# OMC Associates

## BSi 5837 Tree Survey for Development

**CLIENT:** Vivien Bradley

**SITE:** 28 Belsize Lane, Hampstead,
London NW3 5AB

**OUR REF:** 1150DCS2602

**DATE OF REPORT:** 26 February 2017

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# Contents

## EXECUTIVE SUMMARY

*In continuation of the consented development at 28 Belsize Lane, landscaping to the front of the new dwelling incorporates built features which could potentially impact upon trees; most significantly a mature sycamore situated within newly acquired land on the Belsize Lane boundary. Foundations for a new boundary fence and gate have been designed in consultation with an arboriculturist and will require minimal excavation, so reducing the risk of damage to the tree's root system. A new front path within the sycamore's RPA will also be installed in a manner that minimised root disturbance, utilizing a minimal-dig sub base (geogrid and cellular confinement system). Excavation within a small area of the tree's RPA to replace the former driveway will be carefully undertaken under arboricultural supervision and significant roots encountered will be protected and treated in accordance with current best practice recommendations; this is to allow the use of a conventional sub-base where the incursion within the RPA is negligible. In all instances where the use of concrete is necessary within the RPA, roots will be protected from its potentially toxic effects.*

*Temporary concrete surfacing laid for the duration of construction in accordance with the previously agreed tree protection scheme will be carefully removed with the use of hand tools, as will the footings of the former boundary wall buried beneath what will become the front lawn. Alternative means of temporary protection will be utilized until all works are complete. As recommended in report ref. 0942/CJO/1607 produced in July 2015, remediation measures (decompaction and mulching) are prescribed to improve rooting conditions.*

## 1.0 INTRODUCTION

### 1.1 Brief

Following integration of additional land to the front of the property, we are instructed to provide an arboricultural report to demonstrate the feasibility of a proposed new boundary fence and gate fronting Belsize Lane and installation of hard surfacing, where they have the potential to harm the root system of a mature sycamore tree on the front boundary. A footpath is also proposed within the front garden. Recommendations are consistent with the most recently revised version of the British Standard on this subject, "Trees in relation to design, demolition and construction - Recommendations", BS 5837 (2012).

### 1.2 Scope of report

This report incorporates an assessment of the tree potentially affected by the installation of the fence and new hard surfacing; an arboricultural impact assessment (AIA) that accounts for the various types of damage that may be inflicted by their installation and consequential effect to the tree's health and stability; and an arboricultural method statement (AMS) providing the details necessary to ensure they are not damaged during construction.

The report is supplemented by a Tree Survey Plan showing the site as it currently exists and Tree Constraints Plan (TCP) / Tree Protection plan (TPP) that illustrate the extents of the tree's RPA and proposed structures within it, and protection measures described within the AMS.

The report contains the following appendices:

**Appendix 1:** a tree constraints plan (TCP) indicating root protection areas (RPAs) of retained trees with the proposed scheme superimposed to indicate location and extent of encroachment;

**Appendix 2:** tree protection plans (TPP) clearly illustrating the trees in relation to every aspect of the proposed scheme and every aspect of required protection. Where this is phased, multiple TPPs will be provided for each phase for clarity;

**Appendix 3:** a default specification for ground protection;

**Appendix 4:** A diagrammatic cross-sectional illustration of minimal-dig driveway over tree roots;

**Appendix 5:** a cascade chart explaining tree quality assessment;

**Appendix 6:** a record of arboricultural supervision and monitoring;

**Appendix 7:** photographs;

**Appendix 8:** Notices to attach to tree protection fencing and posters to display on site.

### 1.3 Documents

We have been provided with a plan of the proposed front garden layout (ref. 2214 _SK2356 Rev. 2) by the project architect, dated 14 December 2016. Reference is also made to previous arboricultural reports (ref. 0844D/CJO/1710 and 0942/CJO/1607) provided by OMC Associates in 2014 and 2015, relating to the site's re-development and protection of trees.

Where previous recommendations remain relevant they are re-stated within this report, albeit in slightly amended form to suit the current situation.

### 1.4 Site Description

The site comprises what will become the front garden area of the new dwelling; at present this area is covered in temporary concrete surfacing and is being used for general storage, occasional vehicle parking and location of the site office/welfare facilities.

Two mature trees exist within and directly adjacent to the front garden area; a sycamore (T1) on the Belsize Lane boundary and a pear (T2) situated adjacent to the western boundary within the grounds of residential flats.

### 1.5 Planning Proposal

It is proposed that a new boundary fence, pedestrian gate and sliding electric gate be installed on the property frontage. A new footpath will also be installed. In accordance with extant permission, the former driveway to the front of the new dwelling will also be re-constructed in approximately the same location as previously existed.

## 2.0 TREES

### 2.1 Trees data

Dimensions relating to height, crown spread (at four cardinal points where considered necessary), girth at 1.5m as well as age class, structural and physiological condition and BS 5837 (2012) category are noted.

The inspection assesses the height of the crown and suitability to develop near to it.

This survey does not include a detailed assessment of the health of the tree but clear faults are factored into structural and physiological category

### 2.2 Trees and the law

In the preparation of this report it was established that the property lies within the Fitzjohns Conservation Area, however the existence of any other planning restrictions such as Tree Preservations Orders or historic 'in-perpetuity' planning conditions have not been identified.

Please note that no works around trees should be carried out without the approval of the Local Planning Authority (since it is likely to incur large fines) unless planning permission has been granted that indisputably necessitates the removal or pruning of any of the trees included within this report.

Section 197 of the Town & Country Planning Act 1990 states that it shall be the duty of the local planning authority to ensure whenever it is appropriate, that in granting planning permission, “adequate provision is made, by the imposition of conditions, for the preservation or planting of trees” Even when no specific legal protection exists it may be necessary to obtain a felling license from the Forestry Commission if the volume of timber removed exceeds felling license quotas.

The Planning (Listed Buildings and Conservation Areas Act) (1990) in conjunction with English Heritage empowers local authorities to designate areas of special architectural or historical interest as ‘Conservation Areas’, to preserve their character and appearance. Trees can form an intrinsic part of the character and appearance of such areas and the Act prohibits any works to trees within them with a stem diameter measuring in excess of 75mm at a height of 1.5 metres from ground level.

Prior written notice must therefore be given to the local authority of the intention to carry out works to trees in Conservation Areas and the authority’s formal response obtained within the statutory timeframe before works can commence. Penalties for carrying out works to trees in Conservation Areas without a formal response from Local Planning Authority raising no objection to the Notice are the same as those for unauthorised work to trees protected by TPO.

Section 11 of the National Planning Policy Framework adopted in March 2013 “Conserving and enhancing the natural environment” states, “*the planning system should contribute to and enhance the natural and local environment by: protecting and enhancing valued landscapes, recognizing the wider benefits of ecosystem services and minimising impacts on biodiversity*”. It also stresses the importance of “*protection, enhancement and management of green infrastructure*”.

The Council's Local Plan also contains policies relating to the protection and retention of trees and landscape.

The Wildlife & Countryside Act 1981, the Conservation (Natural Habitats etc.) Regulations 1994 and the Countryside & Rights Of Way Act 2000 can all be of relevance.

### 2.3 Tree details

The sycamore (T1) is a significant landscape feature, prominently located at the corner of Belsize Lane where it to the turns to the south at the junction of Wedderburn Road. The tree is healthy and of attractive natural form, benefitting from having not been subject to any significant historic pruning.

The pear (T2) is less prominent but is nonetheless valuable as natural screening between properties; its benefit to wildlife is also recognised as a valuable asset, irrespective of its retention category, as defined by the British Standard.

| TREE NO. | SPECIES | HEIGHT (M) | DIA. @1.5M (mm) | CROWN RADIUS N | S | E | W | AGE CLASS | SULE | CONDITION STRUCTURAL | CONDITION PHYSIOLOGICAL | BS 5837 CATEGORY | TREE WORK | SPACE BELOW CROWN (M) | RPA RADIUS (M) | GENERAL COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | Sycamore *(Acer pseudoplatanus)* | 21 | 850 | 8.5 | 6.8 | 9.0 | 6.8 | M | >40 | Good | Good | A2 | - | 4 | 10.2 | Prominent mature tree of high landscape amenity. Attractive natural form with minimal historic intervention. Healthy callus production around margins of scars from historic removal of lower branches indicates general high vitality. |
| T2 | Edible pear (*Pyrus communis*) | 10.5 | 450 | 4.0 | 4.0 | 2.0 | 3.5 | M | >40 | Fair | Fair | C2 | - | 2.5 | 5.4 | Situated on neighbouring land, within vegetation on western boundary with adjacent flats. Fair overall condition; screening / wildlife benefit. |

For Key see appendix 5

## 3.0 TREE RELATED SITE CONSTRAINTS - GENERAL

### 3.1 Tree crowns/canopies

Where crown/canopies of trees to be retained overhang a development site, careful assessment of the implications must be made. Where it/they obstruct building work - including erection of scaffolding - or where they come into contact with the new build the crown needs to be skilfully pruned to accommodate the development. This may simply involve appropriate crown lifting (removal of lower limbs) or trimming back lateral branches. Schemes that require excessive and inappropriate crown reduction so that the trees are adversely affected in terms of health and form or regular long term cutting back to avoid conflict with the new structure and/or future residents should ideally be avoided.

### 3.2 Indirect damage (Subsidence)

This is applicable where a shrinkable substrate prevails. Where applicable an appropriate foundation compliant with NHBC guidelines must be designed to ensure that tree and building co-exist for the long term and longer term pressure to is not applied to remove nearby trees because of indirect damage. The website of the British Geological Survey (BGS) describes the substrate as being London Clay; a soil type with high shrinkage potential. Despite this both the sycamore and pear are defined in the NHBC guidelines as being of moderate water demand, therefore a relatively low risk of shrinkage related subsidence may be anticipated.

