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Arboricultural Survey (BS5837:2012): Impact Assessment Report & Tree Protection Plan

Site details:

8 Inverforth Close
Hampstead
London
NW3 7EX

Client details:

Mr N Levison
8 Inverforth Close
Hampstead
London
NW3 7EX

Date of Report:

12th December 2016

Report Prepared by:

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1. Introduction

1.1 This report has been commissioned by Peter Stern, Architect on behalf of Mr. N Levison to assess and provide arboricultural recommendations, an Impact Assessment and Tree Constraints Plan for the trees within close proximity of the proposed development site, 8 Inverforth Close, London, NW3 7EX.

1.2 A site visit was conducted on Friday 2nd December 2016 to survey and assess the trees. The weather at the time of inspection was dry and bright with cold temperatures.

1.3 A tree survey, report and recommendations have been compiled for 3 trees (T1-T3) surveyed within 8 Inverforth Close, London, NW3 7EX and the neighbouring site also Hampstead Heath, The Corporation of London.

1.4 The details of the subject trees are set out in the tree survey table in *Appendix A*. The trees were surveyed on the date and time shown above and the tree survey assessment information for the trees describing size, condition and surroundings are found within this appendix.

1.5 The trees located within the site and included in the survey are shown in site plan, *Appendix B.1 - B.3*, and these correspond to the tree survey results table, *Appendix A*.

1.6 Photographs of the trees can also be found in *Appendix C*.

1.7 This report and the opinions within it have been produced by Marcus Foster, a qualified Arboriculturist holding a National Diploma in Arboriculture, and the Arboricultural Association's Technicians Certificate as well as a degree in History and Society. Work experience within the industry includes work as a Contracts Manager for an Arboricultural Association Approved Company, a Local Authority Tree Preservation Officer and an independent Arboricultural Consultant.

1.8 No additional documentation has been referred to relating to the tree or the building at this property for the compilation of this report.

2. Survey Limitations

2.1 No soil excavations have been carried out.

2.2 This report only considers the trees and conditions at the time of inspection.

2.3 No invasive tools were used during this site survey.

2.4 It should be noted that vegetation including shrubs within this area have not been included in the survey and report.

2.5 This report is preliminary and further investigations may be required in order to reach firm conclusions and/or further recommendations for action.

3. Survey Details and Scope

3.1 The site survey included the 3 trees (trees T1-T3) as shown in the survey, *Appendix A,* and also highlighted on site plans *Appendix B.1 - B.3.*

3.2 The trees were surveyed from ground level from within 8 Inverforth Close and . The diameter of the trunks have been measured using a Diameter at Breast Height tape. The height of the trees have been estimated due to the topography of the site.

3.3 The following information was recorded for each tree and is shown in the Tree Schedule included in *Appendix A*:

- Number: an identity number which cross-references locations shown on the plan in Appendix A with the schedule in Appendix B.
- Species: listed by common names
- Tree Height: height in metres (m)
- Tree Spread: spread in metres (m)
- Stem diameter: measured in millimetres (mm) and taken at 1.5m above ground level
- Age Class: Y (young); EM (early-mature); M (mature); OM (over-mature)
- Vigour: G (good); F (fair); P (poor); D (dead)
- Physiological Condition: G (good); F (fair); P (poor); D (dead)
- Structural conditions: Specific comments relating to each tree
- Preliminary Management Recommendations
- Estimated Remaining Contribution (years)
- BS5837 Category Grading
- Protection Distance (if applicable – BS5827: 2012)

3.4 The information contained within the report reflects the condition of the specimens examined at the time of the inspection. As the inspection was only visual no guarantee can be given concerning the condition of the wood at present in any of the trees inspected and furthermore that no future problems or deficiencies may arise.

3.5 Information recorded in the tree survey, *Appendix A* is expanded in the report findings and recommendations have been made in *Section 5*.

Tree Survey Summary

3.6 Trees T1-T3 have been surveyed in accordance with BS5837: 2012 'Recommendations for trees in relation to construction' (BS5837: 2012) and have been rated as follows:

Category 'A' trees

Trees of high quality with an estimated remaining life expectancy of at least 40 years. Trees have been categorised as 'A' trees for one of the following reasons:

- Mainly arboricultural qualities
- Mainly landscape qualities
- Mainly cultural values including conservation

Within the Site Plan (Appendix B) those trees rated as 'A' category trees have a green outline as denoted within the site plan key.

None

Category 'B' trees
Trees of moderate quality with an estimated remaining life expectancy of at least 20 years. Trees have been categorised as 'B' trees for one of the following reasons

- Mainly arboricultural qualities
- Mainly landscape qualities
- Mainly cultural values including conservation

Within the Site Plan (Appendix B) those trees rated as 'B' category trees have a blue outline as denoted within the site plan key.

T3

Category 'C' trees
Trees of low quality with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter below 150mm. Trees have been categorised as 'C' trees for one of the following reasons

- Arboricultural qualities - unremarkable trees of very limited merit
- Mainly landscape qualities
- Trees with no material conservation or cultural value

Within the Site Plan (Appendix B) those trees rated as 'C' category trees have a grey outline as denoted within the site plan key.

T1 & T2

Category 'U' trees
Trees 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.

Within the Site Plan (Appendix B) those trees rated as 'U' category trees have a red outline as denoted within the site plan key.

None

4. Findings and Discussion

Site Overview

4.1 There are 3 trees (T1-T3) located within the site / close proximity of the proposed development and associated construction site activities which incorporate the construction of a new garage attached to the existing dwelling. Trees T1 - T3 have been surveyed and numbered as is depicted within the enclosed site plans.

