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97 Belsize Lane, London, NW3 5AU – Statement on the Suitability of the Submitted Arboricultural Impact Assessment Report

Introduction

My name is Luke Fay, I am Managing Director and Senior Arboricultural Consultant at Treework Environmental Practice. I have over ten years experience as an arboricultural consultant.

I carried out the survey of the trees at 97 Belsize Lane and I produced the Arboricultural Impact Assessment Report that accompanies this Planning Application.

Statement

I have reviewed the proposed design that is presented in this planning application and I can confirm that the tree protection measures that are specified in the Arboricultural Impact Assessment (97 Belsize Lane, London, NW3 5AU, March 2015) and presented in the Tree Protection Plan 150304-1.1-97BL-TPP-NK are sufficient and suitable to properly protect the trees during the construction of this design.

This statement represents a truthful account of my findings and professional opinion:

Luke Fay (1st April 2015)

Registered in England
No 1621606

Treework Environmental Practice

Arboricultural Impact Assessment

Tree Protection Plan

97 Belsize Lane, London, NW3 5AU

On behalf of

Stagg Architects
3rd Floor
44-46 New Inn Yard
London,
EC2A 3EY

Inspected and prepared by

Luke Fay
Senior Arboricultural Consultant
March 2015

Summary

This report has been prepared to accompany a planning application relating to development works to 97 Belsize Lane, London, NW3 5AU.

No trees will be removed for this development.

The major A Category London plane (T1), at the front of the property, will be retained and tree protection measures and specialist works have been specified to ensure that it is not damaged by the proposed development operations.

Protection measures have been specified to ensure that trees in neighbouring gardens will not be damaged by the proposed development operations.

The development has considered the trees in relation to current policy, guidance and best practice.

Sufficient space and protection measures have been allocated to ensure that retained trees are not damaged during the development process.

1.0 Introduction

1.1 Scope

This report was prepared by Luke Fay, a Senior Arboricultural Consultant of Treework Environmental Practice. The scope was outlined in an exchange of emails between Frank Benhamou (the Client) and Benn Stagg (Director of Stagg Architects) and Luke Fay.

1.2 Purpose of the Report

1.2.1 This report is intended to accompany a Full Planning Application. The report demonstrates that the impact and implications of the proposed development, in relation to the arboricultural, landscape and cultural (conservation) value of the trees on the site have been fully considered during the initial design process.

1.2.2 This report considers the implications of the proposed development and considers the impact on retained trees, the number of trees that would require felling and possible mitigation to facilitate such a proposal.

1.2.3 This report, and the accompanying information, is supplied in order to:

- Identify trees to be removed and trees to be retained and requiring protection during the construction phase of the project.
- Recommend facilitation tree works to be undertaken to trees to be retained prior to commencement of the construction phase of the project.
- Present information regarding the location of indicative protective barriers or fencing and ground protection (Construction Exclusion Zones- CEZ) on a Tree Protection Plan (TPP).
- Identify special engineering, excavation or protection measures intended to minimise the impact on trees to be retained of breaches of Root Protection Areas, (RPAs) where this is required in the site layout design.

1.3 Relevant Policy Documents and Guidance

- National Planning Policy Framework
- The London Tree and woodland Framework
- The London Plan
- LB Camden Tree Policy
- LB Camden Local Development Framework
- BS5837:2012

1.4 Plans

This report has been completed with reference to the following plans:

- Proposed Ground Floor Plan (51420-P20 – March 2015)
- Proposed First Floor Plan (51420-P21 – February 2015)
- Proposed Sections (51420-P-40 – February 2015)

1.5 Limitations

1.5.1 The survey is a preliminary assessment from ground level and observations have been made solely from visual inspection for the purposes of assessment in terms relevant to planning and development. Only binoculars, trowel, mallet and fine manual metal probe have been used to aid tree assessment. No invasive or other detailed internal decay detection devices have been used in assessing trunk condition.

1.5.2 The conclusions relate to conditions found at the time of inspection. The recommendations contained within this report (see Section 4.0 Tree Protection and Appendix A - Tree Schedule) are valid for a period of one year only. Any significant alteration to the site that may affect the trees that are present or have a bearing on the planning implications (including level changes, hydrological changes, extreme climatic events or other site works) will necessitate a re-assessment of the trees and the site.

1.5.3 It should be noted that this survey is not a tree safety inspection. It is carried out in order to inform the planning process. Where clear and obvious hazards have been observed, these have been addressed in the recommendations (see Section 4.0 Tree Protection and Appendix A - Tree Schedule). A full assessment of the levels of risk posed by trees would need to be informed by considering site use together with hazards present within a tree.

1.5.4 No topographical survey plan was available at the time of the survey and locations of trees have been recorded by eye, with reference to aerial photographs.

1.6 Site Visit and Tree Assessment Methodology

1.6.1 A site survey was undertaken on 23rd December 2014. The trees were assessed by Luke Fay, an experienced Arboricultural Consultant, of Treework Environmental Practise. This inspection assessed the trees in accordance with BS5837: 2012.

1.6.2 The inspection took place from ground level aided by the Visual Tree Assessment method (Mattheck and Breloer, 1994).

1.6.3 While this appraisal is not a tree risk assessment it nonetheless takes into account observed structural defects of the inspected trees in order to inform conclusions with regard to their retentive worth.

1.6.4 Recommendations that have been provided are intended to address immediate tree hazards and / or to manage trees within the context of the site becoming a work area and a proposed development site.

1.6.5 Further remedial works may be required in order to address medium and long term risks associated with tree faults or with an alteration of the use of the site (i.e. proximity of new buildings or an increase in public activity adjacent to trees). It is recommended that these works will need to be assessed by a tree risk survey following completion of the development. Comprehensive long term management recommendations are not provided within this report. Comments regarding long term management options for consideration are provided within the Tree Schedule (Appendix A) as notes only.

1.7 Data Collection

1.7.1 Data collected includes a designated tree number, single/group categorisation, number of trees in group, tree species, height, number of stems, stem diameter, crown clearance (height of periphery of crown spread above ground level), height and orientation of lowest limb, branch spread (to N, S, E and W), age class, physiological condition, useful life expectancy, tree structural condition, site notes (where this has a bearing on the present or future health or structural condition of the tree), preliminary management recommendations and tree category.

1.7.2 All measurements are metric. Stem diameter is measured at 1.5m, where the stem diameter is estimated, it is shown as bold in the tree schedule (see Key at rear of Tree Schedule table in Appendix A for an explanation of the measurements and codes presented). Other measurements are recorded with the aid of measuring devices where applicable.

1.8 Presentation of the Data Collected

1.8.1 Data collected regarding trees are presented in the Tree Schedule table in Appendix A in accordance with BS5837:2012 Trees in Relation to Construction – Recommendations.