### 3.3 Root Protection Area (RPA)

An RPA is defined in BSi 5837 (2012) as "*the area surrounding a tree that contains sufficient rooting volume to ensure the survival of the tree*".

The 2012 British Standard formula for calculating the RPA has been used in conjunction with existing site conditions that can affect root morphology and dispositions such as the presence of roads, structures and underground apparatus; topography and drainage and the soil type and structure to determine likely RPAs. Upon assessment, it is thought the boundary wall of the former property to the north and highway to the south will have restricted the root morphology of T1, the shape of the tree's RPA has therefore been modified to reflect this. The resultant RPAs are shown within the tree constraints plan at Appendix 1.

Though encroachment upon the RPA should always be avoided, (see section 4 for reasons) it can be acceptable in certain conditions. This involves assessment of the tolerance levels of the tree based on a variety of factors.

## 4.0 Arboricultural Implications Assessment (AIA)

### 4.1 Affects of development on trees - General

The objective of the report is to identify and evaluate the extent of direct and indirect damage on existing trees that may arise as a result of the implementation of the proposed development without appropriate guidance.

A tree may take a century to reach maturity but it can be irretrievably damaged in a few minutes often because of a failure to appreciate the vulnerability of trees, particularly their root systems. *Irreparable damage is frequently done to existing trees in the first few days of a contractor's occupation of a site.*

This report seeks to provide guidance on how worthy trees in the immediate vicinity can be protected during the development.

It is important to be aware that the effects of tree damage may not be apparent for some time.

There are a multitude of activities that can kill or damage trees on construction sites and there is a need to be mindful of these activities and why they may be so harmful to trees. These are briefly summarized below.

### 4.1.1 Direct mechanical damage (*Referred to as D1 in this report*)

Direct damage suffered by trees on construction sites commonly occurs in the form of bark wounding through scuffs and tears e.g. by impact of vehicles or plant machinery, poorly executed branch removal carried out by unskilled operatives, or the accidental snapping, ripping or tearing away of branches/stems struck by high-sided vehicles or machinery. The fragile bark covering shallow roots is also extremely vulnerable to scuffing and tearing, even by pedestrian activity. Although each incidence of damage must be judged according to the individual tree and set of circumstances, such damage is unlikely to cause death unless extensive, but will invariably cause significant disfigurement and initiate long-term degradation of internal tissues, either by weathering or colonisation of wood decay fungi. Such damage often occurs as a result of construction activities taking place too close to trees without protection or appropriate pre-construction tree surgery.

### 4.1.2 Ground compaction (*Referred to as D2 in this report*)

This is likely to be the most common cause of tree death or decline on a building site, yet the least appreciated due to the root systems' lack of visibility. The vast majority of tree roots are located in the upper soil horizons where soil conditions are most favourable for root growth. It is these upper horizons that are most vulnerable to ground compaction. Compaction destroys soil structure and this prevents soil moisture absorption into the ground and loss of natural aeration. This process deprives tree roots of moisture as well as giving rise to root asphyxiation and is often fatal to trees.

### 4.1.3 Changes in ground level (*Referred to as D3 in this report*)

The majority of a tree's root system is generally located in the upper 0.6m of the ground. The bulk of these roots comprise hair-fine, delicate 'feeder' roots, essential for the absorption of oxygen, water and minerals from the soil to facilitate healthy growth and function. Reductions in ground level such as soil stripping can therefore have catastrophic consequences for a tree's health. Conversely, oxygen depletion caused by increases in ground level can result in root asphyxiation and be just as damaging.

### 4.1.4 Severance of roots by ground works (*Referred to as D4 in this report*)

Excavation of ground to remove old foundations and hard standing, construction of conventional concrete footings, new hard standing or the installation of services such as water/sewerage pipes, gas/electricity cables, TV/telephone cables using open trenching within the drip-lines of trees severs any roots present, potentially leading to destabilization, decline or death of trees. It May also have implications for local soil hydrology.

### 4.1.5 Contamination of ground (*Referred to as D5 in this report*)

Spillage of petrol, diesel, paint removers, wood preservatives and many other toxic liquids regularly used on building sites can kill roots. Concrete or cementitious (mortar, cement, slurry) washout wastewater is caustic and considered to be corrosive with a pH over 12, essentially the same as Liquid Drano®, ammonia or other household cleaning detergents. The primary ingredient in ready mixed concrete is Portland cement, which consists of Portland cement clinker, calcium sulphate, calcium and magnesium oxide, heavy metals and potassium and sodium sulphate compounds, chromium compounds and nickel compounds. In cases where tree roots have been exposed to the high pH of cement products, the effects may include inhibited growth and dieback of portions of the crown due to cellular damage from the uptake of toxic compounds, and substantial alteration of the soil and plant chemical composition even after the source of pollution is gone.

#### 4.1.6 Change in ground surface (Referred to as D6 in this report)

Covering surfaces with impermeable materials – especially areas of previously open, undisturbed ground can prove fatal for tree roots. Trees derive moisture from regular moisture recharge of the ground from rainfall, and nutrients generated by the nutrient cycle from decomposing leaf litter. Oxygen is also essential for healthy root function. The introduction of impervious surfaces can therefore prevent moisture infiltration, the release of nutrients from natural decomposition and gaseous interchange between the ground and the atmosphere - creating a build-up of toxic waste gases such as carbon dioxide and oxygen deficit. BS 5837 states that new permanent hard surfacing should not exceed 20% of any existing unsurfaced ground within the RPA.

### 4.2 Affects of development on trees specific to this site

**Removal of site cabins (damage type - D1)**

Use of a mobile crane will be necessary to remove the site office, welfare facilities and storage containers from the front of the site; this carries a moderate risk of impact damage to the lower branches of T1 by the crane's jib if care is not taken. Care will therefore need to be exercised throughout this operation to ensure branches are not broken or bark scuffed; use of a banksman is therefore strongly advised.

**Removal of site hoarding (damage type – D4)**

It is presumed that the posts supporting the site hoarding have been set in concrete, which will require removal. To prevent undue damage to roots this will be carefully undertaken with the use of hand tools only, with any digging confined to the close vicinity of the post-hole.

**Removal of temporary concrete surfacing (damage types – D2 & D4)**

Removal of the surfacing covering much of the tree's root protection area carries a high risk of significant root damage, as the shallowest soil horizon directly beneath the surfacing is likely to contain the highest concentration of roots. Protection of the soil must therefore form the primary consideration as it is progressively exposed, taking great care not to scuff roots on the soil's surface, or compact the exposed ground any further than it currently is.

**Removal of the footings of the former boundary wall (damage types – D2 & D4)**

As with the removal of the concrete for the hoarding's post-holes, removal of the footings will require excavation in an area containing a high concentration of significant roots. Given the age of the wall and in consideration of the typical morphology of roots when growing in and around subterranean built structures, it is also highly likely that a large quantity of roots will have grown along the line of the footings and will be adhering to the brickwork. This operation therefore has a high potential for root damage by ripping or severance, or desiccation if roots exposed during the excavation are not protected. Caution will therefore need to be exercised to ensure damage is minimised; supervision by an arboriculturist is therefore advised.

**Installation of the new boundary fence and sliding electric gate (damage types – D2, D4 & D5)**

The fence and gate will be founded on concrete piles to minimise the damage commonly associated with traditional linear strip foundations which may otherwise have been employed. The spacing between the piles has also been maximised to ensure they are as far as practically possible from the base of T1. Notwithstanding this, holes will need to be excavated and concrete will be used within the RPA, carrying a high risk of root damage by severance and poisoning. Given the location of the pad closest to the western end of the former boundary wall's footings which will be positioned almost on top of the old structure, the potential for damage of T2's root system is deemed to be negligible.

**Installation of electricity feed for electric gate and other features (damage types – D2 & D4)**

The excavation of a trench for the electrical supply to the motorised gate and intercom provision carries the same risk of root damage described above if proposed within the RPA of T1. To minimise this risk, it is advised that the gate's electrical supply is spurred from the supply to the A/C units on the eastern boundary and channelled diagonally under the driveway. The use of hand tools within the RPA will be essential.

**Installation of new hard surfacing (front path) and re-construction of the driveway (damage types – D2 – D5)**

A paved footpath is proposed a little over 2 metres from T1. Given the proximity of the path to the tree a high risk of root damage exists if a traditional sub-base were used, which would necessitate lowering the soil level by approximately 450mm. A risk of soil compaction also exists while the path is being laid. Minimal-dig techniques will therefore be necessary to ensure root disturbance is kept to a minimum; using a engineered sub-base e.g. geogrid to allow a shallower foundation.

Re-construction of pre-existing driveway on the eastern side of the front garden only encroaches upon the RPA of T1 by 3%. Given the minor impact, the driveway's re-construction represents special measures are not deemed necessary for the drive's sub-base, however a moderate risk of root damage remains in the form of severance, desiccation and poisoning by exposure to concrete. The corner of the driveway within the RPA will therefore require careful excavation by hand to the required depth and trimming back of any roots encountered. Protection of the cut ends from desiccation will also be necessary until the sub base is laid, and sheathing of roots thereafter from the potentially harmful effects of concrete.

A small section of terrace is proposed within the tree's RPA closest to the house, however its extents do not exceed the line of the former boundary wall which is likely to have acted as a barrier to T1's roots. No special measures are therefore deemed necessary for the terrace's sub-base, however protection of the exposed ground surrounding will be necessary after removal of the temporary concrete surfacing in order to avoid soil compaction.

The abovementioned operations will take place after the temporary concrete surfacing has been lifted. Once the concrete has been removed the underlying soil will be very vulnerable to compaction damage; it is vital therefore that this exposed ground is protected <u>immediately</u> after the concrete is removed and remain in place until all construction is complete.