4.2 Without the provision of adequate protection during the construction period the proposed development has the potential to affect the trees in the following ways:

- **Potential excavations required for development works in close proximity to the trees located within the rear garden of the property and the neighbouring Corporation of London land**

- **Associated construction site activities which have the potential to cause long term damage to the trees and the amenity value which they offer**

- **Compaction of the ground surrounding the trees during construction works**

- **The use of and storage of materials and chemicals on site during the construction process**

- **The distribution of materials from the public highway to the construction site could cause damage to the trees**

4.3 The trees have been surveyed taking into account the condition, general health and form. In addition they have been surveyed taking into account the amenity value that is offered in relation to both the landscape and surrounding buildings. This report outlines the impact that the proposed development will have on the overall landscape as well as individual trees; it provides recommendations to ensure that long-term amenity value for the area is retained and that the health and structural integrity of the trees is not compromised.

4.4 The report has been written with close reference to the British Standard Guidance, British Standard 5837: 2012 ‘Recommendations for trees in relation to construction’ (BS5837: 2012), which addresses the juxtaposition between trees and structures. The aim of this report is to address these issues and highlight the solutions required in order for the implementation of the development to be carried out without detrimentally affecting the structural integrity of the trees both in the short and long term.

Tree Survey Notes in Relation to Construction Method:

4.5 The trees are protected by virtue of their location within both the Hampstead Conservation Area within the London Borough or Camden and The Corporation of London site - Hampstead Heath (neighbouring land). Therefore in order to implement the proposed development, recommended protective measures are highlighted where deemed appropriate.

Tree T1

4.6 Tree T1 is a mature to over-mature Lime tree which is in generally in a poor state, leaning heavily to the south. The tree has been recently pollarded within the past 3-4 years and this work has likely been carried out on an ongoing basis resulting in the low - mid pollard. The decay within the main union which extends up the south western stem in addition to the excessive lean to the south accounts for the current form of the tree. Relating to this, its limited lifespan, the tree has been classified as a 'C.1' category tree (BS5837:2012).

4.7 Tree T1 has a significant recommended Root Protection Area (RPA) - 13.5m from the main stem - which does extend within the building footprint of both the existing property and the proposed development also. The tree is sited 1.4m from the boundary line with 8 Inverforth Close at its closest point and therefore it is inevitable that the original development did impact on the tree's northern root plate particularly taking account of the lean to the south and the likely significant compensatory tensile roots to the north.

4.8 The proposed location of the garage is currently hard landscaping which will likely be laid on a compacted sub base approximately 100mm depth. The extent of root plate damage below this level as a result of the original construction process for this property on the root plate of tree T1 is unknown in this area as the construction method for this relatively modern development has not been investigated. However, the retention of the tree within the scheme, despite its poor form implies that significant roots still exist to the north and therefore the implementation of the proposed development will require tree protection measures as follows:

4.8.1 Tree Protection Fencing
This should be implemented for the tree on the boundary line between the site No.3 Inverforth Close and Hampstead Heath to ensure damage does not occur to the soft landscaped ground within Hampstead Heath

4.8.2 Excavations & Root Severance Guidance
Close adherence to Excavations and Root Severance guidance as shown within this report for all construction site activities which occur within the RPA (Root Protection Area) of this tree

4.8.3 Structural Engineering / Foundation Solutions
Solutions (for example pile foundations in locations where anchorage roots do not exist) to account for significant roots in this area. Locations will be required to be determined using hand dug techniques for the upper 1000mm in pile locations

4.8.4 Retention of Existing Hard Landscape
It is recommended that the base to the existing hard landscape is retained in situ where possible and where required for removal close adherence to arboricultural guidelines as outlined within an Arboricultural Method Statement should be adhered to

4.8.5 Traffic system for main driveway area
In order to avoid damage to the root plate of tree T1 and other mature trees within the Hampstead Heath land directly adjacent, a traffic management system is recommended to avoid the build up of more than 1 x vehicle within the driveway area at any one time.

4.8.6 Designated Storage Area for Materials / Machinery / Chemicals
The storage of materials and machinery must be within a designated area outside of the RPA of tree T*1*

4.9 By implementing the above tree protection measures as outlined within an Arboricultural Method Statement the tree, T1, can be retained without damage to the root plate or main stem although it should be noted that this tree does have a limited lifespan due to the significant decay with one of the three main stems and its proximity to the main driveway area of Inverforth Close.

Tree T2

4.10 Tree T2 is a mature Apple tree sited within Hampstead Heath and likely planted in conjunction with the construction of the development Inverforth Close or soon after. The tree is structurally sound and has compact balanced form. The tree will not be affected by the proposed development for the following reasons:

- Tree T2 and its associated RPA is sited outside of the proposed development site

- The canopy of tree T2 also does not overhang the development site

- The tree is sited within the woodland area of the adjacent Hampstead Heath with no access point from the development site

Therefore no protection measures are recommended for this tree.

Tree T3

4.11 Tree T3 is a mature Himalayan Birch tree which likely also dates to the original development. Although the tree has a congested multi-stemmed base with 9 main stems develop to form a balanced and compact canopy.