1.8.2 The data significant to the proposed site layout is also presented on the Tree Protection Plan (Drawing Number: 150304-1.1-97BL-TPP-NK, Appendix C).

1.8.3 All other relevant data are presented within the main body of this report.

1.8.4 Trees have been allocated an individual tree number. This number is used to identify individual trees and groups throughout this report, within the Tree Schedule and on all Plans presented in the appendices of this report. Trees have not been identified on site with individual tags in this instance.

2.0 Site Description

2.0.1 The site comprises a two story dwelling with rear garden and hard standing to the front.

2.0.2 The site is located on the southeastern side of Belsize Lane, within the London Borough of Camden at (post code: NW3 5AU, Lat: 51.546255, Long: -0.174995). The site is within the Belsize Conservation Area.

2.0.3 Levels descend across the site from Belsize Lane, to the northwest to rear garden, to the southeast. The ground floor of the property is set below the level of the Belsize Lane and garden comprises a raised terrace (at ground floor level) that descends to the level of the garden.

Red Line Boundary Plan

2.0.4 One tree was recorded on site (T1). Trees in adjacent gardens have also been recorded (T2, G3 and G4). The locations of the offsite trees have been estimated.

Figure 1 – T1 at front of House

Figure 2 – Rear garden, terrace and wall

3.0 Arboricultural Constraints

3.1 Consideration of Tree Constraints within the Design Process

3.1.1 The proposed development will comprise the following elements:

- Construction of a boundary wall to the front of the property
- Internal works
- Extension of first floor room (northwest aspect)

3.1.2 The design process has been informed by the aspiration to minimise any potential impact on trees.

3.1.3 Tree constraints information included Root Protection Areas (RPAs) and crown extents. The RPAs represent a precautionary area in m^2 which should be left undisturbed around each tree that is to be retained. Trees located in gardens to the side of the site do not appear to have RPAs that extend into the property.

3.1.4 A process for making decisions in relation to potential conflicts between design proposals and retained trees has been followed. This process is informed by knowledge of the potential for site operations to cause damage to trees, requirements for minimum clearance between buildings and trees and options for tree protection and management. A summary of this process is shown at Appendix B.

3.1.5 T1 is subject to a Tree Preservation Order (TPO Ref: C356).

3.1.6 The northern and southern boundaries of the rear garden are defined by brick walls. These walls and the raised terrace act as a barrier to roots from the trees in G3 and G4 on the adjacent sites and will prevent roots of these trees from extending into the site.

4.0 Trees Identified for Retention

4.1 The trees identified within this section are marked on the Tree Protection Plan (Appendix C). The appropriate Construction Exclusion Zones (CEZs) (based on the RPA for each tree) requiring protection surrounding each tree to be retained are identified on the plan.

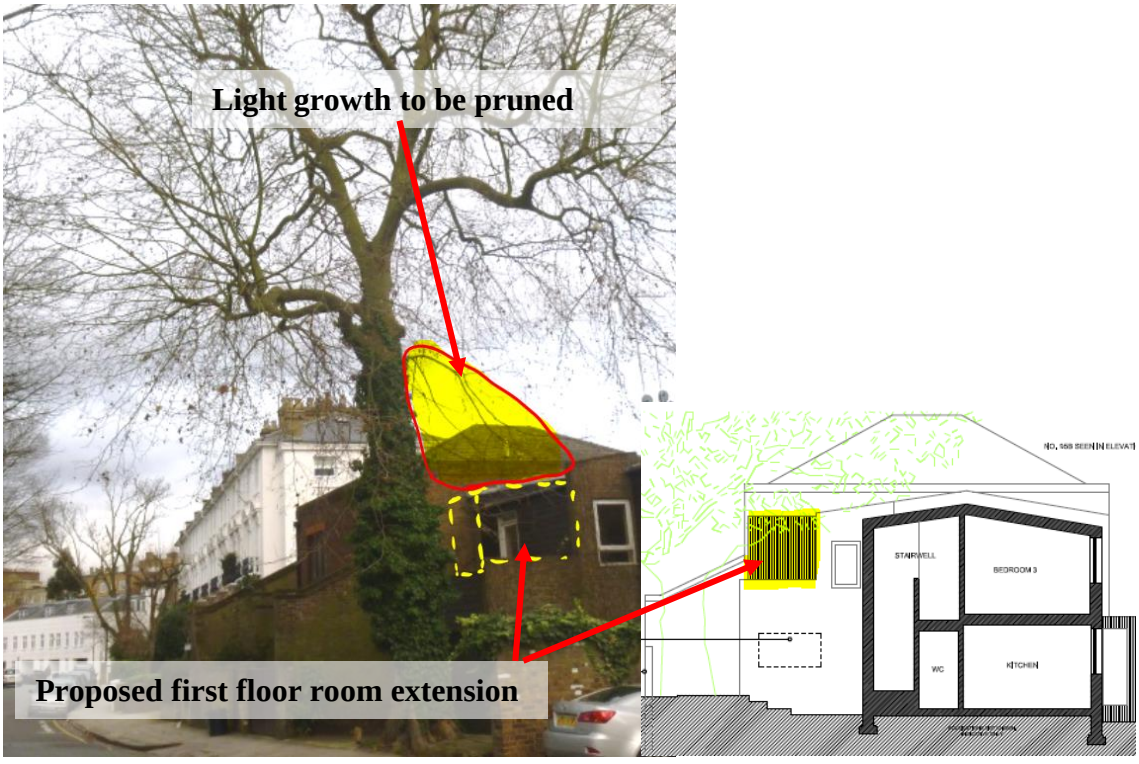
4.2 Some protection measures are proposed for the trees in the neighbouring property as illustrated in the TPP and in the Tree Schedule.

4.3 T1 will be retained and all offsite trees will be unaffected by the proposed works.

4.4 Recommendations Relating to Tree Protection and Construction Facilitation

4.4.1 Performance criteria for tree protection measures are provided at appendix D.

4.4.2 Tree T1 will require pruning of lower minor branches to the southeast to provide clearance for the proposed first floor room extension and prevent damage to branches from site operations (see appendix A).



4.4.3 The stem and buttresses of T1 will be protected by plywood boxing which. The performance specification for the stem and buttress protection will be:

- Height, width and depth will be sufficient to ensure that no part of the stem or buttresses are accessible from the ground up to 2m height.
- The structure will be rigid and sufficiently robust to withstand casual impact (e.g. hit by a loaded wheel barrow).
- A system will be installed (e.g. thick hessian wrapping around the stem that will ensure that if the boxing is broken or moved (e.g. by mechanical impact) the force will be cushioned. Additionally this will prevent abrasion of the tree stem or buttresses if they come into contact with the boxing.
- The boxing will be installed prior to commencement on site and removed following completion.