The following detailed arboricultural method statement (AMS) and tree protection plan (TPP) specify the measures to be adopted on site that are designed to mitigate or significantly reduce the potential impacts previously described. So long as these measures are implemented **in full**, it is anticipated that the health of both trees will not be impacted upon to a degree where their health and or stability could be adversely affected in the long-term.

### 4.3 Issues to be addressed by the AMS:

- Removal of site cabins, hoarding and concrete hard surfacing;
- Installation of temporary tree protection (fencing and ground protection);
- Installation of footpath and sensitive excavation of section of driveway;
- Installation of boundary fence and electric gate (inc. electricity supply);
- Mixing and use of concrete around tree roots;
- Site monitoring;
- Additional precautions.

## 5.0 ARBORICULTURAL METHOD STATEMENT (AMS)

### 5.1 Introduction

Successful avoidance of any damage can be achieved through appropriate tree protection details, correct implementation of these details and close liaison with the Council's tree officer and the appointed arboriculturist.

These details and procedures are provided in the arboricultural method statements outlined below and illustrated in the Tree Protection Plan (TPP) at Appendix 2. All key site personnel must fully familiarise themselves and understand this method statement and tree protection plan. A copy of the method statement must be kept on site at all times. A large (not less than A3 size) copy of the TPP must be placed on the site office notice-board. The general sequence of events should be as follows:

- All relevant aspects of this method statement must be incorporated into the construction method statement to avoid any conflicts.
- No building work or other activity associated with development can take place until the approved protection measures are in place and secure, and a site meeting between involving the contractor, architect, arboricultural officer and consultant has taken place.
- Details of key site personnel will be submitted to the Council's arboricultural officer prior to the commencement of site works.
- All key site personnel must fully familiarise themselves and understand this method statement and tree protection plans.
- A copy of this method statement must be kept on site at all times. A large (not less than A3 size) copy of the TPP must be placed on the site office notice-board.

## 5.2 Ground protection

Protection of the ground within RPAs is essential to ensure the potentially harmful effects of construction activity on ground conditions (compaction and the absorption of potentially toxic materials) are mitigated.

Creation of a Construction Exclusion Zone (CEZ) using protective (Heras-type) fencing is the default means of protecting the root protection area, however, in this instance the area to be protected is quite confined and given the need for access to remove the wall footings and lay the new footpath and install the boundary features, a CEZ would be impractical. Ground protection will therefore be used to protect the RPA of T1.

Once the site is cleared and the site hoarding and temporary concrete surfacing are removed, the exposed ground front and to the eastern (driveway) side of the footings of the former boundary wall within the RPA of T1 must be immediately protected to minimise root disturbance.

To allow easy access to the area where the front path is to be installed and to ensure protection of the remaining ground is maintained, the protection must incorporate a separate section of protection roughly mirroring the extents of the footpath. This can be then be easily lifted after removal of the wall footings is complete. This section may comprise 18mm plywood boarding without the compressible layer.

The extents of the protection (inc. separate section) are illustrated on the TPP (No.2) at Appendix 2.

It is anticipated that the ground protection will only need to withstand pedestrian activity therefore it can comprise a top (wearing) surface of either 18mm ply board, metal plates or fibre glass panels designed for the purpose, on top of a (buffer) layer of chipped bark not less than 100mm deep. The woodchip absorbs impacts and helps to spread the weight of pedestrian activity. The top wearing surface and compressible (buffer) layer will sit on an impermeable membrane (e.g. heavy-grade polythene sheeting) to prevent possible leachates soaking into the ground.

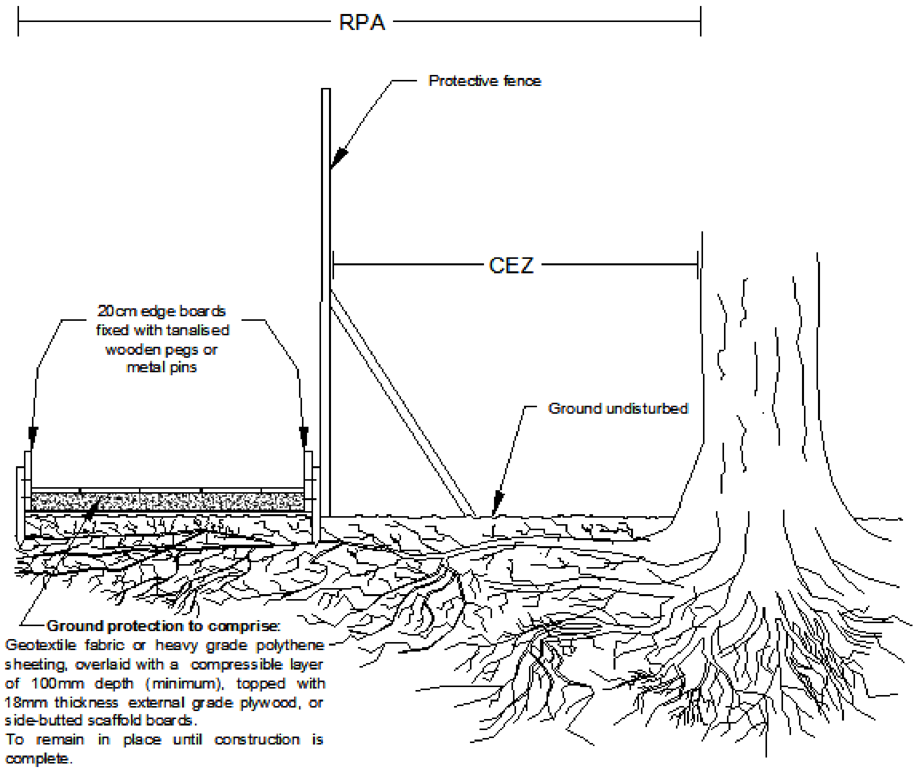
Temporary ground protection must also comply with British Standard Recommendations, as below:

a) **For pedestrian movements only:** a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100mm depth of woodchip), laid onto a geotextile membrane;

b) **For pedestrian-operated plant up to a gross weight of 2t:** proprietary, inter-linked ground protection boards placed on top of a compression resistant layer (e.g. 150mm of woodchip), laid onto a geotextile membrane;

c) **For wheeled or tracked construction traffic exceeding 2t gross weight:** an alternative system (*e.g. proprietary systems of pre-cast reinforced concrete slabs*) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

In this instance, it is anticipated that the ground protection will fall under categories a or b above.




**Any work necessary within RPAs must take place on the installed ground protection. Under no circumstances must any activity take place on soft exposed soil.**

The ground protection shall be laid according to the specification illustrated above and at Appendix 3.

### 5.3 Stem protection

Where fencing is deemed impractical the trunk of T1 will be vulnerable to impact damage during the works in close vicinity therefore temporary trunk protection will be required. This may take the form of several wraps of chestnut pale fencing from ground level to 3m height, over multiple wraps of geotextile membrane. This shall be installed prior to removal of the site hoarding.

### 5.4 Root Pruning

Encountering tree roots is highly likely when excavating within RPAs, even at distance from the parent tree. This is anticipated during excavations to remove the wall footings, holes for piles and pads supporting the boundary fence and electric gate, installation of electric feed for the gate and other features (e.g. external lighting or intercom system), and installation of the portion of sub-base for the driveway.

During these processes, the following guidelines must then be adhered to:

- No roots of greater than 25mm must be cut without consultation.
- Where roots can be carefully moved to one side, this should be carried out rather than being severed.
- If cutting of root(s) of less than 25mm diameter is deemed necessary they must be cleanly pruned, preferably back to a side branch, using sharp bi-pass secateurs or loppers. Once pruned, the cut root(s) must immediately covered with damp, clean, hessian sacking (in summer months) which must be kept damp so long as the roots remain exposed, or dry hessian sacking in winter to prevent desiccation and protect from rapid temperature changes.
- Prior to backfilling, any hessian wrapping should be removed and retained roots should be surrounded with sharp sand (builders' sand should not be used because of its high salt content which is toxic to roots) or other granular fill, before soil is replaced.
- If new concrete is to be used, an impermeable membrane must be placed along the exposed face to prevent contact with and scorching of roots, and to ensure leachates do not contaminate the immediate rooting area in the future.

These procedures **must** be followed and be carried out under the supervision of an arboriculturist. The arboriculturist must oversee excavation deemed to be in highly sensitive areas. Where areas are deemed less sensitive the arboriculturist need not attend site, so long as he/she remains in contact with the builders and can access photos taken in the course of the excavations.

### 5.5 Mixing and use of concrete around trees

Concrete or cementitious (mortar, cement, slurry) washout wastewater is caustic and considered to be corrosive with a pH over 12, essentially the same as Liquid Drano®, ammonia or other household cleaning detergents. Wet concrete is toxic to trees therefore the incorporation of protection (e.g. sheathing with impermeable membrane such as heavy-grade polythene sheeting) is extremely important to prevent it coming into contact with exposed roots, so limiting the potential for harm.

It is just as important not to mix concrete in the vicinity of trees in order to avoid the risk of it soaking into the soil; therefore, no mixing or dispensing of concrete should be undertaken within 5 metres of the RPA of any tree. Where lack of space precludes this (e.g. in a confined site with a dense tree population), mixing would need to be carried out in a bunded area to contain spillages and runoff. A proprietary mixing tray would suffice where only small quantities are required, but mixing of larger quantities (e.g. requiring a mechanical mixer) would require more substantial protection, constructed out of timber sheeting and edged 200mm boards, covered in heavy-grade polythene sheeting.

### 5.6 Removal of site office and storage/welfare facilities

Prior to the removal of the site hoarding and temporary concrete surfacing, the site office, storage containers and welfare facilities will be removed. It is anticipated that a lorry-mounted mobile crane will be used for this, most likely a hydraulic arm mounted on a low-loader. This vehicle must operate either from the highway or the temporary surfacing within the site, by no means must it park on unprotected ground. To avoid the hydraulic arm striking the tree, lifting of the cabins must be overseen by a banksman.