The tree is rated as a 'B.1' category tree (BS5837:2012) due to its good form and relative high visual amenity from within the adjacent Hampstead Heath.
4.13 The tree will not be affected by the proposed development for the following reasons:

- Tree T3 and its associated RPA is sited outside of the proposed development site

- The canopy of tree T2 also does not overhang the development site

- The tree is sited within the rear garden area of No.8 Inverforth Close with no access point from the development site

Therefore no protection measures are recommended for this tree.

Summary

4.12 Tree protection measures are required for tree T1 only and the main areas requiring protective measures are highlighted within *Section 4.8.* In summary these are as follows:

- Tree Protection Fencing

- Excavations & Root Severance Guidance

- Structural Engineering / Foundation Solutions

- Retention of Existing Hard Landscape

- Traffic system for main driveway area

- Designated Storage Area for Materials / Machinery / Chemicals

4.13 Outline protective measures are highlighted within *Section 5* which require close adherence to in addition to all factors above which should be outlined within an Arboricultural Method Statement

5. Outline Tree Protection Plan & Measures

5.1 Excavations & Root Severance Guidance

Protective measures are required when implementing the following with particular reference to the implementation of locations for pile foundations:

- Excavations for the development within the northern RPA of tree T1

- All construction site activities within the RPA of tree T1

it should be noted that in the case of major roots being discovered the following points should be closely adhered to:

- **The severance of any tree roots encountered larger than 25mm in diameter MUST NOT occur without prior consultation with the Local Authority Tree Officer or appointed Arboricultural Consultant.**

- **If at any point it is deemed not possible to continue with excavations without having to damage very significant tree roots, the Local Authority Tree Officer and / or the appointed Arboricultural Consultant must be contacted**.

- **Any excavations which for any reason are required within the recommended ROOT PROTECTION AREA must be firstly agreed in writing with the Local Authority Tree Officer and then be hand dug for the first 1m with close adherence to the specifications as highlighted below.**

5.2 Tree Protection Fencing (T1)

Protection of tree T1 will require the following tree protection:

- Tree Protective fencing for length of boundary where fence will be removed and boundary line between No.8 & hampstead Heath becomes exposed
- Fencing should be implemented to guidelines as specified within BS5837:2012 - see *Appendix E*

5.3 Site Notices

The site notices as included in *Appendix D* summarising the above information should be visible at all times for employees working within the site within close proximity of the trees.

5.4 Traffic Management System

A traffic management system must be implemented whereby the following is adhered to:

- One vehicle at any one time must be permitted within the driveway area between the main access gate and the private gate to No.3 - No.8 Inverforth Close

- The traffic management system must clearly define that the driveway is used for access only in a direct manner without waiting or unloading of materials

5.5 Installation of Utility Services

If for any reason installation of utility services within the Root Protection Area of tree T1, the consulting arboriculturist and Local Authority must be notified prior to any ground tree protection / fencing and barrier removal and the following details adhered to:

- Trenching for the installation of underground services severs any tree roots present and can have a detrimental impact on the structural integrity of affected trees. When services are required to pass through a Tree Protection Area, detailed plans showing proposed routes should be drawn up in conjunction with the consulting arboriculturist to avoid long term health and anchorage problems for related trees.

- The preferable method for trenching is to use a 'Air Spade' or similar to remove soil with compressed air, therefore minimising damage to roots in the process

Further reference can be made to National Joint Utilities Group (Volume 4, Issue 2) for guidance but any approach must be approved by both the consulting arboriculturist and Local Authority tree officer.

5.6 Storage of Materials, Machinery & Chemicals

A designated area for storage of materials, machinery and chemicals is recommended outside of the RPA of any trees within close proximity of the proposed development. By locating the area for storage of materials within the private residential area no trees are affected by this element of the construction process.

5.7 Arboricultural Supervision

It is recommended that an Arboricultural Supervision Scheme is implemented to ensure that Tree Protection is implemented as specified within this report therefore avoiding significant tree root damage or compaction of tree roots. The following is recommended:

Before & During Land Preparation:
- Approval of any utility service routes approved that infringe within the RPA
- Approval of Site Storage Area
- Approval of Root Protection Areas (where fencing not implemented)
- Approval of Tree Protection Fencing positioning

Ongoing throughout development process:
- Monitoring of tree protection / condition
- Monitoring of land use
- Monitoring construction methods and storage areas in relation to trees

5.8 Summary

With close adherence to the above points and to the following:

- **Full implementation of Tree Protection Specifications**
- **Full adherence to Tree Protection Area**
- **Comprehensive use of the Tree Protection Notice**
- **Implementation of Arboricultural Supervision where required**

all trees surveyed and proposed for retention, can remain protected from the construction process and can continue to provide amenity value in this area for the long term.

6. Recommended Tree Management Plan

6.1 Any tree work should be carried out to *BS 3998; 2010 'Tree Work – Recommendations*' & to standards set within the Arboricultural Association's 'Standard Form of Contract and Specifications for Tree Work'.

