

# BS 5837:2012 Tree Survey, Arboricultural Impact Assessment, Arboricultural Method Statement & Tree Protection Plan



31 Downside Crescent  
London  
NW3 2AN

23<sup>rd</sup> February 2023

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# 1. Instruction

Usherwood Arboriculture have been instructed to provide a tree survey, arboricultural impact assessment, method statement and tree protection plan with regards to the proposal to extend the existing rear extension at 31 Downside Crescent, London, NW3 2AN. The survey has been carried out in accordance with BS5837:2012, Trees in relation to design, demolition and construction-Recommendations.

Drawing No.	Title	Drawn/Written by
A1000_P1	Existing drawings	delve architetcs
A2000_P1	Proposed drawings	delve architects
S101 Rev: P2	Plan-Foundations	Chris Brown Structural Engineering Ltd

Table 1. Drawings and documents supplied for consideration within this report

## 2.Executive Summary

This document takes into account the potential impact of development upon trees both within and in close proximity to 31 Downside Crescent. A total of 3 individual trees have been surveyed, although the report deals specifically with the construction of a rear extension within the outer edge of the root protection area (RPA) of a single mature Oak tree identified within this survey as T1. Adherence to the arboricultural method statement and tree protection plan will ensure that no damage or impacts are suffered by T1 Oak.

## 3.The Site

The application site is located on the north side of Downside Crescent and within the Park Hill and Upper Park conservation area. The site is level and currently laid to grass with patio area. The rear garden is bounded by wooden fences to the east and west with a brick wall forming the rear northern boundary. A number of small trees and shrubs grow on the site perimeters with a large mature category A Oak tree dominating the garden landscape.

### Soil conditions.

The British Geological Survey, Geology of Britain viewer describes the local bedrock geology as London Clay formation- clay, silt and sand, there are no details of the superficial material.

### Legal Constraints

Trees can sometimes be the subject of a Tree Preservation Order (TPO) or a property may be situated within a designated conservation area. Both a TPO and conservation area designation require the owner/occupier or those wishing to work on trees to seek the Council's consent or provide written notice prior to carrying out any works. It is a criminal offence to carry out any works to protected trees without the Council's consent. The site is located within the Park Hill and Upper Park conservation area, however, Usherwood Arboriculture has not carried out a statutory check with regards to tree preservation orders.





Aerial image above, courtesy of Google Maps, showing the application site outlined in red.

## 4. Tree Survey

Trees were assessed in accordance with recommendations and guidelines contained within British Standard 5837:2012 - 'Trees in relation to design, demolition and construction- Recommendations' henceforth referred to as BS5837. The survey was carried out in relation to the condition and quality of trees growing either within or near the boundary of the site. Where details have been omitted including the heights of crown break and the direction of the first major lateral branch, these details were not seen as being relevant to this application. Where access allowed, tree heights were measured with a Haglof electronic clinometer and trunk diameters with a diameter tape measure. Crown spreads were measured with a tape measure at the four cardinal points.

All trees were assessed from the ground utilizing the Visual Tree Assessment method as developed by Mattheck and Breloer (The Body Language of Trees, Research for Amenity Trees No 4 Department of the Environment).

This tree survey should not be treated as a hazard assessment, it has been carried out to inform the planning process with regards to the appropriate retention and protection of trees as visual and ecological assets within the landscape. However, where clear and obvious defects have been observed, the relevant parties have been informed.

## Tree Assessment and Categorization

Tree quality ratings have been assessed in accordance with BS5837's Table 1, Cascade chart for tree quality assessment.

**U**= Trees in such a condition that any existing value would be lost within 10 years and which should in the current context, be removed for reasons of sound arboricultural management. (Trees that have serious, irremediable structural defects, such that their early loss is expected due to collapse or ill health including trees that will become at risk due to the loss of other U category trees).

**A** = Trees of high amenity quality and value in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested).

- 1) Trees that are particularly good examples of their species if rare, unusual or essential components of groups or formal or semi-formal arboricultural features.
- 2) Trees, groups of trees or woodland which provide a definite screening or softening effect to the locality in relation to views in or out of the site, or those of particular visual importance.
- 3) Trees groups or woodlands of significant conservation, historical, Commemorative or other value (e.g. veteran tree or wood pasture).

**B** = Trees of moderate quality and amenity value: those in such a condition as to be able to make a significant contribution (a minimum of 20 years is suggested).

- 1) Trees that might be included in the high category but are down-graded because of impaired condition (e.g. remediable defects).
- 2) Trees, groups of trees or woodland that form distinct landscape features but do not form essential components of the landscape.
- 3) Trees with clearly identifiable conservation or other cultural benefits.