## 5.7 Removal of site hoarding

Removal of concrete used to set the hoarding posts in the ground will be undertaken with the use of hand tools only, taking care not to damage the bark of any roots that may have been exposed when the holes were initially created. Once the concrete is removed the holes must be backfilled immediately with good quality topsoil.

## 5.8 Removal of temporary hard surfacing

Once the site is cleared removal of the temporary concrete surfacing may commence, this shall be carried out with the use of hand tools only. Given the sensitivity of the ground beneath the concrete due to it constituting the RPA of T1, the concrete shall be progressively broken up and removed working backwards from the furthest margins towards the boundary, working from the remaining surface. On completion of the concrete removal, the area of exposed ground within the RPA of T1 shall immediately covered with ground protection as detailed at Section 5.2.

## 5.9 Removal of footings of former boundary wall

Once the ground protection is laid, removal of the wall footings may commence. This shall also be carried out with the use of hand tools; given the risk of significant root damage occurring this shall be undertaken under the supervision of an arboriculturist. To ensure any roots (particularly those of 25mm diameter or above) that may be adhering to the footings are not torn in the process of removal the following precautions will be taken:

- The brickwork and/or concrete will be manually lifted, working from the ground protection or ground outside the RPA and not from soft exposed ground.
- The brickwork and/or concrete will be carefully eased out without tearing any of the larger (>25mm dia.) roots that may have grown under or around it. If this has occurred the root(s) will be gently prised away and cleanly cut first with sharp bypass secateurs or hand saw.
- All roots exposed in the course of the footings' removal will be protected from desiccation in accordance with the method described at Section 5.4 until they are covered with good quality topsoil.
- Upon completion of removal, the trench left by the footings shall be backfilled with good quality topsoil and immediately covered with ground protection. This shall constitute 18mm ply-wood sheeting pinned to the ground with tanalised wooden pegs or metal pins.

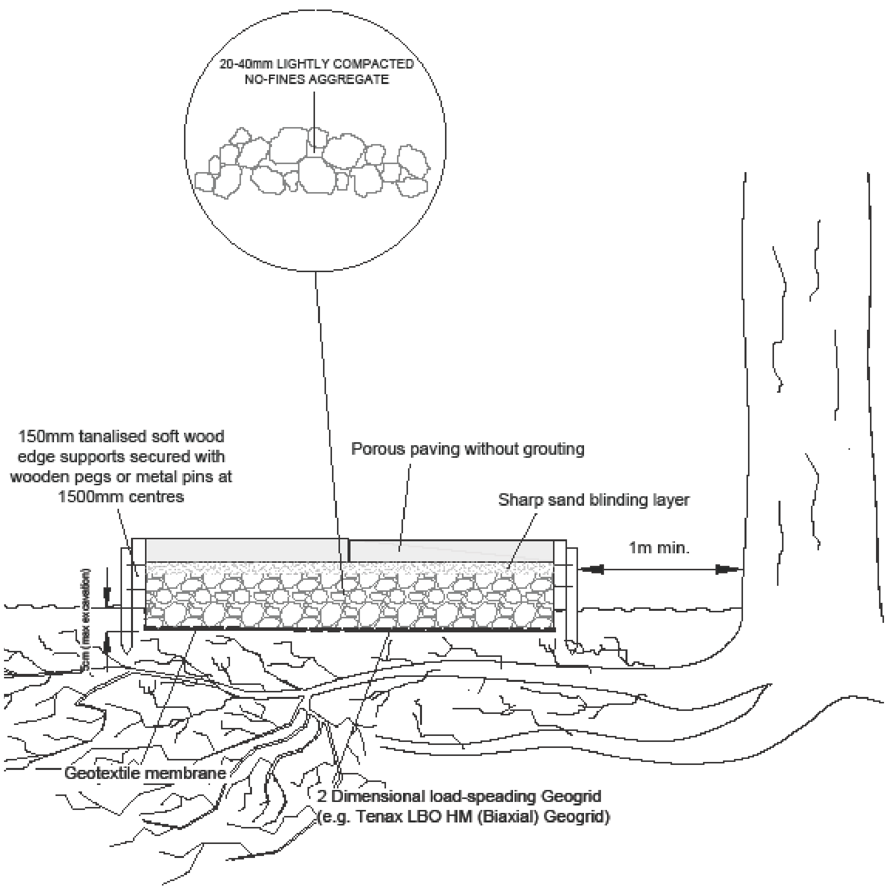
## 5.10 Installation of new footpath

Once the former boundary wall footings are removed laying of the new pedestrian path can commence. The entire path encroaches upon the RPA of T1 therefore it shall be installed with minimal excavation to minimise root disturbance – a traditional sub-base cannot be used due to the extensive excavation this would require and potential for root damage.

*The method below is suggested, based on best practice recommendations. Any alternate method will be discussed and agreed with the project arboriculturist and/or local authority tree officer prior to installation.*

- This work shall not take place when the ground is wet or saturated to avoid the possibility of compaction. The period between May and October is advisable.
- The section of ground protection covering the ground where the path shall be laid will be lifted.
- The ground beneath the protection shall be prepared by removing any surface rocks, debris or other organic material. Some levelling of the ground will be acceptable to facilitate the path's installation; this shall be undertaken to a maximum depth of 50mm, using hand tools only. Wheelbarrows used in the course of this work will run on scaffold boards and be confined within the extents of the drive, this is especially important in wet conditions to prevent rutting of the ground surface.

- Any roots greater than 25mm diameter encountered in the course of the excavations will be protected from desiccation as per the method described at section 5.4.
- A porous geotextile membrane will be laid directly onto the soil over the whole area where the path is to be installed.
- The path's edges shall be contained by 150mm tanalised wooden edge boards pinned to the ground with wooden pegs or metal pins driven at 1500mm centres.
- A 2-dimensional load-spreading 'geogrid' (e.g. Tenax LBO HM (Biaxial) Geogrid by Geosynthetics Ltd.) shall be installed over the geotextile to stabilise the aggregate sub base. This shall be pinned to the ground with the use of 'J' pegs to prevent movement.
- The grid will then be covered with 20-40mm no-fines aggregate to approximately 100mm depth; this will be poured and tamped progressively along the length of the path and not tipped straight onto the grid in one pile. Tamping will be carried out with the use of a wacker-plate to ensure it securely penetrates the mesh and creates a positive interlock.
- The aggregate will be topped with a layer of lightly tamped sharp sand (depth to be determined by the contractor), once this is complete the paving slabs can be laid.
- The paving slabs must be laid dry-jointed to allow air and moisture to penetrate the tree's rooting area.




Once installed, the path will form part of the ground protection for T1. A brochure detailing the Tenax Geogrid and indicative cross-sectional illustration detailing hard surface installation within RPA is attached at Appendix 4.

## 5.11 Excavation for section of driveway within RPA of T1

Some careful excavation will be necessary in a small section of the RPA of T1, to facilitate installation of the sub-base for the driveway. This shall be undertaken with the use of hand tools, under the supervision of an arboriculturist. Any roots encountered in the course of this work shall be pruned back to the edge of the excavation, in accordance with the method described at Section 5.4. Once excavation is completed to the required depth, the cut ends of the roots shall be covered with an impermeable membrane to protect them from the potentially toxic effects of concrete products.

### 5.12 Installation of boundary fence and electric gate

The new boundary fence and electric sliding gate will be installed within the RPA of T1. To minimise the potential for root damage, the fence and gate will be founded on 400mm diameter piles, as illustrated within the TPP's at Appendix 2. The piles' depth has yet to be confirmed by the structural engineer. Given the risk of damaging large woody structural roots, the piles' position will be informed by trial excavations to determine root presence therefore some flexibility will have to be incorporated into the structural engineer's specification. These excavations will be carried out by hand under the supervision of an arboriculturist. If large diameter roots (40mm or greater) are encountered in the course of the excavation they shall be preserved and worked around. Smaller diameter roots (25-40mm dia.) may be cut back cleanly to the edge of the hole in accordance with the method described at Section 5.4.

All exposed roots (cut or otherwise) shall be continually dampened to prevent desiccation. Once the excavation is carried out to the required depth. If the holes are to be left open, the roots shall be covered by dampened hessian sacking pinned to the sides of the hole to preserve its efficacy.

Prior to pouring concrete all hessian shall be removed and the holes lined with an impermeable membrane (e.g. heavy grade polythene sheeting) to prevent roots coming into contact with the wet concrete.

### 5.13 Electricity supply to the electric gate and other features

The trench required to install the electricity cable for the electric gate marginally encroaches upon the RPA of T1. Notwithstanding this, minimisation of root disturbance is still a primary concern therefore excavations and protection from desiccation will be undertaken in accordance with Section 5.4. If the cable is to be encased in concrete, the cutting shall be lined in heavy-grade polythene sheeting to prevent root contact.

***This principle applies to any additional electrical feed proposed in the front garden not covered by this report e.g. for external lighting or gate intercom system. If any additional feed is proposed within RPAs their location <u>must</u> be agreed by the arboriculturist and local authority tree officer.***

Due to the damaging nature or trench digging within RPAs no underground ground services are to be laid within identified RPAs other than that already identified for the SE located soakaway.

If, in exceptional circumstances, this is deemed unavoidable a means of achieving this in a way that will not result in unacceptable levels of root damage must be agreed between the developer, arboriculturist and Council's Arboricultural Planning Officer.

### 5.14 Removal of protective measures and soil remediation

Once all works in the front garden are complete the ground protection and stem protection for T1 may be removed.

The soil within T1's RPA has been subject to considerable disturbance and compaction in the course of the construction and it is strongly advised that soil remediation measures are undertaken prior to soft landscaping works, to improve its structure, moisture infiltration/retention and nutrient content. Remediation will take the form of sub-soil aeration with the use of compressed air, and the incorporation of bulky organic mulch e.g. well composted woodchip or leaf mould – peat must not be used due to its potentially acidifying effects.