6.2 Recommended Tree Works Specification

T1 Lime
*Re-pollard and further inspect south westerly stem to provide further recommendation**

** Works only to be carried out by The Corporation of London and are recommended to be carried out for reasons of health and safety in line with good arboricultural practice. These works are not related to the proposed development for which no works are recommended.*

T2 Apple
No action required at present

T3 Birch
No action required at present

7. Appendices

Appendix A

Tree survey (BS5837:2012)

8 Inverforth Close
Hampstead
London
NW3 7EX

Colour Key: BS5837: 2012
(see *Section 2.6*)

- Category A
- Category B
- Category C
- Category U

8 Inverforth Close, London, NW3 - BS 5837: 2012 Tree Schedule – December 2016

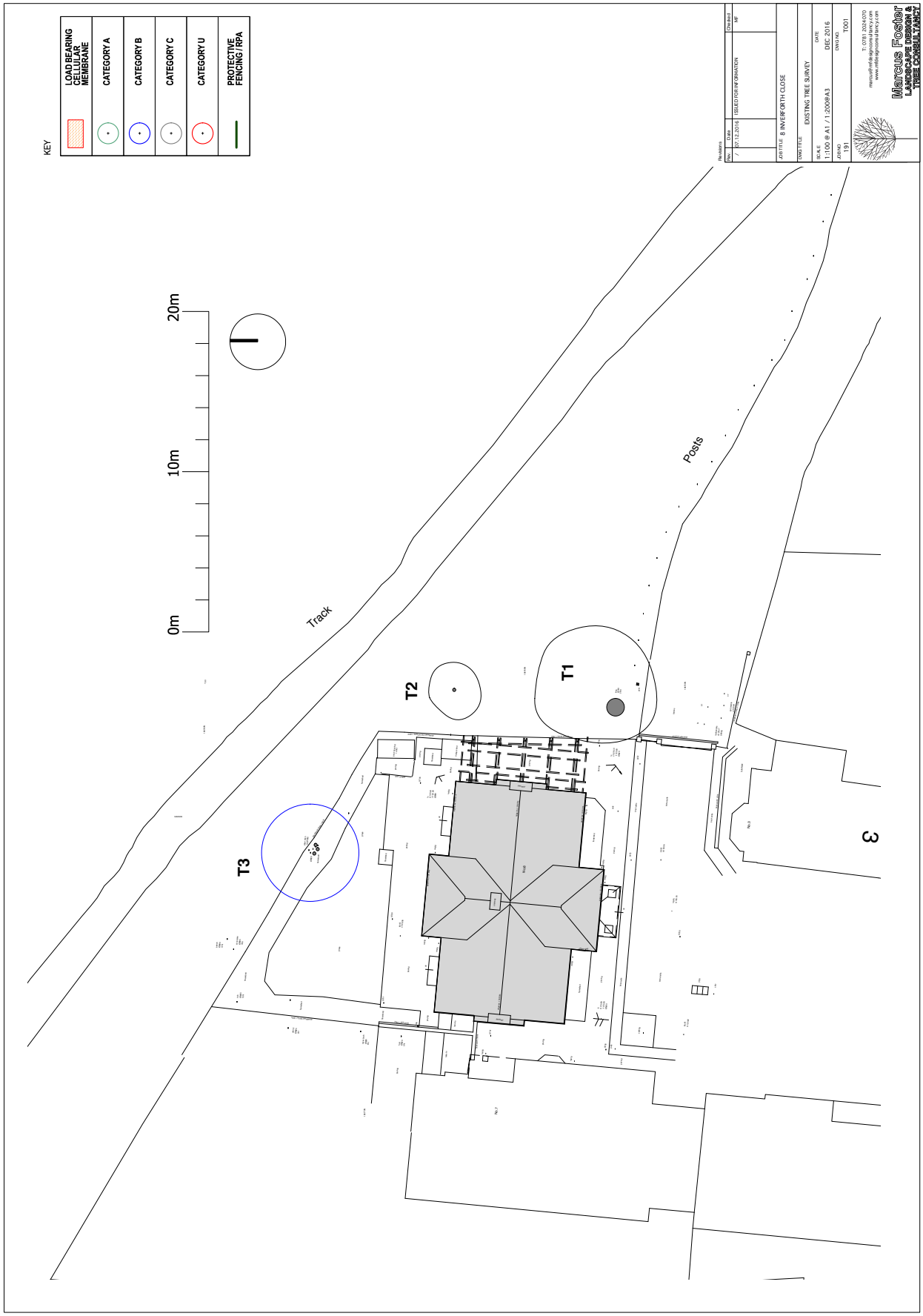
Tree No	Species	Ht (m)	DBH. (mm)	Sprd (m)	Age	Visual Cond.	Phys. Cond.	Comments / Structural condition	Management Recommends.	Estimated Remaining (years)	BS 5837 Rating	RPA Distance (m)
T1	Lime	14	1130	N: 4 E: 5 S: 5 W:3	M / OM	F	G	Tree is heavily leaning at base to the south - good compensatory growth although extensive epicormic growth at base. On southern side extensive single fluting extends from base; appears sound. Main union at 3.0m showing signs of decay. 3 stems develop. South western stem has been heavily reduced with fungus from main union to 5-6m - likely *Bjerkandera adusta*; top of this stem has full cavity. Further 2 stems heaviy reduced to 11-13m to account for decay; reasonable condition. Last reduced 3-4 years ago	Re-pollard and further inspect south westerly stem to provide further recommendation	10 years +	C.1	3.0m
T2	Apple	6	180	N: 2 E: 2 S: 2 W:2	M	G	G	Generally structurally sound; a good ornamental specimen, lightly suppressed by neighbouring trees	No action required at present	40 years +	C.1	6.7m
T3	Birch	11	m/s 180	N: 3 E: 4 S: 3 W:2	M	G	G	Tree is generally structurally sound at base with good root flare - 6 stems developing from main union which is congested but gives way to balanced canopy, previously reduced back to west towards property	No action required at present	20 years +	B.1	1.8m