**C** = Trees of low quality and amenity value currently in adequate condition to remain until new planting is established (a minimum of 10 years is suggested) or trees under 150 mm stem diameter.

- 1) Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.
- 2) Trees presenting groups or woodlands but not with a significantly higher landscape value and or offering low or temporary/transient screening benefit.
- 3) Trees with no conservation or other cultural benefits.

Note: Category C trees are the least suitable for retention, where they would impose a significant constraint on the development their removal for development purposes may be considered acceptable by the LPA.

## 5.Tree Survey Data & Appraisal

This survey concerns 3 individual trees, full details of the survey data can be found in the Tree Survey Schedule at **Appendix 1**. An explanation of Tree Quality category ratings is set out on the previous page.

### Category A individual trees and groups of trees.

1 individual tree has been graded as category A (trees of high quality) as part of this survey.

### Category B individual trees and groups of trees.

No individual trees have been graded as category B (trees of moderate quality) as part of this survey.

### Category C individual trees and groups of trees.

2 individual trees have been graded as category C (trees of low quality) as part of this survey.

### Category U individual trees and groups of trees.

No individual trees have been graded as category U (trees unsuitable for retention) as part of this survey.

3 tree species were recorded as part of this survey, their common and botanical names are set out within the table below.

Common Name	Botanical Name
Cherry sp	Prunus sp
Common Ash	Fraxinus excelsior
Pedunculate Oak	Quercus robur

Table 2. Tree species recorded on site and their botanical names



## T1 Oak & T2 Off-site Ash



Images above of the mature category A Oak tree situated in the north-east corner of the garden and the second image of T2 off-site category C Ash, recently topped to a 5m high monolith with no remaining vegetative growth, so no longer considered a constraint to the proposed development.

## 6. Arboricultural Impact Assessment

The term Arboricultural Impact Assessment sets out the potential risks and threats associated with proposed construction to trees both within and near to an application site, seeking to minimise those risks through the implementation of a sound and recognised methodology set out within an arboricultural method statement.

Construction and development in general can impact trees in a number of ways, the most notable being damage to the tree's root system leading to decline and potential structural instability. BS5837 recognises this and sets out recommendations to minimise damage associated with the effects of soil compaction and root severance.

The proposal to extend the depth of the existing extension at 31 Downside Crescent by 1 metre will encroach upon the notional root protection area (RPA) of T1 Oak by 4.5m<sup>2</sup>, or less than 1%, even so, a precautionary approach will be taken during construction as set out within the arboricultural method statement.

T1 category A mature Oak grows in the north-east corner of the garden which is largely level and laid to lawn. The proposed addition to the extension extends into the outer southern edge of the RPA as shown on the arboricultural impact and tree protection plans at **appendix 3 and 4.**

The addition to the existing extension will be set upon isolated pads with lintels spanning in between. A foundation detail can be found at **appendix 6**.

Excavation for the installation of pads and lintels will be initially carried out by hand and under arboricultural supervision, ensuring any unintended root damage can be avoided.

### **Root Protection Areas- General information**

BS 5837 describes the root protection area (RPA) as a layout design tool indicating the minimum area around a tree deemed to contain sufficient roots to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority.

The **Root Protection Areas (RPA)** have been calculated in accordance with Table D1 of BS5837:2012. Notional RPA's are plotted on the arboricultural impact assessment plan at **appendix 3**. The RPA is defined by the formula in paragraph 4.6 from the British standard and may be refined by considering current on-site constraints to root activity such as buildings, walls, earthworks, hard paving and services.

### **Root Systems and compaction**

Root systems can easily be damaged during construction works, leading to the sometimes-rapid decline of valuable trees. The biggest problem for trees on or close to construction sites is the compaction of soil caused by inappropriate vehicular movement and storage of materials especially where the site is founded on a compressible clay.

Numerous surveys have shown that a significant proportion of a tree's roots proliferate in the top 600-1000mm of soil. There will of course be roots that may go down to depths of 3 metres or more although these will be in the minority. Roots in the upper soil surface find it far easier to intercept moisture, acquire oxygen and perform gaseous exchange. You also find that as soil depth increases so does its strength or compaction, making it harder for roots to elongate with new extension growth.

Root morphology differs from species to species and is largely dependent on the soil type and ground conditions, however the fine roots responsible for moisture and nutrient uptake can last anything from 10 days to over a year (Eissenstat and Yanai, 1997), with the tree producing new fine roots on a regular basis. The larger and more structural roots are a permanent feature of the tree and convey moisture and nutrients from the soil via the fine roots, into the trunk and canopy. The larger roots are of course responsible for the tree's stability as well as being areas of carbohydrate storage. Younger trees are more able to adapt to change and have more potential energy to explore alternative rooting environments whereas more mature trees are slower to react to a changing soil environment and are adapted to expend their energy on other important functions.