4.4.4 The ground around T1 comprises hard surfacing, concrete and paving slabs within the site and tarmac in the public highway. Where necessary the area of ground in the RPA of T1, within the site will be protected from compaction and contamination (see TPP and Appendix D). Additionally, in order to further avoid root damage in this area, any operations within this area will be by hand only.

4.4.5 A wall will be constructed adjacent to T1 (see TPP). The wall be supported on a ground beam which, in turn will be supported on two piles. the following method is proposed for the construction of the wall:

- The holes for the piles will be excavated by hand to a depth of 1,000mm; if significant roots are found, the pile location will be removed to avoid damaging significant roots.
- Any roots that are exposed will be wrapped or covered (e.g. with hessian) to prevent desiccation and to protect them from rapid temperature changes; where necessary, roots will be kept moist by regular application of water.
- Further excavation of the piles may require specialist plant / machinery. Plant / Vehicles will only enter the RPAs where suitable ground protection is present.
- Pile holes will be lined with a non-permeable membrane prior to concrete being poured
- If any excavation is required for the ground beam, this will be carried out by hand. No roots with a diameter greater than 25mm will be severed unless approved by the arboricultural consultant.
- The ground beam will be laid with a minimum of 25mm between it and any tree roots, to allow space for incremental root growth.

4.4.6 The RPA of T2 (located in adjacent garden, to southeast) is estimated extend into the site. The area of the garden where roots of T2 are likely to be present will be designated a Construction Exclusion Zone, with appropriate protection measure in place, during the works and access will be restricted by fencing.

4.4.7 All tree protection measures will be carried out / installed prior to commencement of construction works.

4.4.8 Consideration will be given to the implications of storing materials near to trees in order to avoid the risk of contamination of the Root Protection Area of a tree. Appropriate ground protection will be installed to prevent contamination and, where required, spill kits will be installed. Such materials include:

- Diesel
- Oil
- Bitumen
- Cement

4.4.9 No fires will be lit onsite.

4.4.10 Concrete mixing only be carried out either outside of the RPAs of trees or in locations where appropriate ground protection has been installed to prevent contamination of the RPA.

5.0 Trees Identified for Removal

5.1 No trees are to be removed for this development.

REFERENCES

Mattheck, C. and Breloer, H. (1995). The Body Language of Trees: A handbook for failure analysis. Research for Amenity Trees **4**. HMSO, London, 240pp.

Matheny, N. and Clark, J. (1997) Trees and Development: A Technical Guide to Preservation of Trees During Land Development. ISBN 1-881956-20-2

Lonsdale, D. (1999). Principles of Tree Hazard Assessment and Management. Research for Amenity Trees 7. DETR, London.

Robers, J. Jackson, N. and Smith, M. (2006). Tree Roots and the Built Environment. Research for Amenity Trees 8. Department for Communities and Local Government, London

STANDARDS PUBLICATIONS

Trees in Relation Design, Demolition & Construction – Recommendations. (BS5837), British Standards Institution, London (2012).

Tree Work - Recommendations. (BS3998), British Standards Institution, London (2010).

Appendix A

Tree Schedule

Final Tree Schedule with additional Immediate Recommendations in the light of site layout design.

Tree Categories

Table 1 Cascade Chart taken from BS5837:2012 Trees in Relation to Design, Demolition & Construction – Recommendations.

Tree Schedule Key

BS5837 Tree Schedule

97 Belsize lane NW3 5AU

Treework Environmental Practice

Tree / Group Reference	No. of Trees	Tree or Group Species	Height (m)	DBH (cm)	No. of Stems	Spread N (m)	Spread E (m)	Spread S (m)	Spread W (m)	Crown Cleanrance (m)	Age Class	Physiological Condition	Structural Condition	Tree or Group Conditions /Recommendations	RPA (m^2)	RPR (m)	Remaining Contribution (Years)	BS Category
T1	1	*Platanus x hispanica* London plane	27.0	87	1	11.0	8.0	7.0	9.0	4.0	Mature	Good	Fair	Structural impact - Potential. Structural impact - Footpath / highway / drive disturbance. Buttresses / buttress roots - Major adaptive growth / strong development. Base / stems obscured - Vegetation. Ivy or climbing plant. Crown reduction - Historic. TPO Ref: C356 Not plotted on a topographical survey. Height and crown extent have been estimated. Prune from adjacent structure. Prune low branches over property to southeast to facilitate construction of first floor room extension (see illustration in Section 4 of	342.4	10.4	40+	A1
T2	1	*Salix babylonica 'Tortuosa'* Contorted weeping willow	20.0	50	1	6.0	6.0	6.0	6.0	3.0	Mature	Fair	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Located in neighbouring property. Not shown on topographical survey. All dimensions are estimated.	113.1	6.0	10-20	B1
G3	4	*other* other	5.0	10	1	2.0	2.0	2.0	2.0	1.0	Early Mature	Fair	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Mixed shrubs and small trees Located in neighbouring property. Not shown on topographical survey. All dimensions are estimated.	4.5	1.2	20-40	C2
G4	1 1 1	*Salix matsudana* Contorted Willow *Prunus sp.* Prunus sp. *Ilex aquifolium* Holly	14.0	20	1	5.0	5.0	5.0	5.0	3.0	Mature	Fair	Fair	Access to inspect base - Not possible. Access to inspect base - Restricted / obscured. Located in neighbouring property. Not shown on topographical survey. All dimensions are estimated.	18.1	2.4	20-40	B2

Generated By MyTREES tree management software

Survey date: 03/03/2015 Surveyor: Luke Fay

Table 1 **Cascade chart for tree quality assessment**

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see **4.5.7**.*			See Table 2
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Tree Schedule - KEY

Treework Environmental Practice

Tree Number
Trees are tagged with metal tags where agreed. Where this has not been agreed, tree numbers within the Tree Schedule relate to those marked on the Tree Constraints Plan and Tree Protection Plan drawings.

Single or Group
One tree within a group of trees may be tagged in order to identify trees of a relatively uniform arboricultural or landscape feature. This may include a linear screen, hedge, or group of trees not considered as appropriate to survey as a single tree.

Number in Group
Number of trees within a group. A group of trees may comprise of more than one species.

Species
Scientific or common name is presented. For trees within groups the species together with the numbers of each species within the group is presented, unless otherwise stated.

Height (metres)
All heights are estimated. Where feasible or appropriate height estimation is carried out with the aid of a clinometer or similar device.

Number of Stems
A value of 1in the Number of Stems field indicates a tree with a single stem at 1.5m above ground level. Where more than 1 stem is recorded each stem will be measured at 1.5m above ground level and the RPA calculated in line with BS5837:2012.