Appendix B

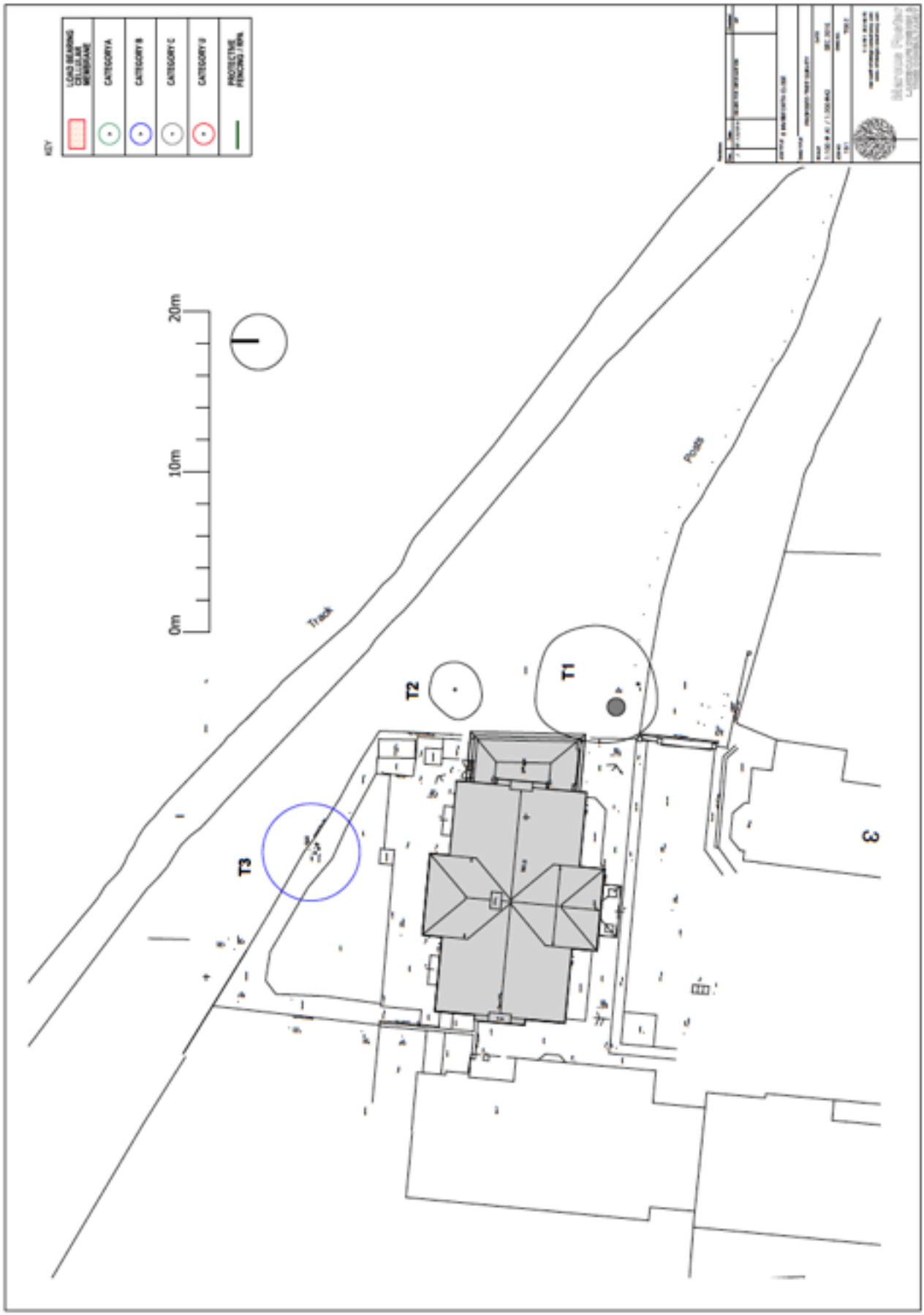
Existing & Proposed Site Plan (BS5837:2012) *incorporating* Tree Constraints Plan