The National Geology of Britain Viewer advises that the local soil comprises a bedrock of London Clay. therefore the risk of soil compaction is considered to be moderate, however, the risk will be mitigated with the use of appropriately placed ground protection and tree protective fencing.



## Root severance

As mentioned above, the roots are responsible for a number of functions including stability and the transport of water and nutrients. Studies have shown that trees can withstand and recover from the loss of a proportion of their root systems, especially where those roots have been removed in a single direction. It is not expected that significant roots will be encountered as sufficient distance has been allowed between T1 Oak and the proposed extension, however, where roots are encountered, a protocol for root pruning has been included within the arboricultural method statement.

## 7.Arboricultural Method Statement (AMS)

The arboricultural method statement sets out a precautionary approach towards tree protection. Any operations including access, proposed within the RPA (or crown spread where this is greater) should be described within an arboricultural method statement, to demonstrate that the operations can be undertaken with minimal risk of adverse impact to retained trees.

The methodology will provide sufficient protection to the rooting environments of all trees within the vicinity of the proposed construction throughout the duration of works.

### Phase 1- Installation of protective fencing and ground protection

#### Tree protective fencing

- Erect protective barrier fencing in locations shown on the tree protection plan at **appendix 4**. Tree protection positions will have already been marked out by the project arboriculturalist during phase 1. A protective fencing diagram can be found at **appendix 5**. Barriers will consist of a heras type panel inserted into rubber 'elephants feet' and reinforced with a stabelizer strut. Two clamps either end of each section will ensure the area within the fence (CEZ) remains out of bounds to construction activities throughout the duration of works.



Photos above show protective fencing installed as per BS5837:Fig 3A with rubber feet and stabelizer struts.

## Ground protection

- Ground protection will comprise of either a proprietary ground protection mat such as TrakMat or if approved by the Local Planning Authority, closely abutted ply boards of 18mm thickness installed upon 150mm layer of hand spread woodchip mulch. The mulch will be laid upon a porous membrane as shown in the images below and in the location shown within the Tree Protection Plan at **appendix 4**.



Images above from a site managed by Usherwood Arboriculture and showing the three stages of ground protection installation.

Image 1 laying of geotextile membrane.

Image 2- hand spreading of 150mm depth of woodchip mulch.

Image 3- Trakmat ground protection mats directly laid upon woodchip mulch.

- Following completion of construction, the woodchip mulch may either be carted from site or spread on flower beds as a moisture retaining and weed suppressing mulch.

## Phase 3- Excavation for foundation within RPA of T1 Oak

- Once the tree protection measures have been implemented, construction works may commence.
- The existing narrow patio will be have been removed by hand prior to the installation of ground protection.
- The initial 500mm depth of foundation pads will be hand dug under arboricultural supervision, the final depth of pads to be a minimum of 2.3 metres below existing ground level.
- Excavation for lintels spanning the pads will be carried out entirely by hand and again under arboricultural supervision.
- Any significant exposed roots will be dealt with as set out within box 1 over page.

If any tree roots are encountered during the excavation process, roots up to 25mm shall be cut back with a sharp pair of by-pass loppers, except where they occur in clumps. Roots occurring in clumps or of 25mm diameter and over should be severed only following consultation with the project arboriculturalist or Local Authority tree officer.

If substantial tree roots are to be left exposed for any length of time, these must be covered with a damp hessian rap to minimize desiccation. Hessian should be removed immediately prior to backfilling with a suitable soil or sharp sand, not builders sand which contains sodium, detrimental to tree roots.

**Box 1. Dealing with tree roots found during excavation works.**

- Following the excavation for pads and lintels, the exposed earth surface on the outer edge of foundations will be lined with an impermeable sheet or membrane such as DPM in order to prevent toxic leachates associated with curing concrete from damaging nearby roots.

**Phase 4- Above ground construction**

- Once above ground, the extension addition may be constructed in the standard manner without the need for specific arboricultural measures.

**Site supervision and pre-commencement meeting**

- A pre-commencement meeting should take place following the installation of protective fencing and ground protection, this is in order for the project arboriculturalist to clarify that tree protection measures have been correctly implemented prior to the commencement of construction works. On a straight forward scheme such as this one, the initial meeting and checking of tree protection measures may take place via video call.

**General measures to be adopted in proximity to trees-**

- All tree protection measures will be set in place prior to commencement of any works relating to the approved planning consent.
- No bonfires on site.
- No materials are to be stored within the confines of the protective fencing (CEZ).
- Storage of materials on soft ground in proximity to any other trees and hedges away from construction is to be avoided.
- No discharging of any products associated with construction near trees or hedges
- No refueling/topping up of hydraulic fluids etc. on plant machinery within or close to the RPA of trees.