It is also strongly advised that a 1 metre mulch circle is left around the tree's base to maintain improved oxygen absorption, suppress weed growth and maximise the capture of rainfall runoff from the tree's structure in heavy downpours.

### 5.15 Landscaping

Landscaping will commence once all protection is removed and soil remediation works are complete. Given the recent decompaction / remedial treatment within the RPA of T1, a risk of re-compaction exists unless the following precautions are not complied with:

1) Temporary ground protection (e.g. 18mm plywood boards) must be used for all landscaping works within RPAs;

2) No deep digging or use of machinery (e.g. rotovators) must take place within the RPA since they have the potential to damage roots, however some scope for lighting forking over would be acceptable to plant bulbs.

### 5.16 Additional Precautions outside the Tree Exclusion Zone.

- All-weather notices should be erected on the barrier with words such as "Exclusion Zone – Not to be moved without appropriate consent". Copies of such notices are attached at Appendix 8.
- Materials that will contaminate the ground such as diesel oil and concrete mixings will not be discharged within the RPA or within 10m of any of the tree stems.
- Notice boards, telephone cables or other services should not be attached to any part of the tree.
- No fires that have the potential for flames to extend to within 5m of any point of the tree are to be lit.

## 6.0 SEQUENCE OF EVENTS AND SITE INSPECTION/MONITORING

All key site personnel must fully familiarise themselves and understand this method statement and tree protection plan. A copy of the method statement must be kept at all times on site. A large (not less than A3 size) copy of the TPP must be placed on the site office notice-board. The general sequence of events should be as follows:

### 6.1 Sequence of events

**Stage 1:** Prior to removal of the site cabins, hoarding or concrete, a site meeting involving the site manager/foreman and arboricultural consultant will take place. If the local authority arboricultural officer must also be notified of this meeting in good time to allow the opportunity for them to attend.

**Stage 2:** Remove site cabins, install temporary stem protection for T1, then commence to remove hoarding and concrete surfacing. Install temporary ground immediately after concrete surfacing has been removed.

**Stage 3:** Undertake removal of wall footings and lay extra ground protection. Arboricultural supervision will be required.

**Stage 4:** Remove section of ground protection and install new pathway. Once complete this will form part of the ground protection. Arboricultural supervision will be required.

**Stage 5:** Carry out sensitive excavation of corner of driveway within the RPA of T1. Arboricultural supervision will be required.

**Stage 6:** Carry out excavations for fence/electric gate foundations and electrical feed. Arboricultural supervision will be required.

**Stage 7:** Once decompaction works are complete and prior to soft landscaping a final visit to debrief landscaping operatives on temporary protection measures during landscaping operations to avoid re-compaction of the soil.

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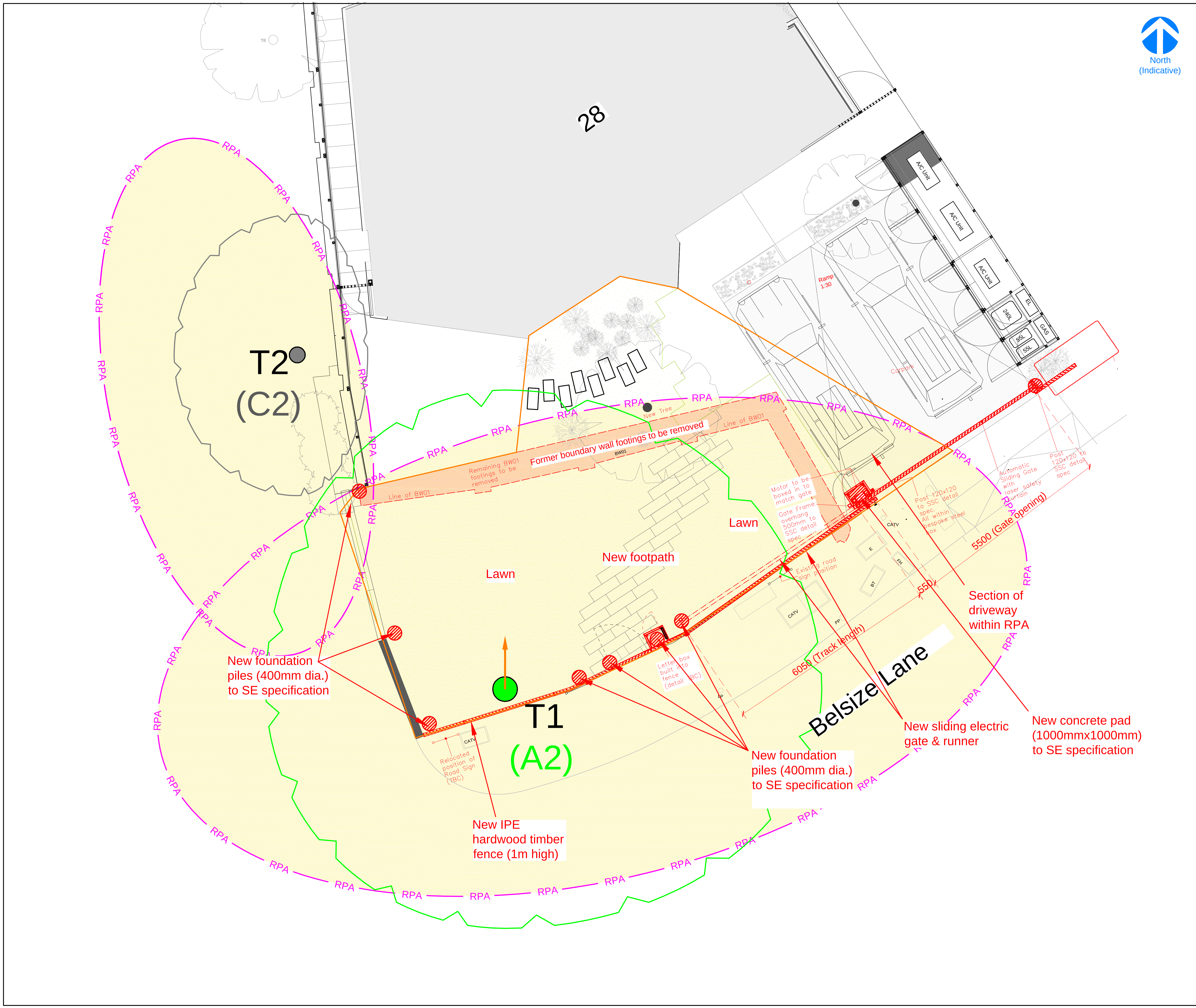
## Appendix 1 Tree Constraints Plan




**DO NOT SCALE** - Use only figured dimensions
To be read in colour

BS 5837:2010 TREE RETENTION CATEGORIES

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

Category B
Trees of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20years is suggested)

Category C
Trees of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10years is suggested), or young trees with a stem diameter below 150mm.

Category 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.

BS 5837 Root Protection Areas
Adjusted to reflect the likely distribution of roots, as influenced by existing site conditions

Height and Direction of First Significant Branch

| - | - | - |
|---|---|---|

REVISIONS

| | |
|---|---|
| Title<br>Tree Constraints Plan | |
| Client<br>Mrs V. Bradley | |
| Project<br>28 Belsize Lane, Hampstead, London NW3 5AB | |
| Date<br>February 2017 | Drawn by<br>CS |
| Project Ref.<br>1150_TCP | Scale<br>1:100 @ A3 |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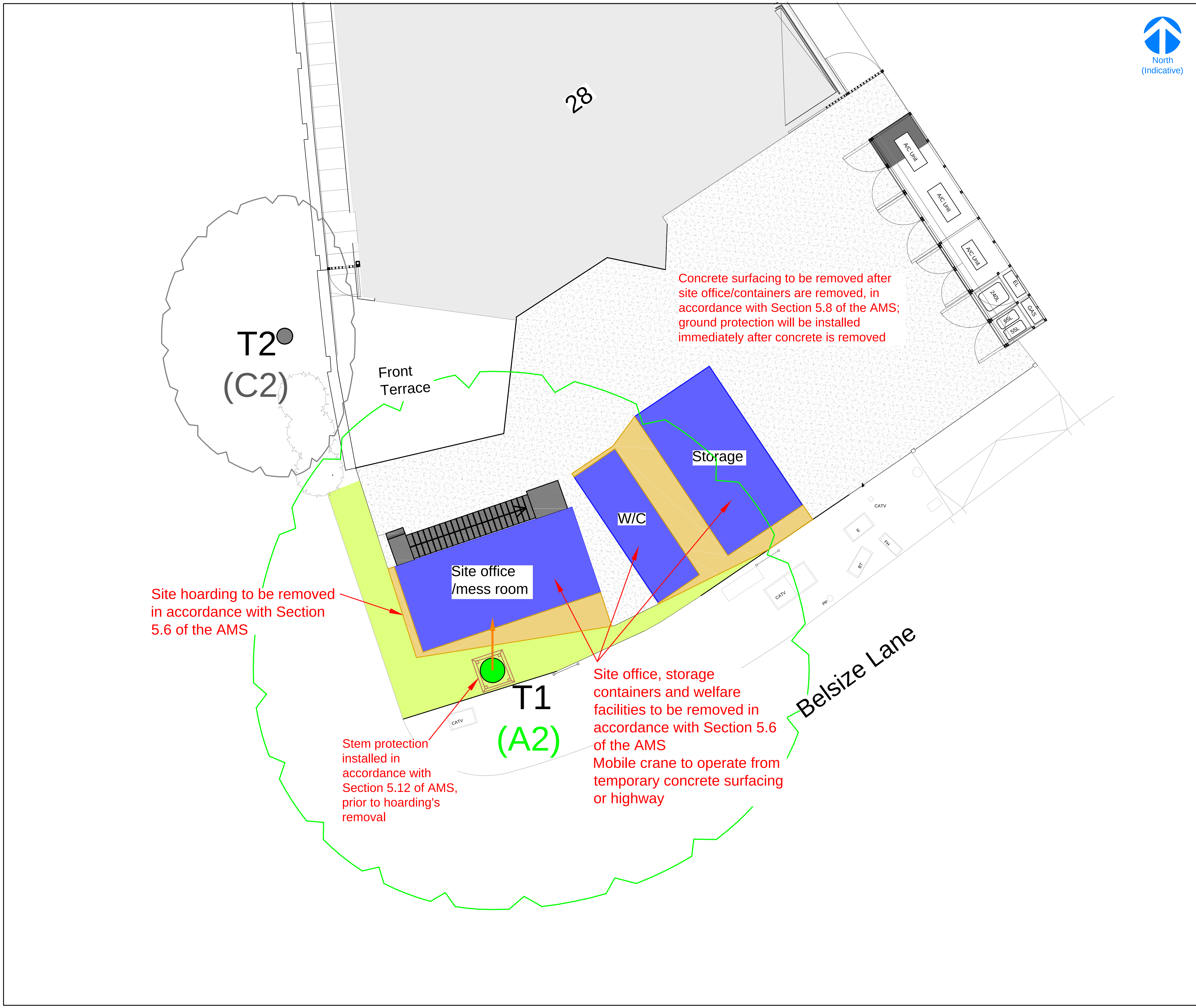
## Appendix 2 Tree Protection Plans