Stem diameter / DBH (centimetres)
Stems are measured in accordance with BS5837:2012. The diameters of tree stems are measured at 1.5m with a diameter tape or callipers (Diameter at Breast Height). All measurements are rounded down to the nearest cm. Stem Diameter measurements shown in **bold** are estimates either due to restricted access to the tree stem or base or due to climbing plant growth about the stem restricting the accuracy of a measurement.

Crown Clearance (metres)
Distance above ground level of the lowest point of the crown periphery in order to inform access beneath crowns where appropriate or required.

Crown Spread Radius (metres)
The crown radius from bole to crown limit identified at the four cardinal points (N, S, E and W) in order to allow presentation of the above ground constraints on the Tree Constraints Plan and Tree Protection Plan. Measurements are approximate and depend on clear access about the crown. May be estimated from aerial photographs.

Age Class
(Y) Young, (MA) Middle Aged,
(M) Mature, (OM) Over Mature, (A/V) Ancient / Veteran.

Physiological Condition
(G) Good, (F) Fair, (P) Poor, (D) Dead.

Structural Condition
(G) Good, (F) Fair, (P) Poor

ULE (Years)
Useful Life Expectancy. The anticipated future contribution to the amenity of the site. This may be influenced by the current or anticipated change in site use.

Notes and Recommendations
Tree structural condition / Site notes or description relevant to tree structure or future development works on site / Long term management recommendations.

Immediate Recommendations
Remedial tree works required to manage risks requiring attention within six months. Annual tree risk assessments are recommended.

Category
Tree category as defined within BS5837:2012 (Table 1). Categories A, B and C: trees identified for retention. Category U: trees identified for removal. Sub-categories 1, 2 or 3 according to Table 1.

Root Protection Area (metres^2)
The minimum precautionary area around each tree which should be left undisturbed (either through the erection of protective fencing or the installation of special engineering measures) calculated in accordance with BS5837:2012,

Appendix B

Tree Constraints

Summary of Design Decision Process in Relation to Tree Retention, Protection & Removal.

Damage to Trees

Many operations throughout the development process, from erecting the hoarding around the site to the grading of soils during landscaping can damage trees. Some types of damage may have an insignificant affect on the tree (e.g. snapping a small branch) while others may lead to the death of the tree (e.g. severing roots). An understanding of trees and their vulnerabilities is essential when making decisions regarding risk of damage and tree protection.

Key points relating to tree damage:

- Tree roots tend to be concentrated within the top 600mm of soil.
- It is essential to understand where tree roots are likely to be in order to make good decisions regarding tree protection.
- Tree roots can be damaged by:
    - Severance / physical damage
    - Poisoning (e.g. cement, diesel, salt, etc.)
    - Fire
    - Compaction (i.e. a weight, such as a vehicle or stored materials compress the soil so that there is no oxygen contained within it).
    - Asphyxiation (e.g. due to raised soil levels)
    - Drought and / or conditions creating drought stress
    - Poor soil condition for root growth
- Root loss or death can lead to the death of part or all of the tree and / or loss of tree stability such that the tree becomes prone to collapse.
- Tree stems may be affected by physical damage and fire
- If a significant part of the stem of a tree is damaged, this can lead to the death of part or all of the tree.
- Wounds on the tree stem can allow ingress of microorganisms (e.g. pathogens and / or decay fungi) which, in turn may lead to disease and / or the collapse of the tree.
- Tree limbs, branches and shoots can also be affected by physical damage and fire
- If a significant part of a large limb is damaged, this can lead to the death of the rest of that limb and all of the parts of the tree crown that are attached to it.
- Wounds on limbs can allow ingress of microorganisms (e.g.: pathogens and / or decay fungi) which, in turn may lead to disease and / or the collapse of the limb.

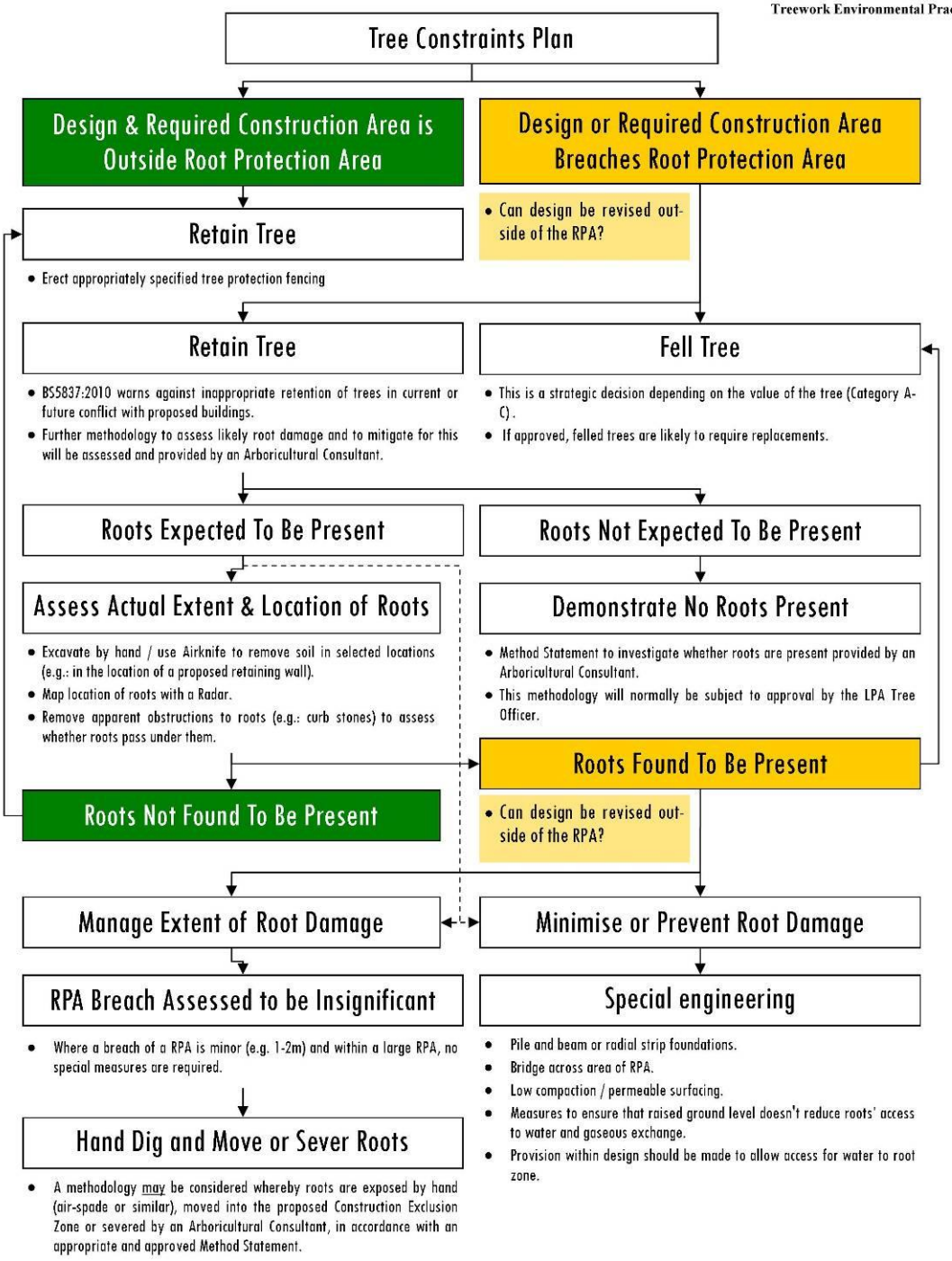
Key points relating to tree protection:

- Tree protection measures will include some or all of the following:
    - Assess location of roots
        - The Root Protection Area (RPA), generated in accordance with BS5837: 2012, provides a sufficient precautionary zone where rooting conditions are more-or-less open, unobstructed and level

        - Where root conditions are such that it is not possible to confidently accept the RPA as providing an more-or-less accurate illustration of the location of roots, it may be necessary to carry out soil investigations to ascertain the location of roots
    - Siting of proposed structures away from trees, where practicable (beyond the RPA and crown of the tree)
    - Planning of operations
    - Detailed Arboricultural Method Statements for specific operations near to trees
    - Training (e.g. tool box talks) in how to avoid tree damage for personnel working on the site
    - Supervision of sensitive operations by an Arboricultural Consultant
    - Regular monitoring of the site by an Arboricultural Consultant
    - Facilitation pruning
    - Appropriate Tree Protection Fencing and Barriers
    - Appropriate Ground Protection Measures
    - Engineering solutions to proposed structures close to trees to avoid tree damage
    - Contingency planning

Decision Process for Tree Retention, Removal & Protection

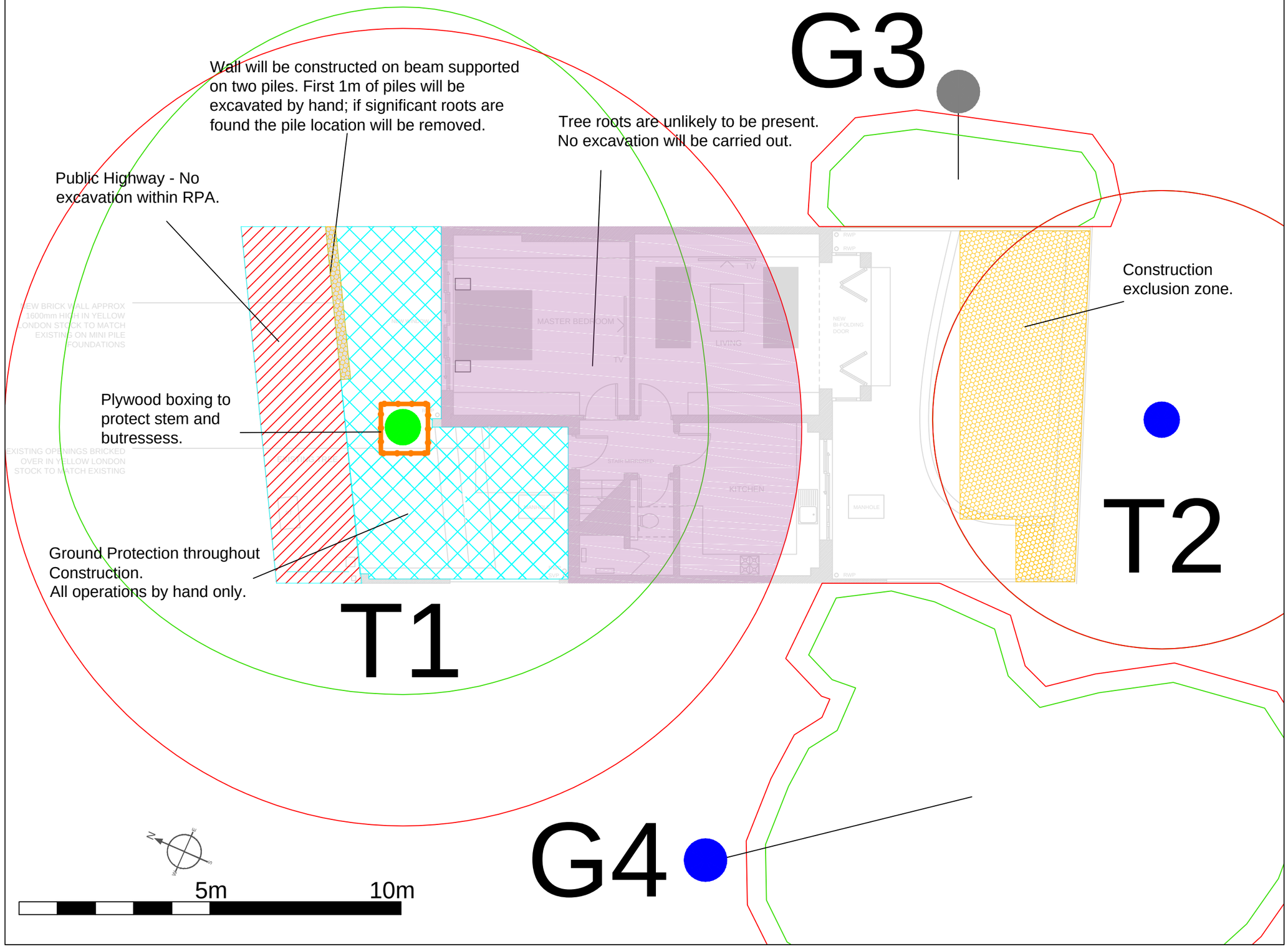
Treework Environmental Practice



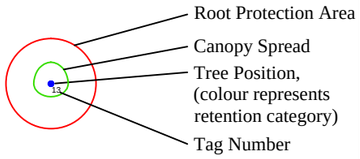
Appendix C

Tree Protection Plan

Plan showing dimensions and location of proposed tree protection fencing and ground protection measures that define the Construction Exclusion Zones. Plan also shows Root Protection Areas.