- There will be no lowering or raising of soil levels within the root protection areas of retained trees except where specified and agreed by the LPA.
- There will be no excavation or trenching for the installation of services within the root protection areas of retained trees.

## 8. Conclusion

It is my opinion that provided the measures set out within this document are adhered to, there should be no adverse impacts upon T1 Oak, I therefore suggest that this application should be regarded as being arboriculturally acceptable.

## 9. Qualifications & Experience

I have been involved in the horticultural and arboricultural industries for over 35 years, firstly as a contractor and for the last fifteen years as a Local Authority tree officer and consultant. I hold the AA Tech cert arb, and ND Arb (RFS) as well as being a Lantra accredited Professional Tree Inspector. I am also a technical member of the Arboricultural Association and professional member of the Consulting Arborists Society.

Lawrence Usherwood  
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<http://usherwoodarboriculture.co.uk/>





## Appendix 1: Tree Survey Schedule

Trees have been listed on the schedule with both their common and scientific names.

**Tree height** is normally measured and rounded up to the nearest metre for trees above 10 metres in height using a Haglof electronic clinometer.

**Stem or trunk diameters** were measured using a diameter tape in mm at 1.5 metres above ground where access allowed, otherwise diameters have been estimated.

**Crown spread** has been measured in metres from the trunk to the tips of the live lateral branches taken at the four-cardinal points N-E-S-W using a ground tape.

### Age Class

**Young** - Trees in the first fifth of full life expectancy

**Semi-mature** - Trees in the second fifth of full life expectancy

**Early-mature** - Trees in the third fifth of full life expectancy

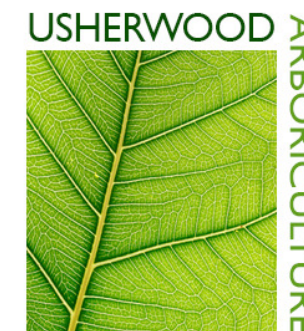
**Mature** - Trees in the fourth fifth of full life expectancy

**Post-mature** – Trees having reached full life expectancy and trees in natural decline

**Veteran** - Trees of interest biologically, culturally and aesthetically due to certain features and/or age.

**ERCY**-The estimated remaining contribution in years calculated considering the tree's species, location, current age and physiological and structural condition at the time of the survey.