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To be read in colour

BS 5837:2010 TREE RETENTION CATEGORIES

Category A
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Category 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.

REVISIONS

| | |
|---|---|
| Title | Tree Protection Plan 1 (Removal of Construction Site Installation & Temporary Concrete surfacing) |
| Client | Mrs V. Bradley |
| Project | 28 Belsize Lane, Hampstead, London NW3 5AB |
| Date | February 2017 |
| Drawn by | CS |
| Project Ref. | 1150_TPP_1 |
| Scale | 1:100 @ A3 |

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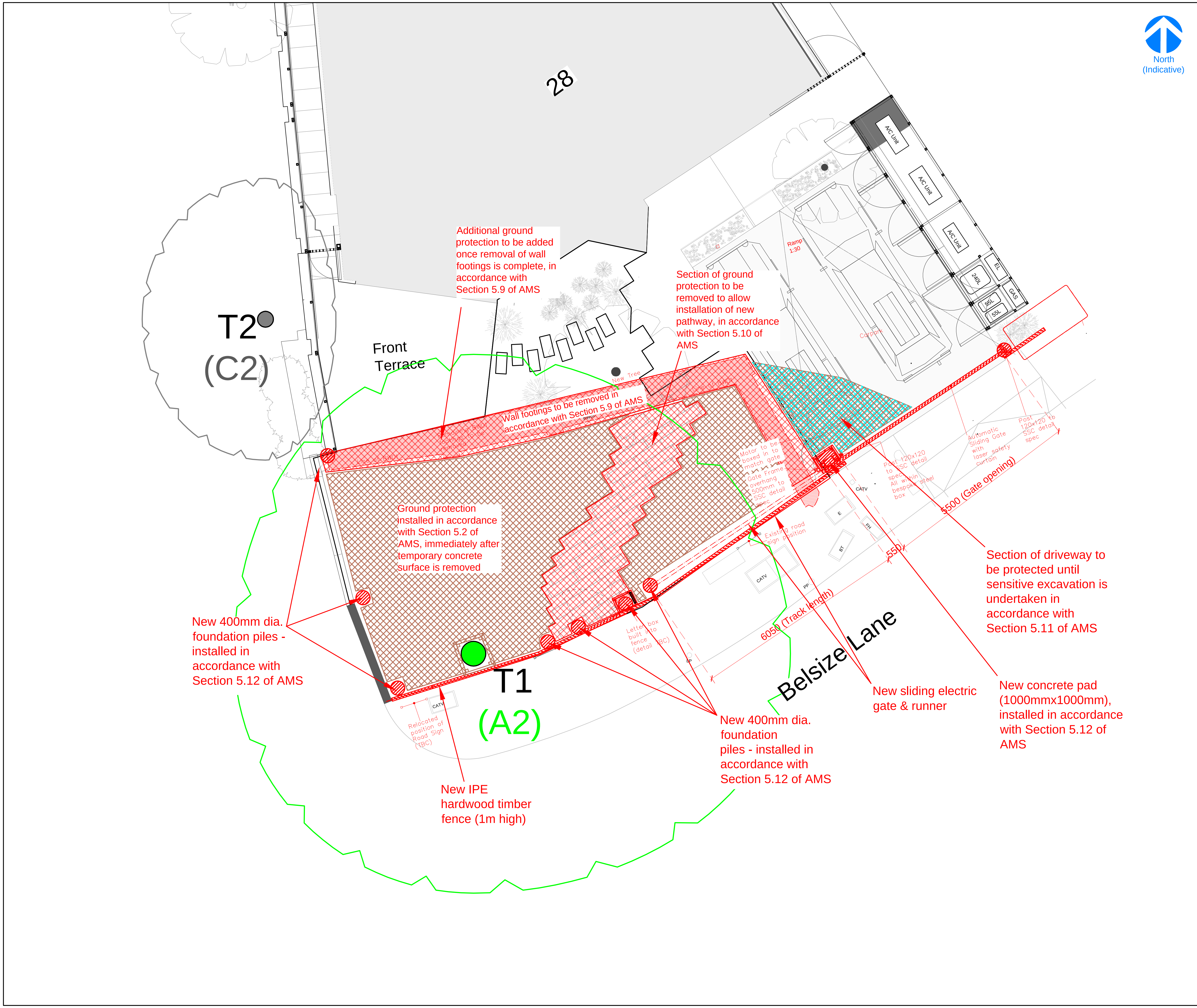


**DO NOT SCALE** - Use only figured dimensions
To be read in colour

BS 5837:2010 TREE RETENTION CATEGORIES

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

Category B
Trees of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20years is suggested)

Category C
Trees of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10years is suggested), or young trees with a stem diameter below 150mm.

Category 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.

BS 5837 Ground Protection
(refer to section 5.2 and Appendix 4 of the Arboricultural Method Statement for description and specification)

Section of driveway to be protected until sensitive excavation is undertaken, in accordance with Section 5.11 of AMS

REVISIONS

Title Tree Protection Plan 2
(Proposed Boundary Treatment and Installation of Path & Drive)

Client
Mrs V. Bradley

Project
28 Belsize Lane, Hampstead, London NW3 5AB

| Date | Drawn by |
|---|---|
| February 2017 | CS |
| Project Ref. | Scale |
| 1150_TPP_2 | 1:100 @ A3 |

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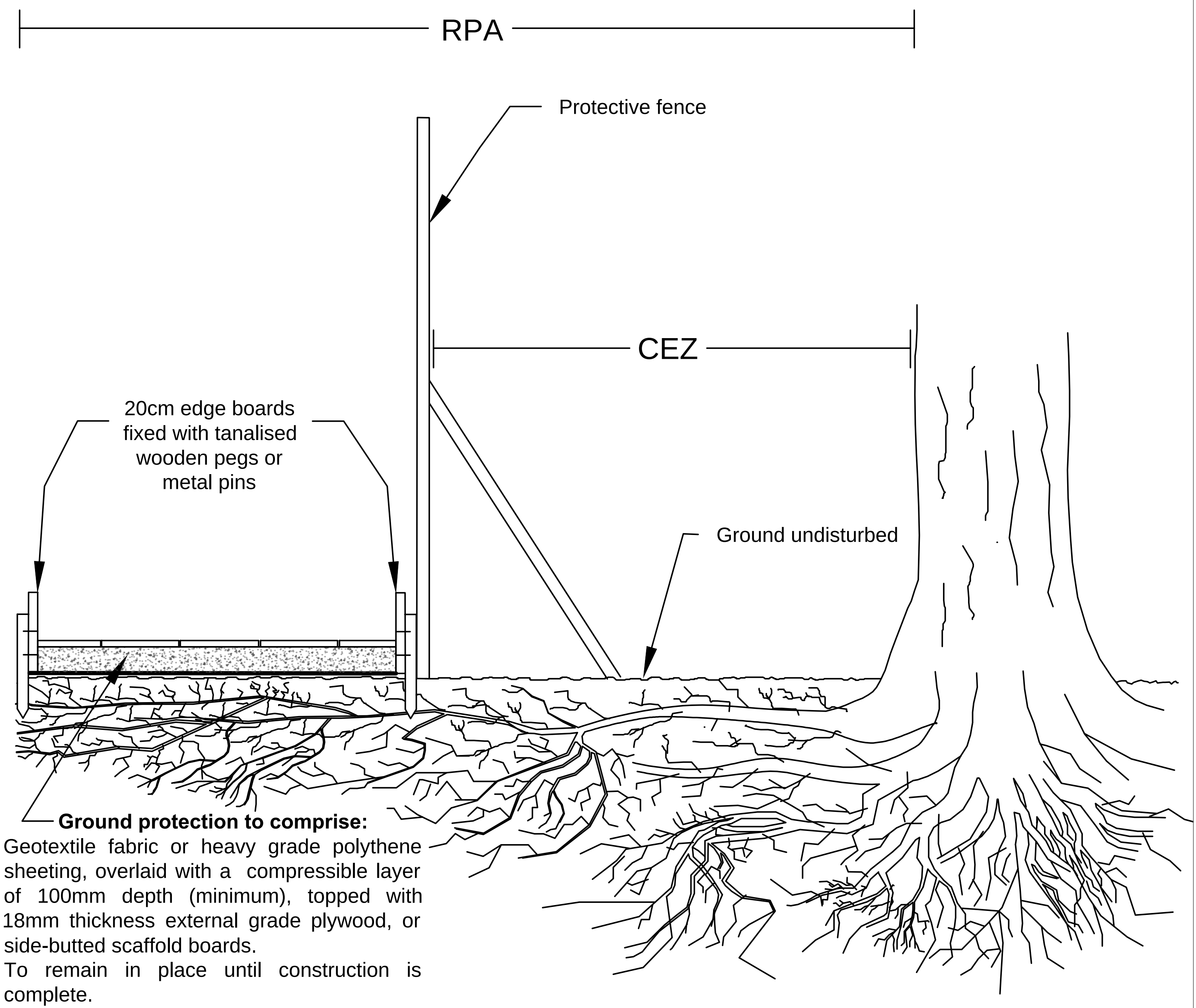
## Appendix 3 Default specification for ground protection

# Ground Protection for Pedestrian Use within Tree Root Protection Areas

To avoid damage to roots and soil structure outside the CEZ but within the RPA, temporary ground protection will be installed using hand tools and wheelbarrows only. Wheelbarrows will only be used on boards or on retained/completed hard surfacing to avoid rutting.