8 Inverforth Close Hampstead London NW3 7EX

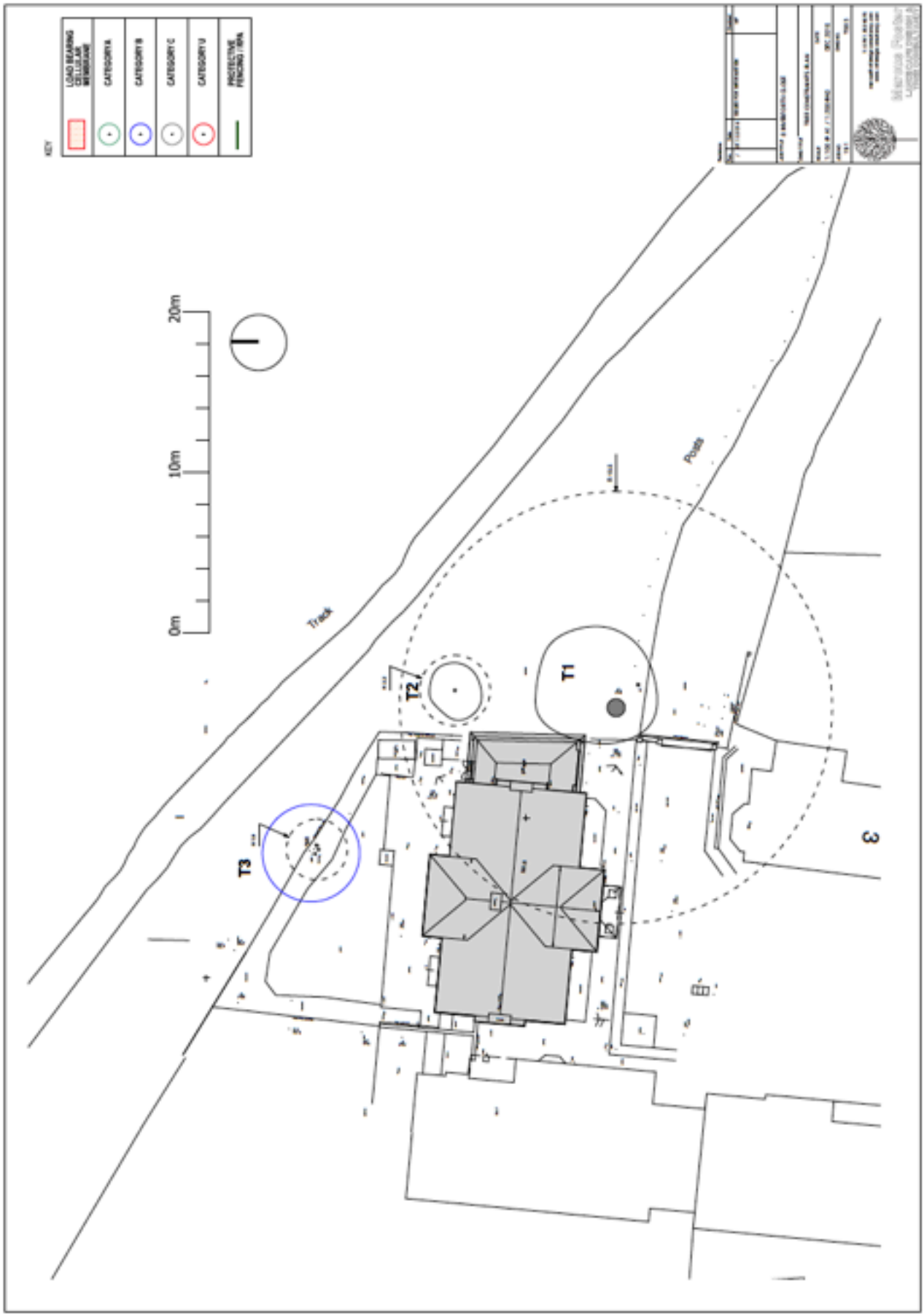
Appendix B.1: Existing Site Plan - 8 Inverforth Close, London, NW3



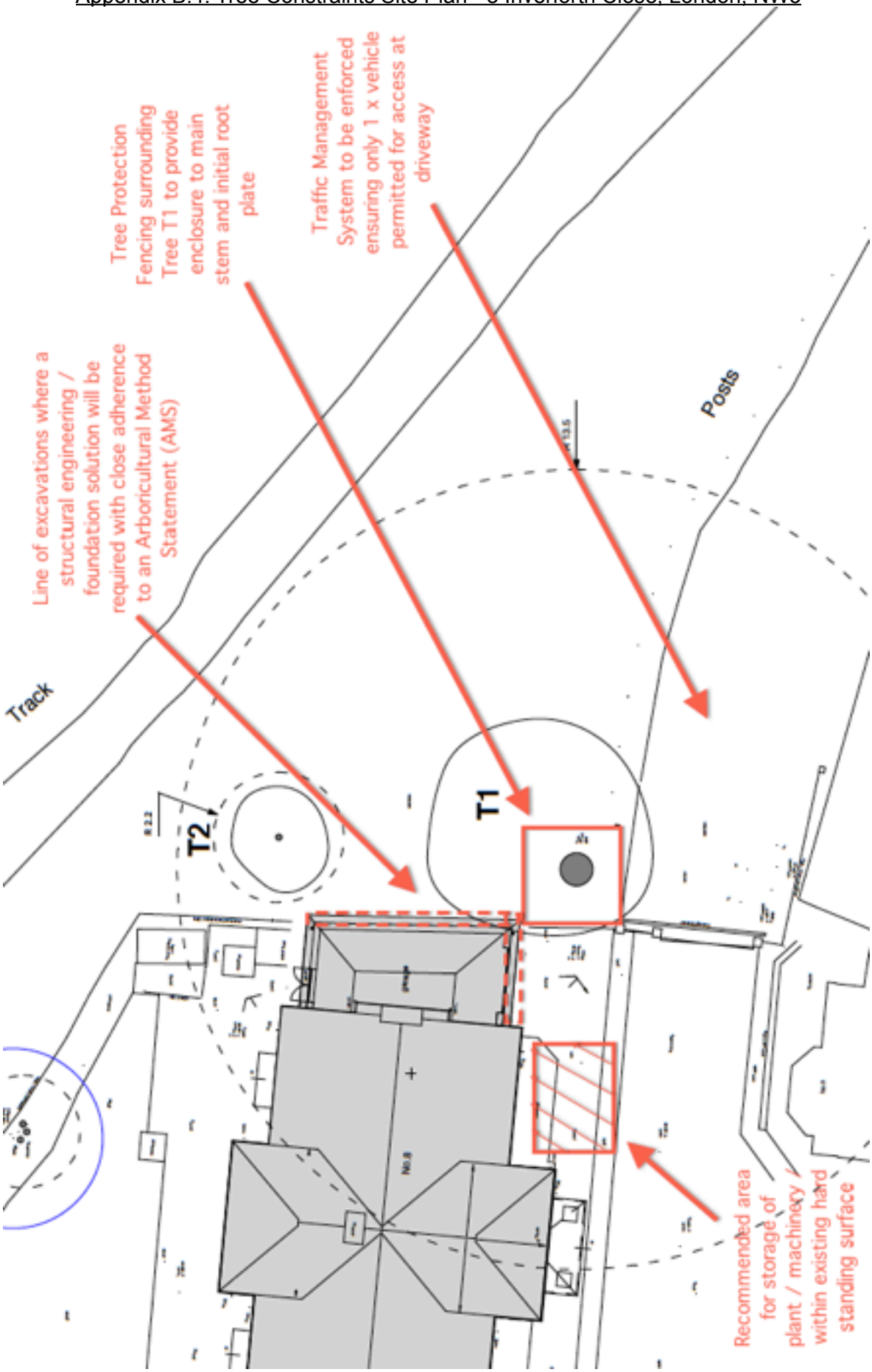
Appendix B.2:Proposed Site Plan - 8 Inverforth Close, London, NW3