Symbol Guide



BS5837:2012 - Tree Category

- Category A Trees High Quality
- Category B Trees Moderate Quality
- Category C Trees Low Quality
- Category U Trees Poor Quality/Remove
- Construction exclusion zone
- Hand Dig
- Location of Protective Box
- No excavation zone

Client:
Frank Benhamou

Agent:
Stagg Architects

Date:
March 2015

Scale:
1:100 @ A3

Project Name:
97 Belsize Lane, London

Drawing Title:
Tree Protection Plan

Drawing Number:
150304-1.1-97BL-TPP-NK

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Appendix D

Tree Protection Measures

Includes key principals as well as Figure 2 and Figure 3 taken from BS5837:2012 Trees in Relation to Design, Demolition & Construction – Recommendations illustrating the systems to be employed for ensuring an adequate Construction Exclusion Zone about retained trees

Technical measures to prevent tree damage

Tree Pruning

Tree pruning will be carried out where the design and / or planned site operations encroach into the crowns of trees and where these encroachments can be accommodated through facilitation pruning without significantly reducing the landscape value and / or viability of the tree.

Tree pruning operations will:

- be specified by the arboricultural consultant
- be in accordance with current best practice (e.g. BS3998:2010)
- be carried out by a suitably experienced and qualified arborist

Tree Protection Fencing

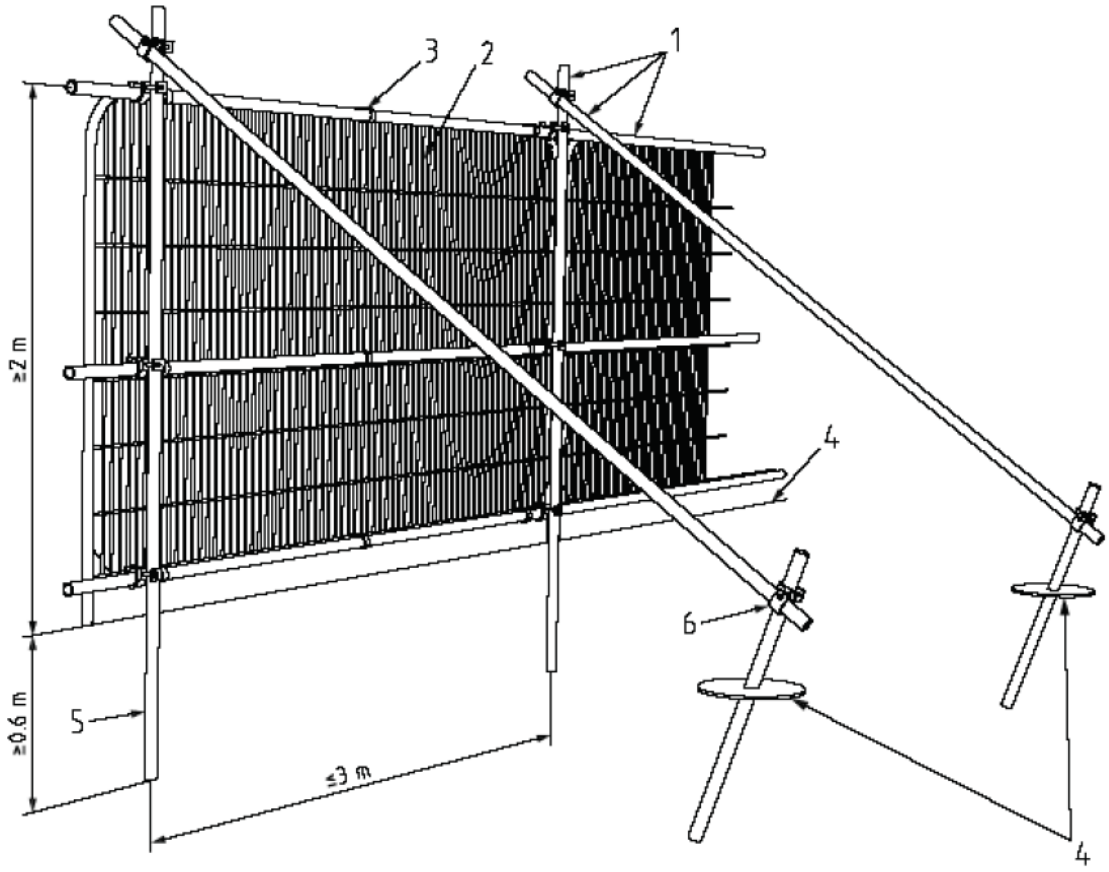
Tree protection fencing will be located at the edge of the Construction Exclusion Zone (CEZ) and will be suitably robust to provide sufficient protection for trees.

The performance requirement for fencing will be determined by the type of activity that will take place in the area around the CEZ.

Typically the performance requirement for the Tree Protection Fencing will be:

- Tree Protection Fencing will be installed prior to commencement of activity on the site.
- Tree Protection Fencing will only be removed once all works associated with the development have been completed.
- The Tree Protection Fencing will be installed and removed without causing damage to retained trees
- Installation, removal and, where required, replacement of Tree Protection Fencing will be supervised and signed off by the Arboricultural Consultant
- The Tree Protection Fencing will be stable and robust (typical construction method, in accordance with BS5837: 2012, see below)
- The area between the Tree Protection Fencing and the tree will be a Construction Exclusion Zone (CEZ)
- Fence panels will be made of mesh (e.g.: heras fencing) or, if solid, will have 30cm windows cut into sufficient panels to enable visual assessment of conditions within the CEZ
- The CEZ will be clearly identified (see construction exclusion zone sign example, below)