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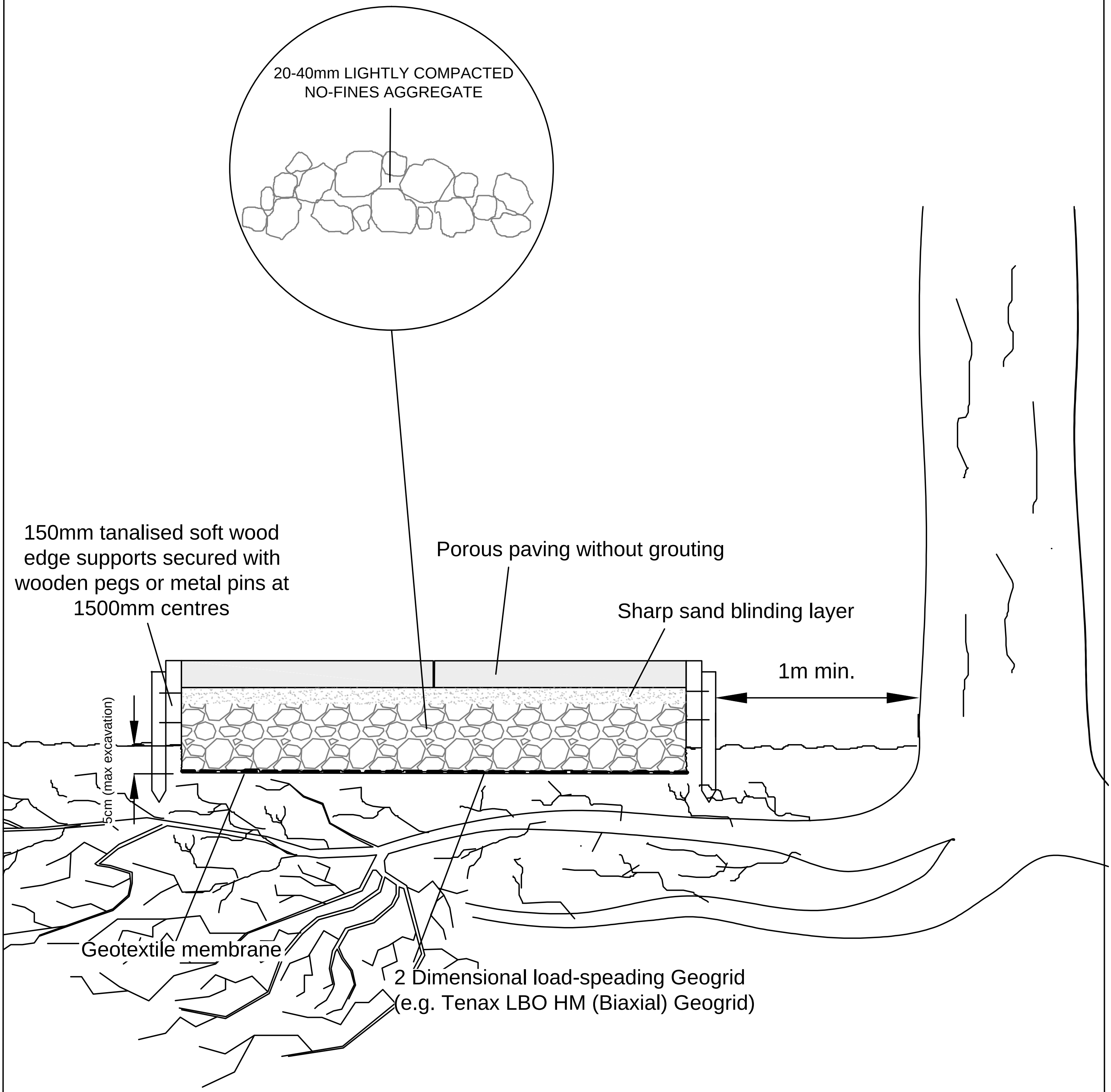
**Appendix 4 Diagrammatic Cross-Sectional Illustration of Minimal-Dig Driveway Over Tree Roots**
**Brochure for Tenax Geogrid**

# Recommended composition of hard surface construction within root protection areas




This drawing is not a specification for works

# Tenax Geogrids

Soil Reinforcement Solutions

Geosynthetics Limited

# Tenax

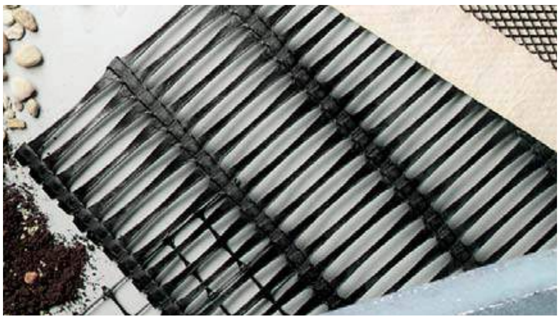
Soil Reinforcement Services

## Extruded geogrids, such as those manufactured by Tenax, are widely accepted as giving the best performance and longer-lasting results for soil reinforcement.

As the distributor for Tenax in the United Kingdom, Geosynthetics Limited stock their full range of extruded geogrids and provide next day delivery to site as standard. Tenax geogrids fall into two categories to suit a wide variety of applications: the mono-oriented TT range and the bi-oriented LBO range. Civil engineers regularly specify Tenax to provide:

**Product features:**

- Increased soil stabilisation
- Better reinforcement
- Increased bearing capacity
- Improved lateral confinement
- More effective distribution of applied loads



Recognised as a World leader in this field and with a reputation for excellence, Tenax continues to support private and public sector clients in a number of crucial areas including:

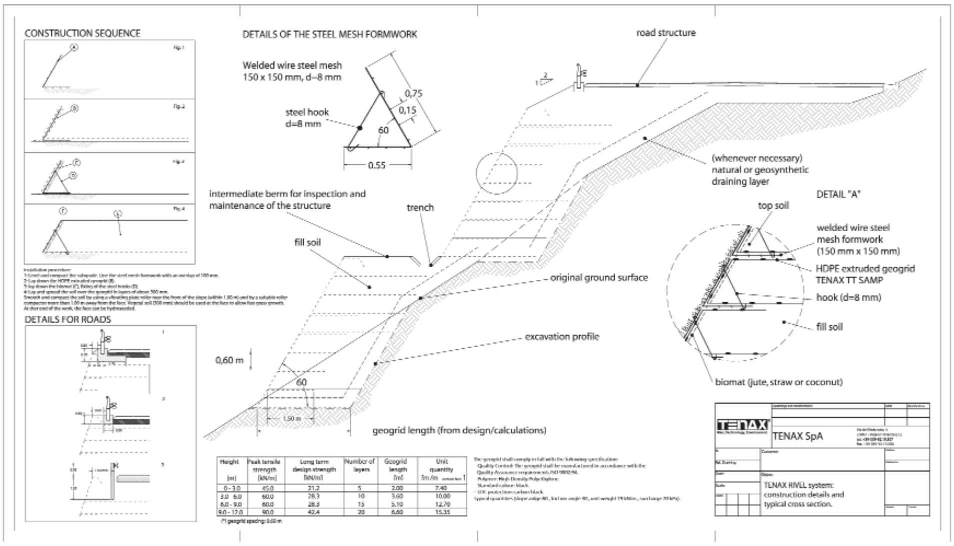
- State-of-the-art geotechnical engineering services from field and laboratory testing to engineering analysis and construction procedures.
- Engineers, geologists and environmental experts to provide a balanced solution to any environmental project.
- Educational seminars, design workshops and customised “in-house” training.
- Specific software for designing Civil Engineering applications with TENAX geosynthetics.

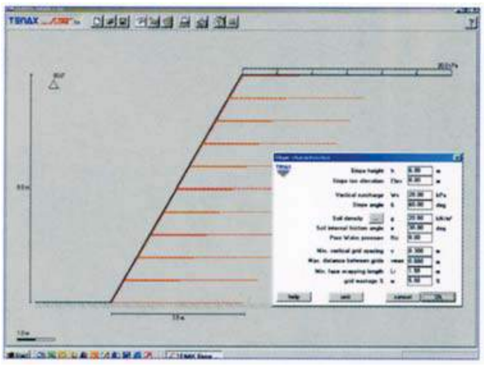
# **Design** services

## Tenax design services

Whatever the nature of your project, the TENAX Geosynthetics Technical Office (GTO) will give you expert advice in selecting, designing and developing technically appropriate and cost effective solutions.

The Tenax Geosynthetics Division can provide local support for a wide range of engineering problems; helping you to find the best solution through feasibility studies, field and laboratory testing, construction quality control and engineering analysis.



Above

Detailed construction drawing for specific project conditions.

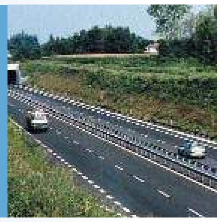
Left

TNXSLOPE: Specific software for designing steep slopes reinforced with Geogrids.