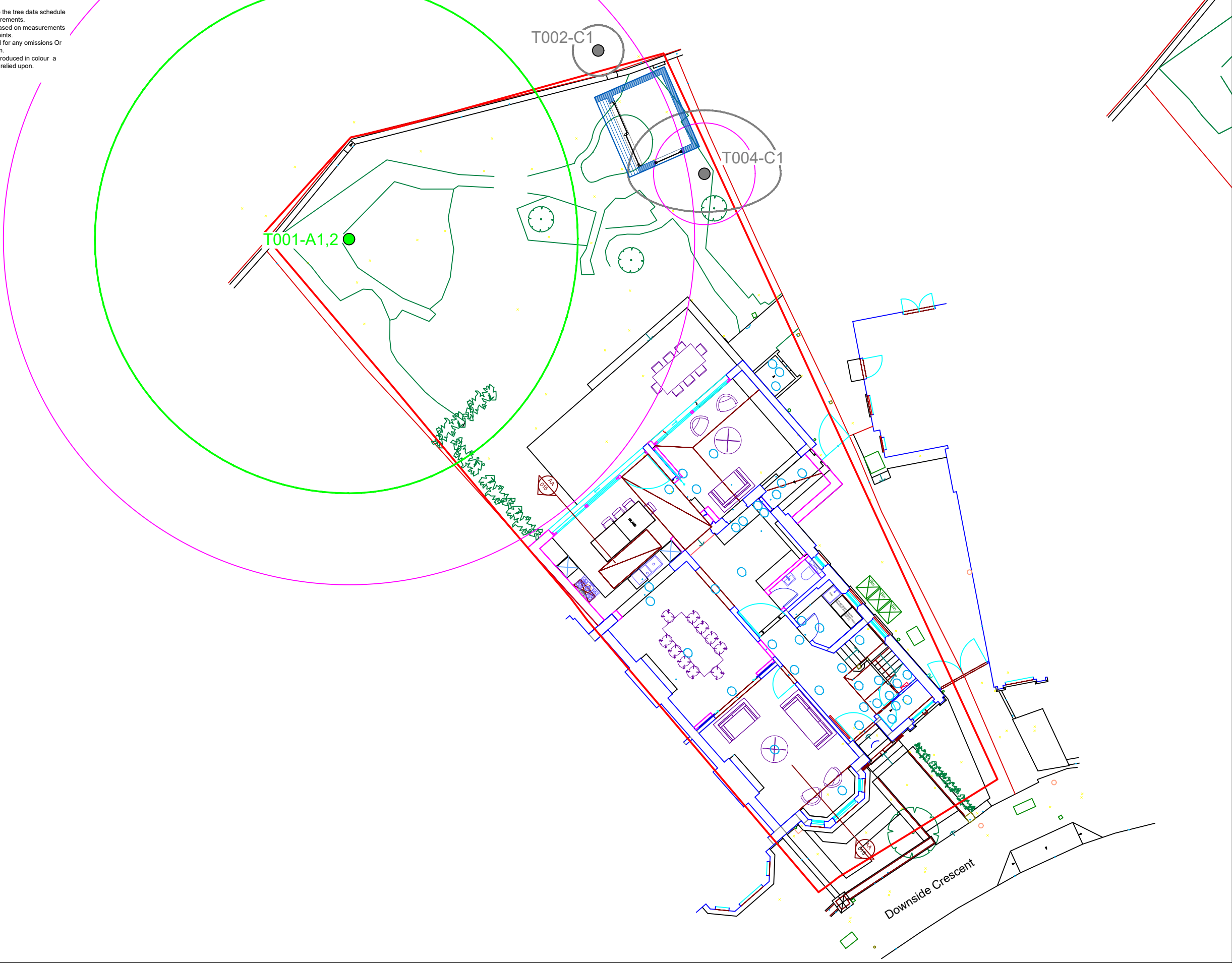
# BS5837 Survey Data



Ref.	Species	Measurements	General Observations	Category	Recommendations
T001	Pedunculate Oak ( <i>Quercus robur</i> )	Height (m): 25 Stem Diam (mm): 1130 Spread (m): 10N, 9E, 10S, 10W Life Stage: Mature Rem. Contrib.: 40+ Years	Impressive garden tree with excellent crown structure in generally good condition.	A1,2  RPA Radius: 13.6m. Area: 581 sq m.	Protect RPA with tree protective fencing and ground protection.
T002	Common Ash ( <i>Fraxinus excelsior</i> )	Height (m): 5 Stem Diam (mm): 550 Spread (m): 1N, 1E, 1S, 1W Life Stage: Mature Rem. Contrib.: <10 years	A previous survey (2017) suggested the off-site tree had been recently pruned with a height of 15m. The tree has since been topped at a height of 5 metres with no remaining vegetative growth.	C1  RPA Radius: 6.6m. Area: 137 sq m.	No protection required.
T003	English Yew ( <i>Taxus baccata</i> )	Height (m): 5 Stem Diam (mm): 160 Spread (m): 1.5N, 1.5E, 1.5S, 2W Life Stage: Semi Mature Rem. Contrib.: 40+ Years	Poor quality asymmetric tree growing on rear boundary.	C1,2  RPA Radius: 1.9m. Area: 11 sq m.	Tree Previously Removed.
T004	Cherry ( <i>Prunus</i> sp. 'Cherry')	Height (m): 6 Stem Diam (mm): 170 Spread (m): 2.5N, 3E, 1.5S, 3W Life Stage: Early Mature Rem. Contrib.: 20+ Years	Unremarkable tree growing on east site boundary in close proximity to boundary fence. The tree will probably require removal in the medium term when it conflicts with the fence.	C1  RPA Radius: 2.0m. Area: 13 sq m.	Protect RPA with tree protective fencing.

## **Appendix 2: Tree Constraints Plan**

**General Notes**  
Do Not scale off drawing - refer to the tree data schedule for accurate crown spread measurements.  
Depictions of tree canopies are based on measurements taken to four cardinal compass points.  
No liability of any kind is accepted for any omissions Or inaccuracies in respect of this plan.  
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**Key**

**Trees**  
Showing Canopy extents, category colour and tag number (with category).

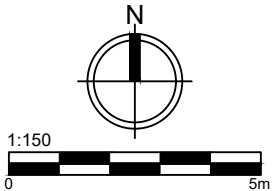
**Category A**  
Trees of high quality with an estimated remaining life expectancy of at least 40 years.

**Category B**  
Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.

**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.

**Category U**  
Trees in such a condition that they can not realistically be retained as living trees in the context of the current land use for longer than 10 years.