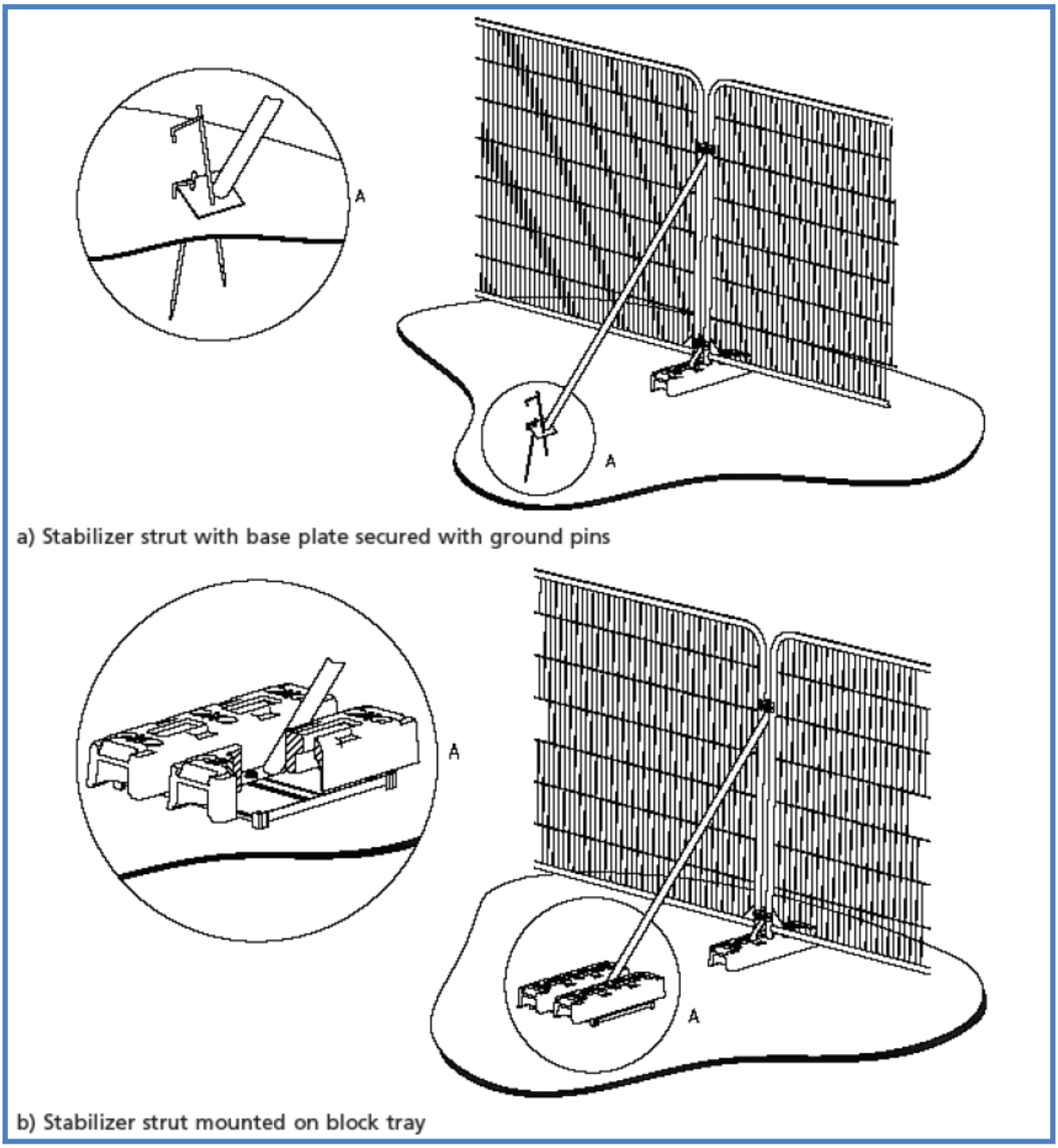
Example Tree Protection Fencing Sign



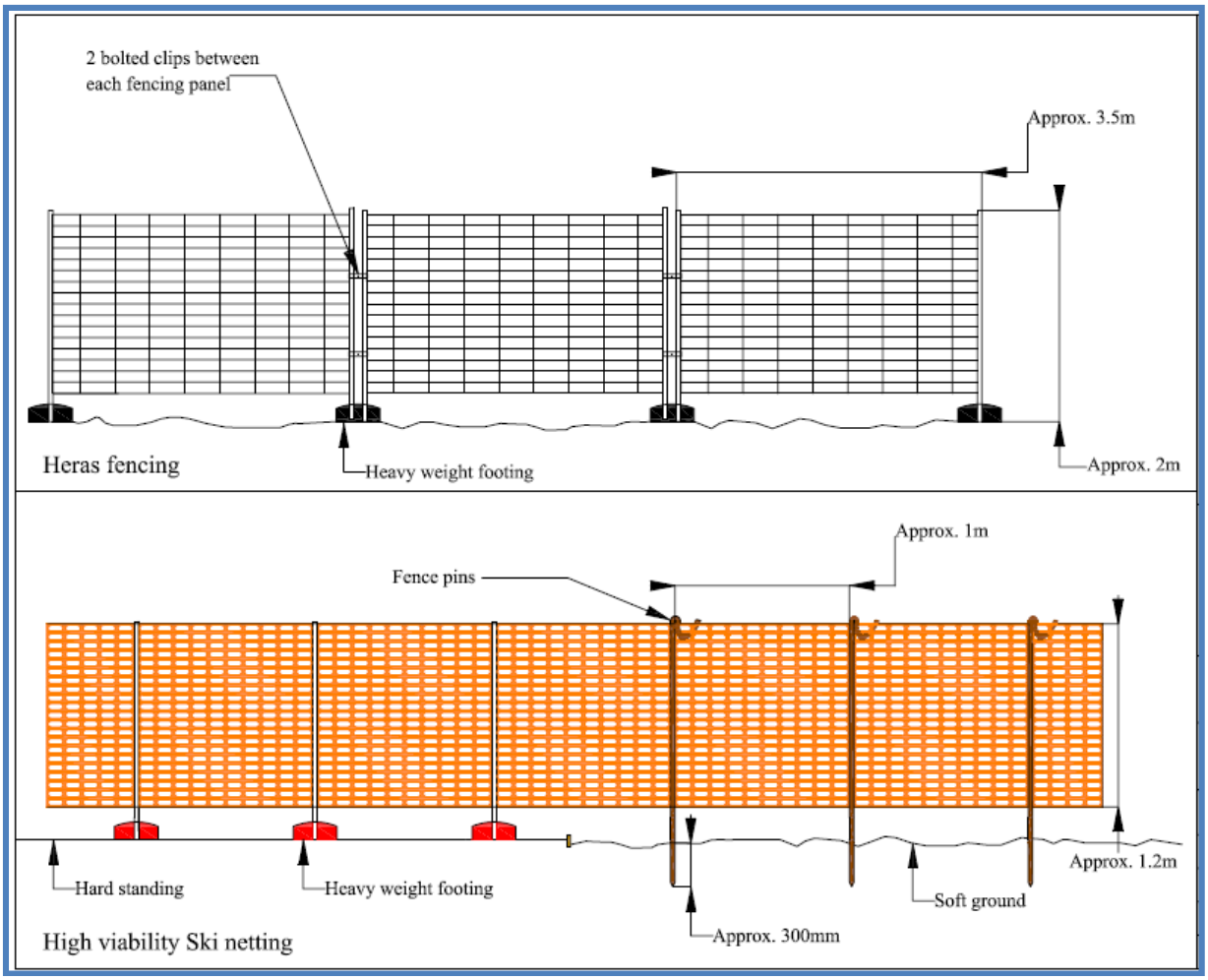
Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

BS5837: 2012 - Figure 2 – Tree Protective Barrier



BS5837: 2012 - Figure 3 – Examples of Above Ground Stabilisation Systems



Examples of lower specification fencing may be considered areas of low intensity activity