Appendix B.3:Proposed Site Plan w/ RPA - 8 Inverforth Close, London, NW3



Appendix B.4: Tree Constraints Site Plan - 8 Inverforth Close, London, NW3



Appendix C

Site Photographs for:

8 Inverforth Close
Hampstead
London
NW3 7EX

* Taken 2nd December 2016

C.1 Photograph of trees T1 & T2, taken from land adjacent to Inverforth Close, Hampstead Heath as viewed in a westerly direction

C.2 Photograph of base of tree T1, land adjacent to Inverforth Close, Hampstead Heath as viewed in a westerly direction

C.3 Photograph of main stem and fruiting bodies on south western stem of tree T1, land adjacent to Inverforth Close, Hampstead Heath as viewed in a southerly direction

C.4 Photograph of tree T1, land adjacent to Inverforth Close, Hampstead Heath as viewed in a northerly direction

C.4 Photograph of tree T1, land adjacent to Inverforth Close, Hampstead Heath and also surrounding trees within Hampstead Heath / 1 Inverforth Close as viewed in a northerly direction

Appendix D.1:
Site Specific Tree Protection Notice

Tree Protection Notice (BS5837: 2012):

8 Inverforth Close
Hampstead
London
NW3 7EX

Notice to be clearly shown on site
AT ALL TIMES

TREE PROTECTION
CONSTRUCTION SITE NOTICE

Guidance for ALL EMPLOYEES working on site in relation to the tree protection required at all times

Site: 8 Inverforth Close, London, NW3

- There should be no storage of fuels, chemicals or cement based products within RPA of trees T1 - T3 other than where designated on a hard standing surface

- There should be no storage of materials or mixing of chemicals / concrete within this area at any time. There should also be no fires within the site

- . Notice boards, telephone cables etc should not be attached to any part of any of the trees.

- The severance of any tree roots encountered larger than 2.5 cm in diameter MUST NOT occur without prior consultation with the Local Authority Tree Officer or appointed Arboricultural Consultant.

- If excavations do occur within the specified Root Protection Area where hand dug excavations are being undertaken, ANY tree roots encountered over 2.5cm in diameter should be retained where possible. Hand digging is to continue around any such tree roots.

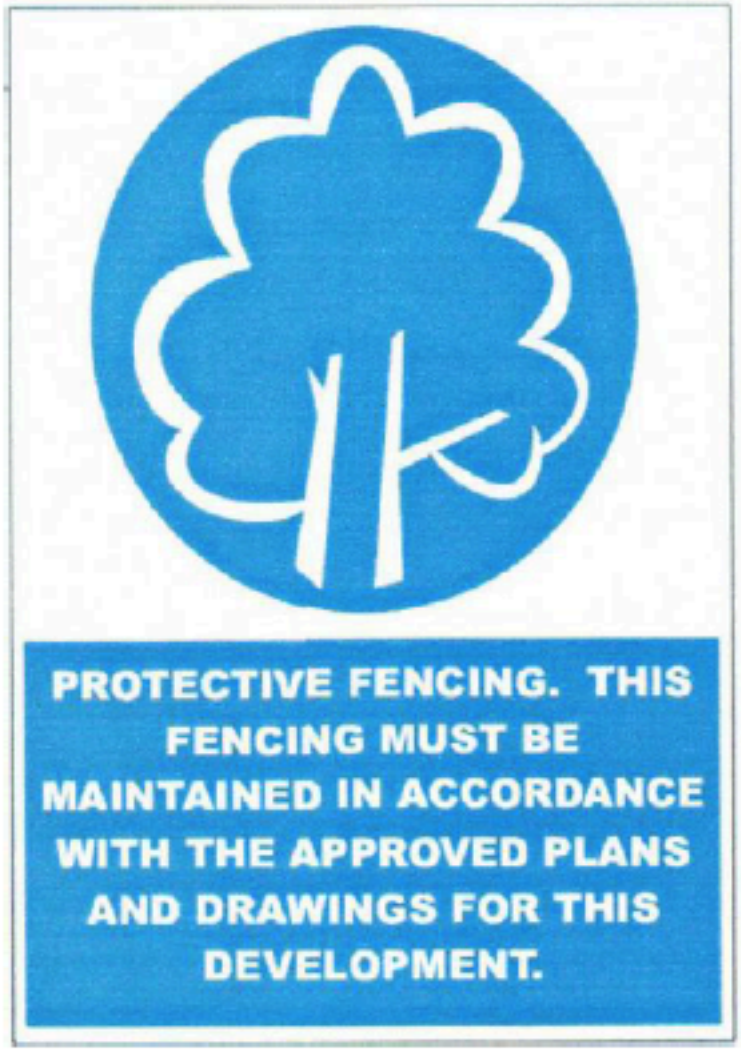
If at any point it is deemed not possible to continue with excavations without having to damage significant tree roots, the Local Authority Tree Officer and / or Arboricultural Consultant must be contacted.