**BS 5837:2012 Root Protection Area**



**Tree Constraints Plan**

Client: Seema Shah

Site/Project: 31 Downside Crescent, London, NW3 2AN

Scale/Sheet: 1:150 - A3 Date: 21/2/2023

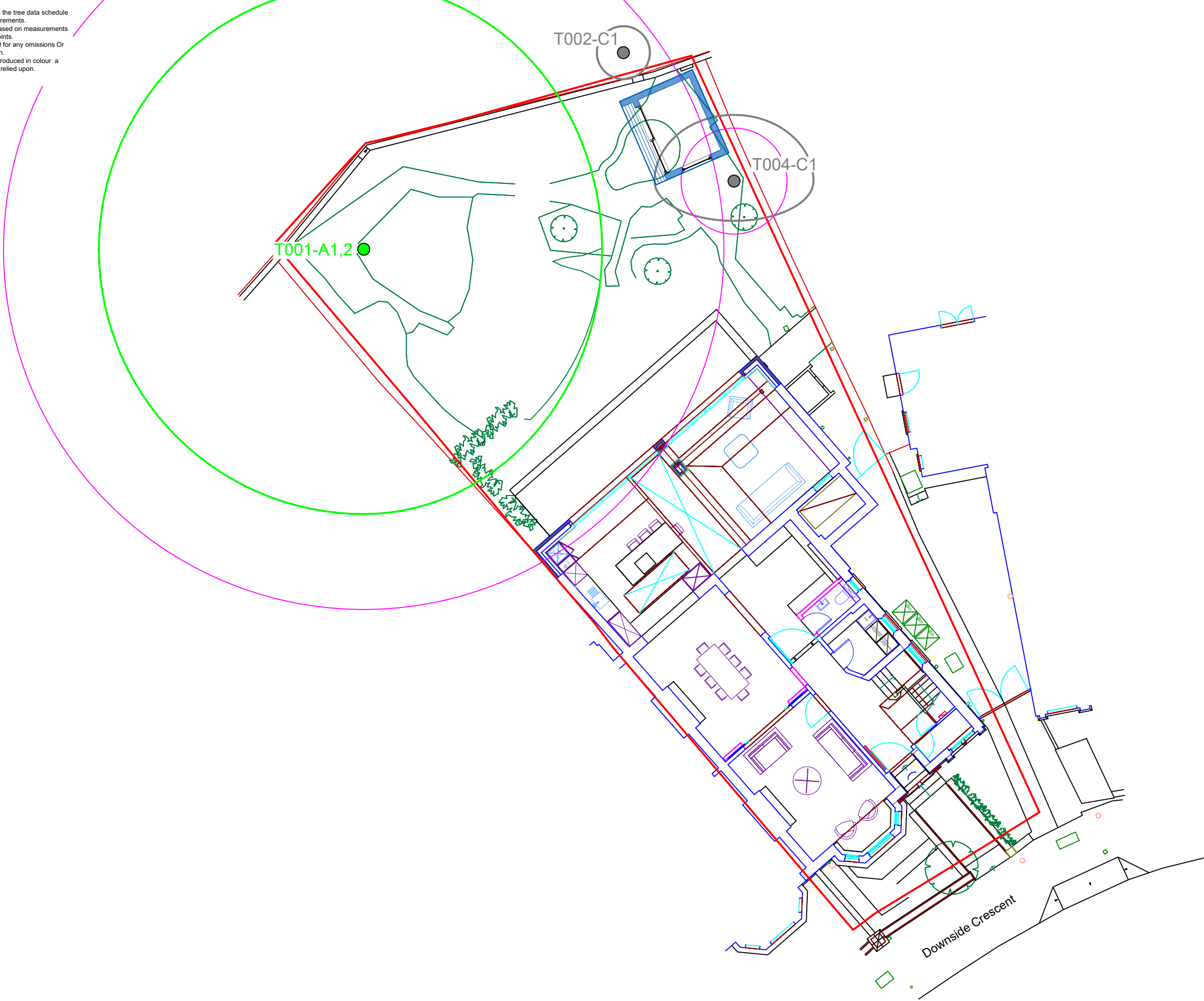
Drawing No: UA/TCP/1 Rev: 1 Drawn By: CS Checked By: LU

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## **Appendix 3: Arboricultural Impact Plan**

**General Notes**  
Do Not scale off drawing - refer to the tree data schedule for accurate crown spread measurements.  
Depictions of tree canopies are based on measurements taken to four cardinal compass points.  
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**Key**

**Trees**  
Showing Canopy extents, category colour and tag number (with category).

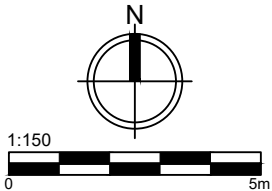
**Category A**  
Trees of high quality with an estimated remaining life expectancy of at least 40 years.

**Category B**  
Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.

**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.

**Category U**  
Trees in such a condition that they can not realistically be retained as living trees in the context of the current land use for longer than 10 years.

