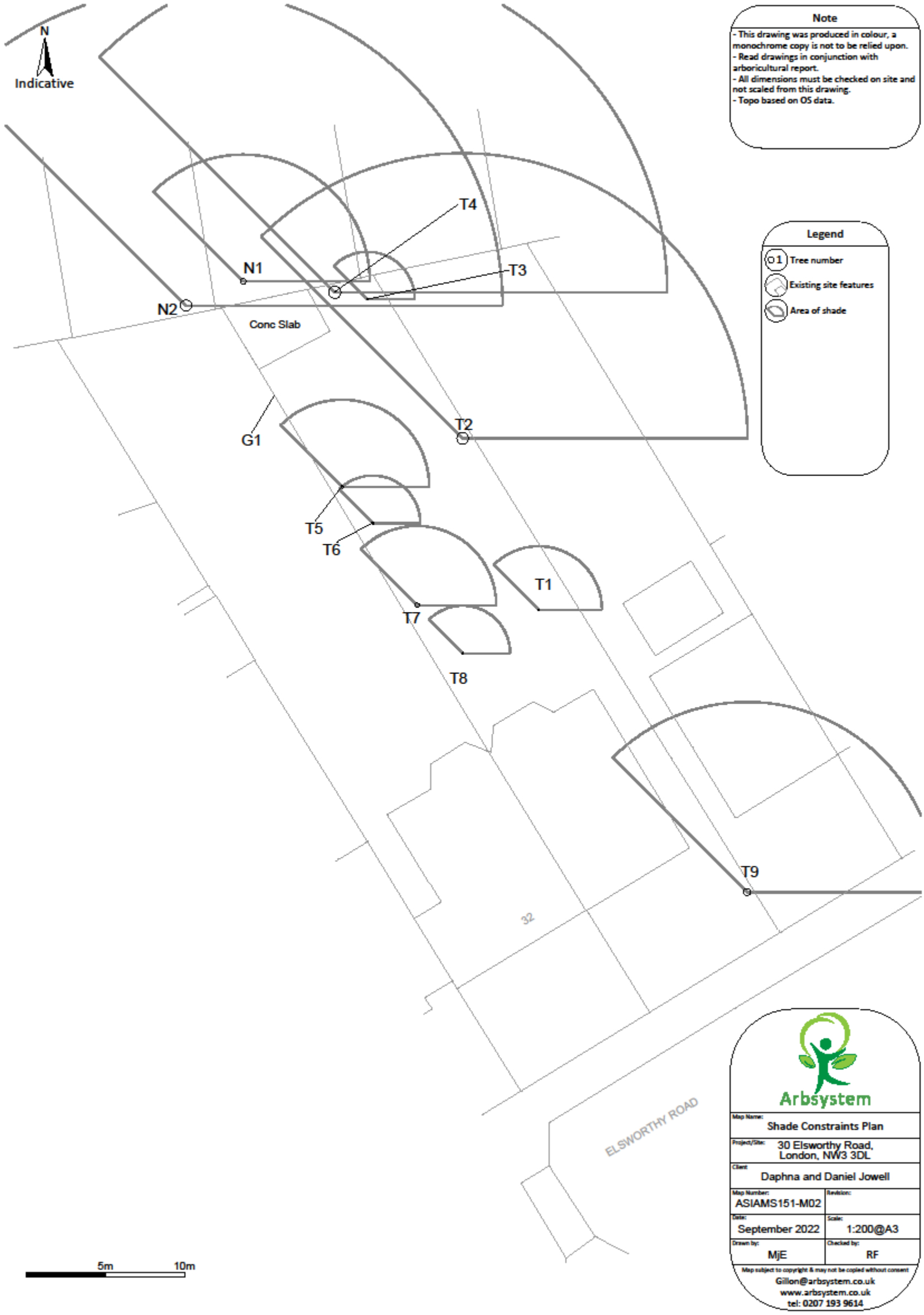
3. Shade plan



Shade plan- ASIAMS151- M02

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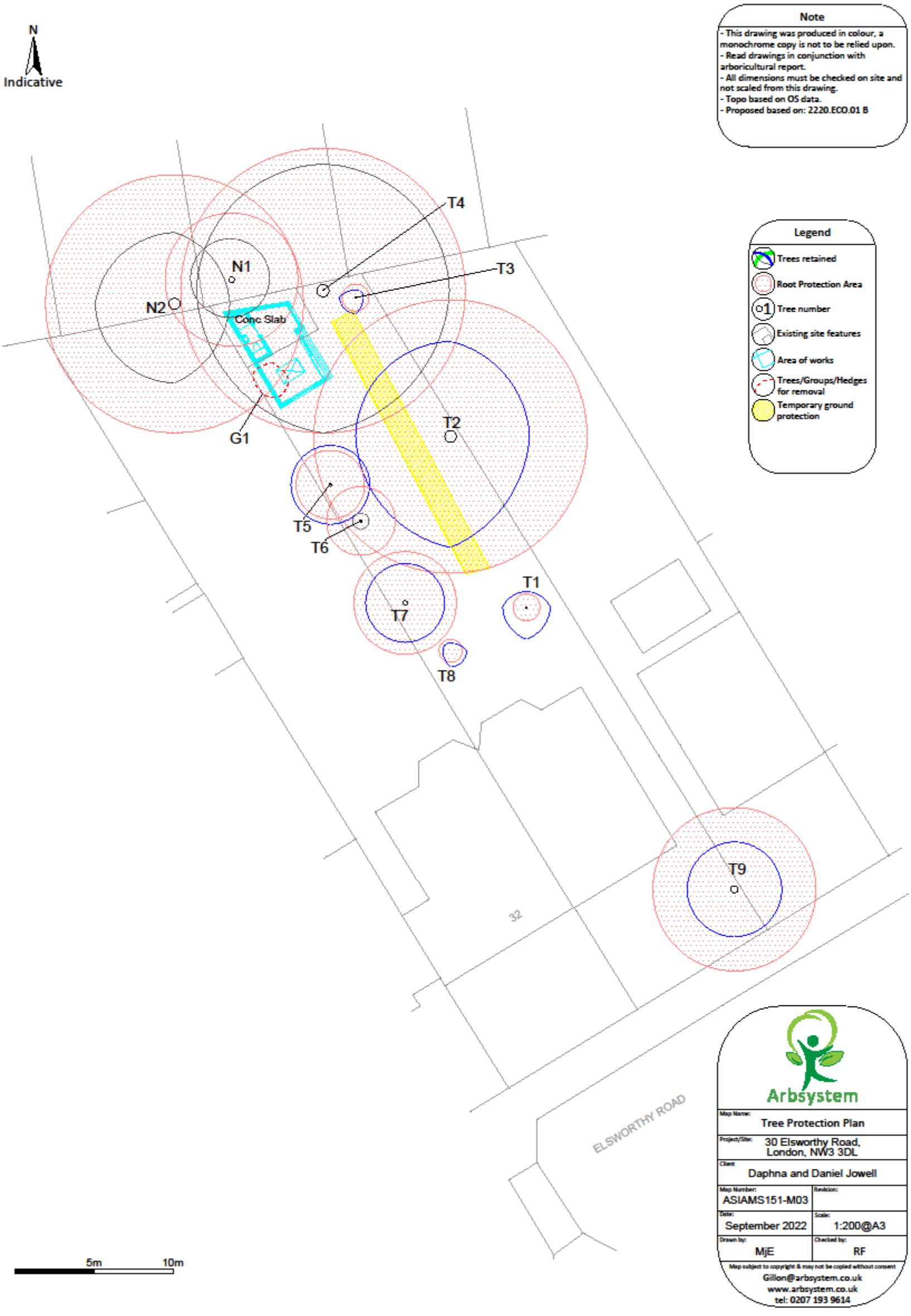
4. Tree Protection Plan



Tree protection plan- ASIAMS151- M03

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5. Arboricultural sequencing of events and site monitoring

Stage	Event
Stage 1	Project arboricultural consultant (AC) appointed
Stage 2	Tree works to be carried out once planning permission granted, or prior to planning with appropriate notification given to LPA (for pruning of live wood).
Stage 3	Main contractor supplied with arboricultural report ASIAMS151.1. Main contractor to supply report to secondary contractors and brief as necessary. Main contractor to prepare contingency plan and provide to AC
Stage 4	Site set-up as per tree protection plan ASIAMS151 M-03. A copy of the TPP should be available on site for the reference of all contractors
Stage 5	Once tree protection measures are in place, and prior to works beginning, a site visit by the AC is required. This site visit and any subsequent AC site visit should use an auditable system of site monitoring which should be made available to the landowner on request.
Stage 6	Following the initial site visit by the AC works can commence. Following this commencement an AC visit is required every 2 months until completion of the project. This is in order to ensure continuous tree protection, avoid potential breaches of planning and delays to the development
Stage 7	When works are complete, and machinery and stored materials are removed the tree protection measures can be removed.
Stage 8	Final visit from AC to provide final audit and sign off project.

Note: If at any point during the development any changes to the project involving the trees and woody plants- including but not excluding others: tree protection measures, pruning, excavation within or near to RPA's- consultation must be made with the AC in writing. The AC will advise on the matter and a site visit to oversee operations may be required.