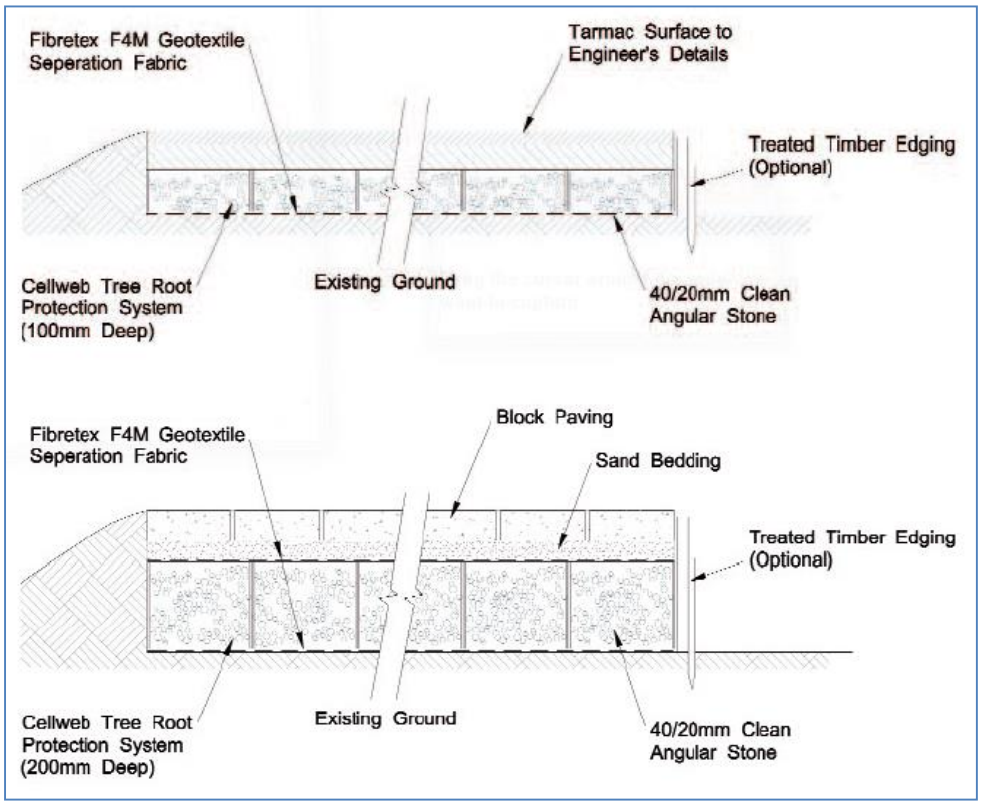
No-dig Construction and Special Engineering Measures

No-dig construction methods and special engineering measures will be employed to enable the construction of roads and other built features within the RPAs of trees without damaging tree roots. Installation of built features using no-dig and special engineering measures will meet the following performance criteria:

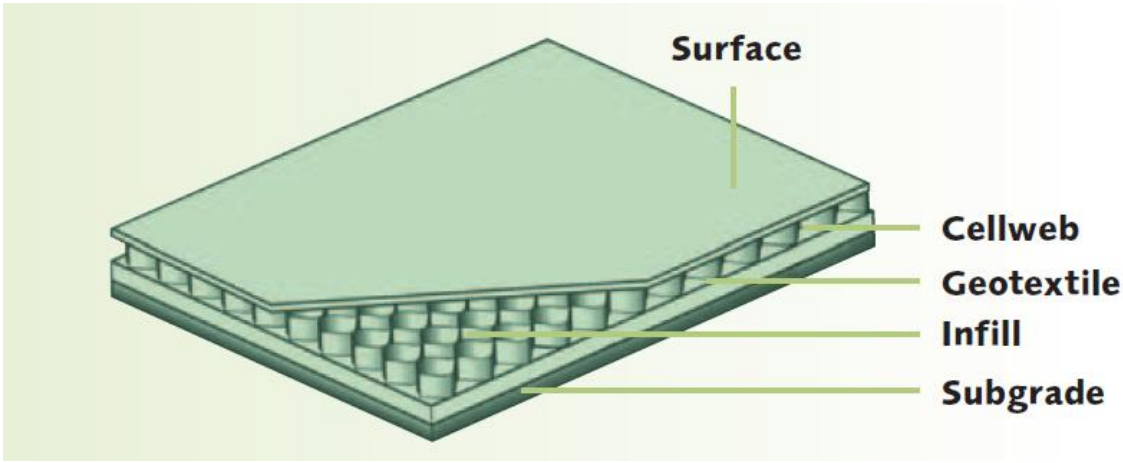
- Ensure that tree roots are not damaged
    - *For the roots of the trees to remain undamaged there must be no excavation, soil stripping or site grading within the rooting areas – in other words NO DIGGING*
- Ensure that soil is not compacted
- Ensure that no spilled toxic materials seep into the soil
- Ensure that sufficient rain water reaches tree roots
- Ensure that gaseous exchange can take place within the soil around tree roots

- All operations will be supervised and signed off by the Arboricultural Consultant

No-dig construction can be achieved through the use of a cellular confinement system (see typical specification for Temporary Ground Protection, above)



Example Specification for lighter and heavier duty constructions (Cellweb)



Examples of Cellular Confinement System Details (Cellweb)

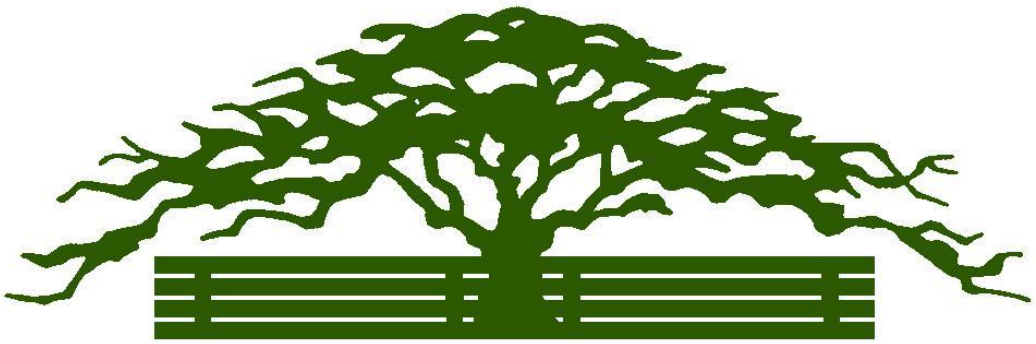
Underground Service Installation

Where underground services are to be laid with the RPAs of trees, appropriate measures will be employed to ensure that tree roots are not damaged. These may include:

1. Hand digging trenches and feeding services through roots that are present
2. Excavation of trenches using an AirKnife and feeding services through roots that are present

Excavation of Trenches will conform to the following criteria:

- Where roots are exposed, they will be protected from desiccation and damage
- The trench will be backfilled with soil of a suitable quality to encourage rooting within 6 hours
- It may be possible to prune some roots where these are less than 25mm diameter and agreed by the Arboricultural Consultant



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