**BS 5837:2012 Root Protection Area**



**Drawing Title**  
**Arboricultural Implication Plan**

**Client**  
Seema Shah

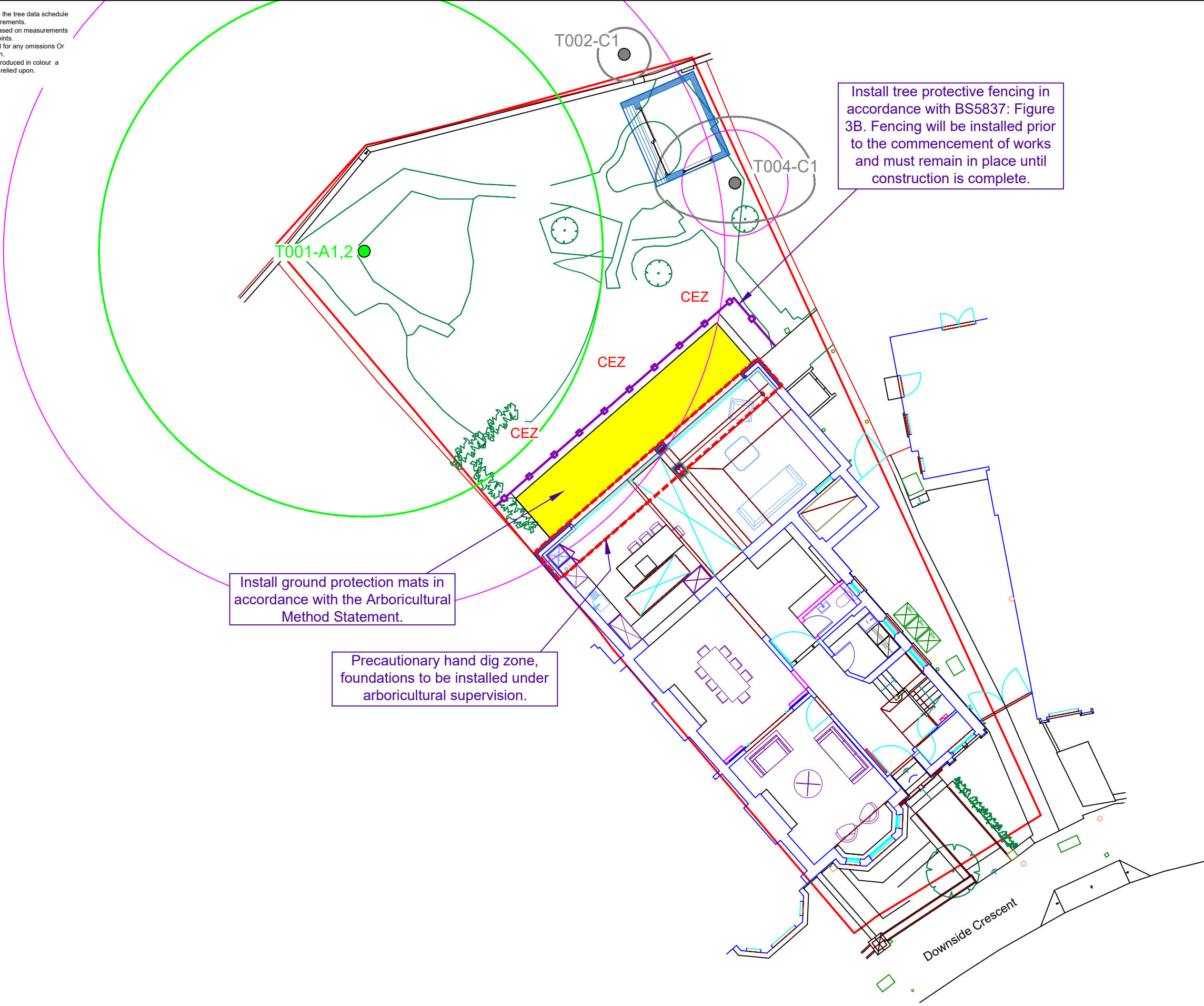
**Site/Project**  
31 Downside Crescent,  
London, NW3 2AN

<b>Scale/Sheet</b> 1:150 - A3	<b>Date</b> 21/2/2023		
<b>Drawing No</b> UA/AIP/1	<b>Rev</b> 1	<b>Drawn By</b> CS	<b>Checked By</b> LU

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## **Appendix 4: Tree Protection Plan**

**General Notes**  
Do Not scale off drawing - refer to the tree data schedule for accurate crown spread measurements.  
Depictions of tree canopies are based on measurements taken to four cardinal compass points.  
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**Key**

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**Category U**  
Trees in such a condition that they can not realistically be retained as living trees in the context of the current land use for longer than 10 years.