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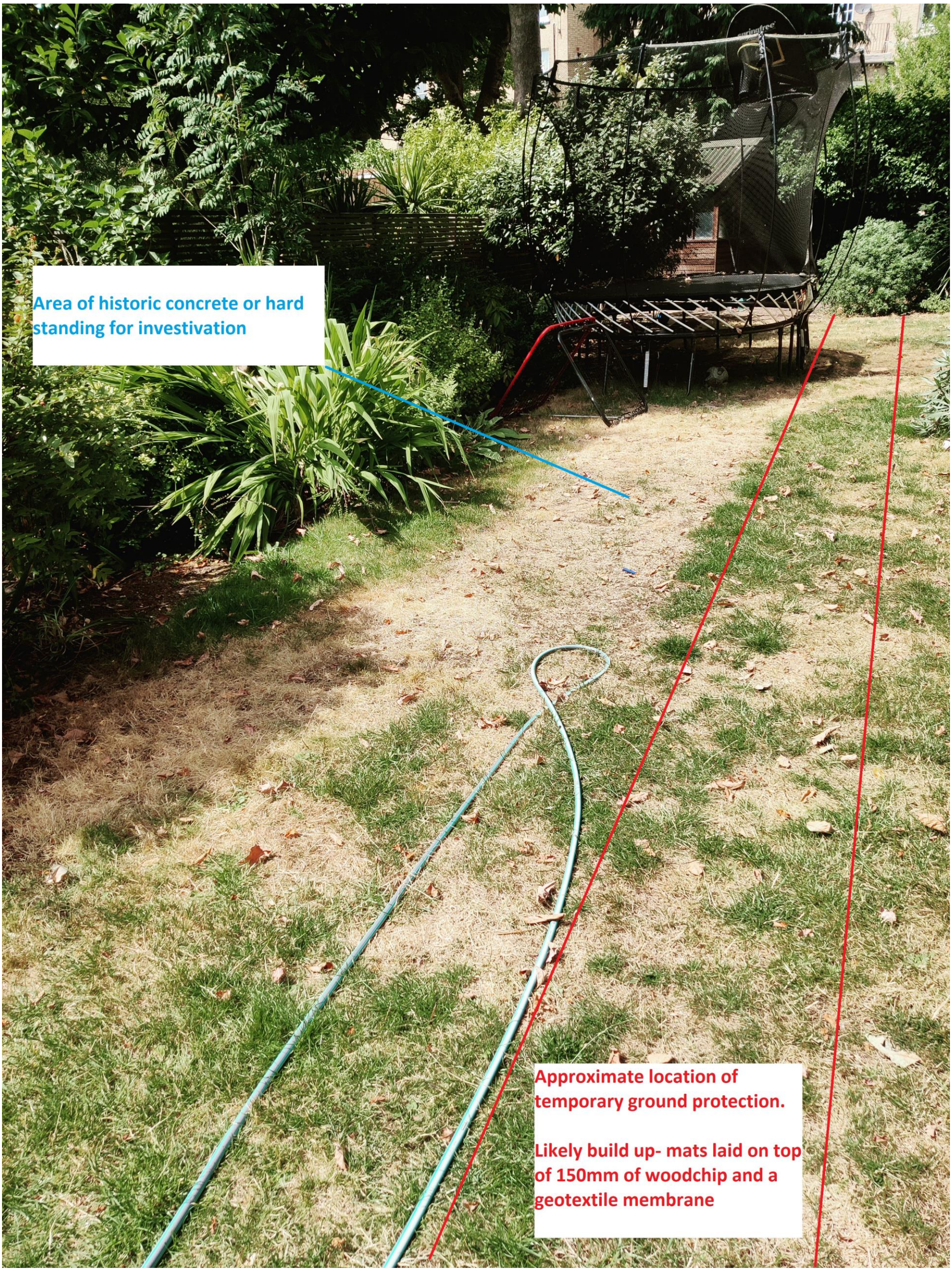
6. Pictures



Picture 1- showing approximate location of temporary ground protection and area of historic concrete or hard standing

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Picture 2- showing historic concrete or hard standing within the lawn

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Picture 3- showing G001, a group of small and young woody plants that need removing or relocating to enable the proposals

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7. Reference material

BS5837:2012 Trees in Relation to Design, Demolition and Construction - Recommendations.

BS3998:2010 Tree work. Recommendations.

Tree Preservation Orders: A Guide to the Law and Good Practice.

NJUG 10 - Guidelines for the planning, installation and maintenance of Utility Services in relation to trees.

BS8206: Part 2: 2008 Code of Practice for Daylighting.

Site Layout Planning for Daylight and Sunlight. A Guide to Good Practice.

CIBSE: Daylighting and window design, lighting guide LG 10: 1999.

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