Marcus Foster (Arboricultural Consultant): 0781 202 4070
Local Authority Tree Officer (LB Camden): 020 7974 4444

Appendix D.2:
Generic Tree Protection Notice
(BS5837:2012)

8 Inverforth Close
Hampstead
London
NW3 7EX

Notice to be clearly shown on site
AT ALL TIMES



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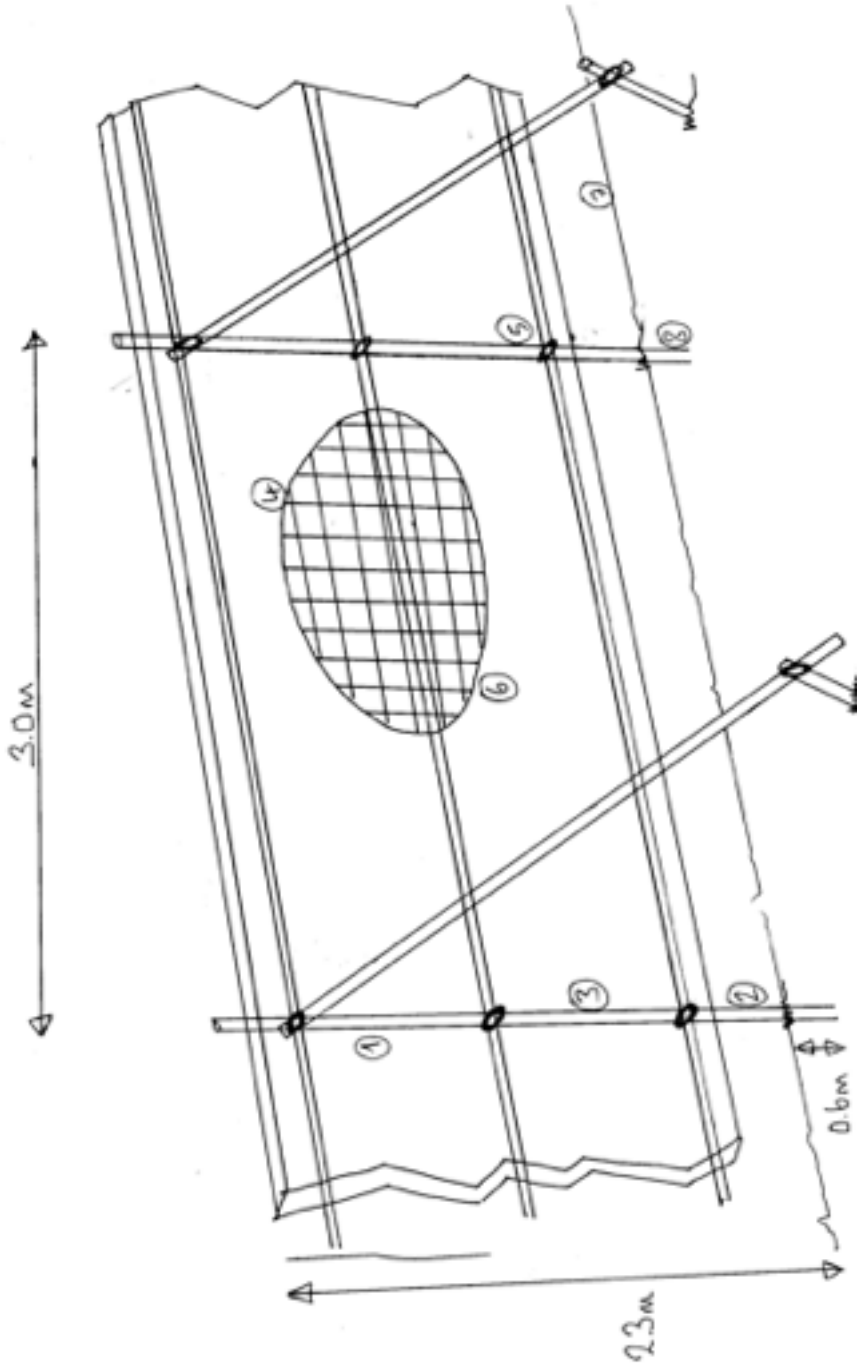
Appendix E: Example of Tree Protection Fencing as outlined in BS5837 (2012) Specifications



Tree Protection Specification Key:

1. Scaffold tubes
2. Uprights driven into ground
3. Panels secured to uprights
4. Weldmesh secured to fence
5. Standard clamps
6. Wire secured to fence
7. Ground level
8. Tubes driven 0.6m into ground

Appendix F: References

1. *BS5837: British Standard: Trees in relation to construction - Recommendations*, British Standard (2012)

2. *Principles of Tree Hazard Assessment and Management,* Lonsdale, D. (Department for Transport, Local Government and the Regions, 1999)

3. *The Body Language of Trees*, Mattheck, C. and Breloer, H. (HMSO, 1994)

4. *Trees in Britain,* Philips, R. (Pan Books, 1978).

5. *Diagnosis of Ill Health in Trees,* Strouts, R. and Winter, (TSO, 1994)

6. *NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (Issue 2),* (November 2007)