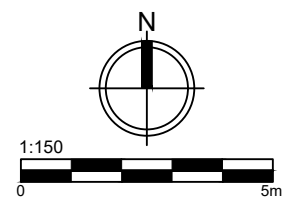
**BS 5837:2012 Root Protection Area**

**Tree Protective Fencing**

**Ground Protection**

**CEZ**  
**Construction Exclusion Zone**

**Precautionary Hand Dig Zone**



**Drawing Title**  
**Tree Protection Plan**

**Client**  
Seema Shah

**Site/Project**  
31 Downside Crescent,  
London, NW3 2AN

**Scale/Sheet**  
1:150 - A3

**Date**  
22/2/2023

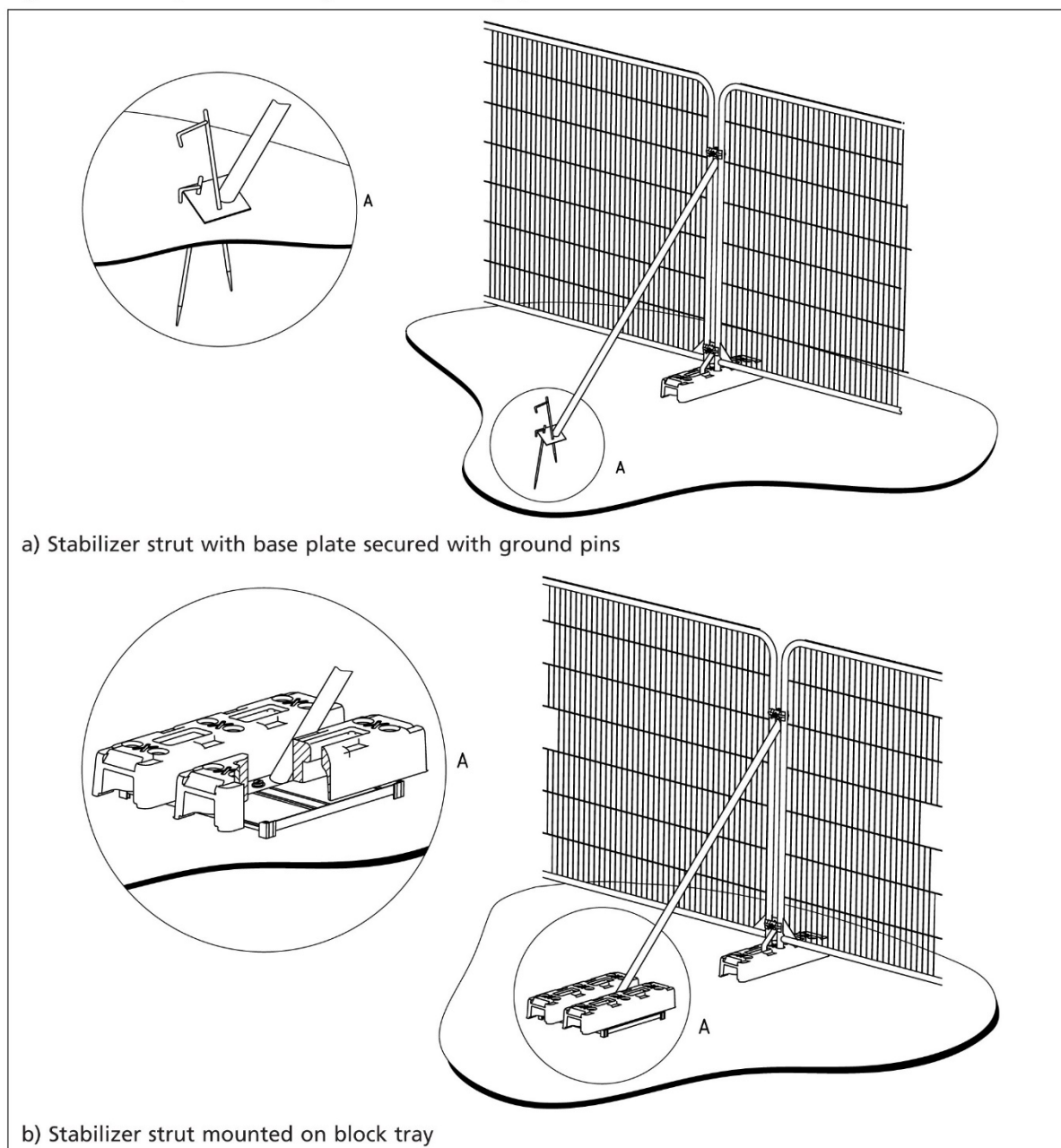
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UA/TPP/1	1	CS	LU

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## **Appendix 5: Tree Protective Fencing**

Figure 3 Examples of above-ground stabilizing systems



## **Appendix 6: Proposed foundation Plan**