**Geosynthetics Ltd is committed to offering the best solutions for soil stabilisation, erosion control, drainage and environmental protection problems.**

Well trained staff are always available to discuss which materials are best suited to any particular application.

# **Product** applications



Railroad ballast reinforcement with Tenax LBO geogrids

Low bearing capacity subgrade reinforcement with Tenax LBO geogrids.

## Tenax LBO - Bi-oriented geogrid

With a high tensile strength in both directions and a uniform distribution of rectangular apertures, Tenax LBO is ideal for the following applications:

- Paved and unpaved roads
- Airport runways
- Industrial yards
- Embankment foundations over soft soil
- Railroad ballast reinforcement
- Soil reinforcement of building foundations

By confining the granular fill and providing tensile reinforcement, Tenax LBO helps to distribute loads more effectively, resulting in reduced rutting and shear failure. In addition to this it increases the bearing capacity of soft sub-soil, and provides the lateral confinement required to prevent the pumping of sub-grade fines – increasing longevity and reducing the need for maintenance.

Manufactured from polypropylene, Tenax LBO has an open structure with rigid ribs and junctions that create a more efficient interlocking action between the geogrid and the fill to give improved performance.

Please call

01455 617139

or email sales@geosyn.co.uk
for further information.

Wide product range

Large stock holding

Next day delivery

Soft soil stabilisation and separation using Tenax GT.

## Tenax GT – Geotextile thermally bonded to Tenax LBO geogrid

Laminating a non-woven geotextile to Tenax LBO produces Tenax GT; a polypropylene geocomposite specifically designed for the stabilisation of soils in applications where reinforcement as well as separation is required. This separation between the granular base and very fine soil provides an effective filtering action and avoids mixing of the different soil types to extend life and increase performance.

In addition to this Geosynthetics Limited can supply TenaxGT440R, which has been developed specifically for railway applications to improve track life and performance by both stiffening the ballast over weak ground, and separating the ballast from the sub-grade.

Tenax Rivel system for landslide repair.

## Tenax TT

Ideal for a wide variety of soil reinforcement applications including:

- Vegetated steep slope embankments
- Landslide repair
- Modular concrete block retaining walls
- Road and railway embankments
- Rock fall protection systems
- Containment dykes for landfill and water basins

Manufactured from high-density polymers, its high tensile strength in one direction makes it the ideal solution for the construction of embankments and walls with green-faced slopes that are stable at inclinations of up to 80°. Tenax TT also reduces cost and minimises environmental impact by allowing the use of poor quality in-situ fill material and encouraging the reinforced slope back to its natural vegetated state.

Available in tensile strengths in excess of 120kN/m2 and with extremely high junction strength, means it can also be used in structures such as the Tenax Georaft System, where the geogrids are connected with Bodkin-type joints for extra reinforcement.

Bridge abutment with Tenax TT samp and concrete blocks.

# Quality assurance

## The reassurance of Tenax quality

The TENAX Quality Assurance System – for the manufacture of geogrids and polymer based three-dimensional extruded structures for Civil Engineering applications – has been assessed and certified in accordance with ISO 9001: 2000 Quality Standards by both SGS United Kingdom and SGS Italy, the world's leading inspection, verification, testing and certification company.

With periodic inspections by internal personnel and external auditing authorities, Tenax geogrids benefit from the rigorous control from the selection of raw materials, through to product release - giving you the guarantee of product integrity and performance.

AGRÈMENT TECNICO
A.T. ICITE: n.508/98 del 19.6.98
Application: Rinforzo tensionale e stabilizzazione terreni.
Tensile reinforcement and soil stabilization.
Validity: 3 anni / 3 years

First issued: May 9, 1994

Certificate No. Q2568

0799-CPD-25

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## Appendix 5 Cascade chart explaining tree quality assessment

## Key to tree schedule references

## BS 5837:2012 Cascade chart for tree quality assessment (Table 1)

| Category and definition | Criteria (including subcategories where appropriate) | | | Identification on plan |
|---|---|---|---|---|
| **Trees unsuitable for retention** | | | | |
| **Category U**<br>Those in such 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 to collapse, including those that will become unviable after removal of other U category trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)<br><br>• Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline<br><br>• Trees infected with pathogens of significance to the health and/or stability of other nearby trees (e.g. Dutch elm disease), or very low quality trees suppressing adjacent trees of better quality.<br><br>**NOTE:** Category U trees can have existing or potential conservation value which it might be desirable to preserve. | | | DARK RED |
| | **1 Mainly arboricultural qualities** | **2 Mainly landscape qualities** | **3 Mainly cultural values, including conservation** | |
| **Trees to be considered for retention** | | | | |
| **Category A**<br>**Trees of high quality** with an estimated remaining life expectancy of at least 40 years | Trees that are of particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups, or of 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) | LIGHT GREEN |
| **Category B**<br>**Trees of moderate quality** with an estimated contribution of at least 20 years | Trees that might be included in the high category, but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage) | 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 | MID BLUE |
| **Category C**<br>**Trees of low quality** with an estimated contribution of at least 10 years, or young trees with a stem diameter below 150mm | 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 landscape value; and/or trees offering low or only temporary/transient landscape benefits | Trees with no material conservation or other cultural value | GREY |

## KEY TO TREE SCHEDULE REFERENCES

**Prefix:** **T** – Tree **S** – Shrub/Climber **TG/SG** – Group/Hedge of Trees or Shrubs **H** - Hedge

***** Estimated

**Dia.:** **N/A -** Tree less than 100mm (for shrubs: young, semi-mature or mature)

**Age Class:**

| | |
|---|---|
| **Young:** | Generally less than 10 years old and high life expectancy |
| **Semi-mature:** | Within first 30% of life expectancy and significant growth to be expected |
| **Early-mature:** | Typically 30-60% of life expectancy, full size almost reached |
| **Mature:** | Typically 60% or more of life expectancy, full size reached with very gradual, slight further increases in size |
| **Veteran** | A stage of development where intervention/management may be required to ensure the tree remains safe |
| **Over-mature:** | Where a tree is so senescent that management is not worthwhile |

**Life Expectancy:** How many years before tree is likely to need removing (subject to human intervention)

**Crown Radius:** If crown is symmetrical, one dimension is given for the radius followed by "S"

**B.S. Category:** **See Appendix 2**

**Physiological Condition:**

| | |
|---|---|
| **Good:** | Healthy tree with no symptoms of significant disease |
| **Fair:** | Some disease noted and/or vitality is below what would be expected |
| **Poor:** | Significant disease noted and/or very low vitality |
| **Very Poor:** | Tree is in severe decline |

**Structural Condition:**

| | |
|---|---|
| **Good:** | No significant structural defects |
| **Fair:** | Defects noted but not sufficient to warrant immediate work |
| **Poor:** | Significant defects. Monitoring and/or remedial works required |
| **Very Poor:** | Significant defects requiring immediate work or tree removal |

**Space Below Crown:** A useful indicator to determine the practicality of developing below the crown. Rather than a measurement which can be misleading and open to interpretation.

| | |
|---|---|
| **Y** | Potential to develop below the dripline with either no treework or removal of limbs that will not adversely affect the health and appearance of the tree |
| **N** | No scope to develop below the dripline of the tree |
| **N/A** | Tree to be removed |

**Treework:** This is general since the report is not a tree-work specification. It indicates:

| | |
|---|---|
| **H** | High priority. For trees to be retained and where work required to make safe |
| **L** | No urgent work required but would benefit from some intervention |
| **N** | No treework identified as necessary in the foreseeable future |
| **P** | Facilitation tree surgery advised |
| **R** | Remove – tree identified to be removed because "U" category tree |
| **RA** | Tree removed to accommodate development **WA** Treework to accommodate development |
| **IV** | Sever and remove ivy |

**B.S. Category:**

**A** - Those of high quality and value i.e. make a substantial contribution;

**B** - Those of good/moderate quality and value, might be Cat. "A" but slightly impaired

**C** - Those of low quality i.e. adequate to remain until new planting is established or young trees with a stem diameter less than 150mm at 1.5m height

**U** - Those of such poor condition that any existing value would be lost within 10 years

**1 - Mainly Arboricultural value** **2 - Mainly Landscape value** **3 - Mainly Ecological value**

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# Appendix 6 Record of arboricultural supervision and monitoring

| INSPECTIONS | DATE | PERSONNEL PRESENT | FURTHER INSPECTION REQUIRED? | REMOTE - PHOTO BASED | OBSERVATIONS AND RECOMMENDATIONS |
|---|---|---|---|---|---|
| 1) Site meeting with tree officer. arboricultural consultant and site manager prior to the removal of the site cabins, hoarding or concrete | | | | | |
| 2) Removal of wall footings and installation of extra ground protection | | | | | |
| 3) Installation of new pathway and excavation for section of driveway within the RPA of T1 | | | | | |
| 4) Excavations for foundations for boundary fence and electric gate (inc. electrical feed) | | | | | |
| 5) Removal of ground protection once all construction works and soil remediation measures are complete and prior to commencement of soft landscaping | | | | | |

***Each stage as detailed above must be signed off by the Council's Arboricultural Officer prior to commencement of further stages.***

## Project Contacts

**Council Tree Officer:** Nick Bell (LB Camden)

**Managing agent:** Martin Liechti (Oakhill Management Ltd.)

**Arboriculturist:** Chris Sheldon (CS) T: 020 8252 7919

**Architect:** -

## Notes:

O M C
Arboriculture

# OMC Associates

## Appendix 7 Photographs


**Above / below:** T1 as viewed from the highway

**Above / Below:** New front garden area - as currently exists

# OMC Associates

**Appendix 8 Notices for tree protection fencing and posters to display on site**

# TREE PROTECTION AREA
# KEEP OUT !

**(TOWN & COUNTRY PLANNING ACT 1990)**

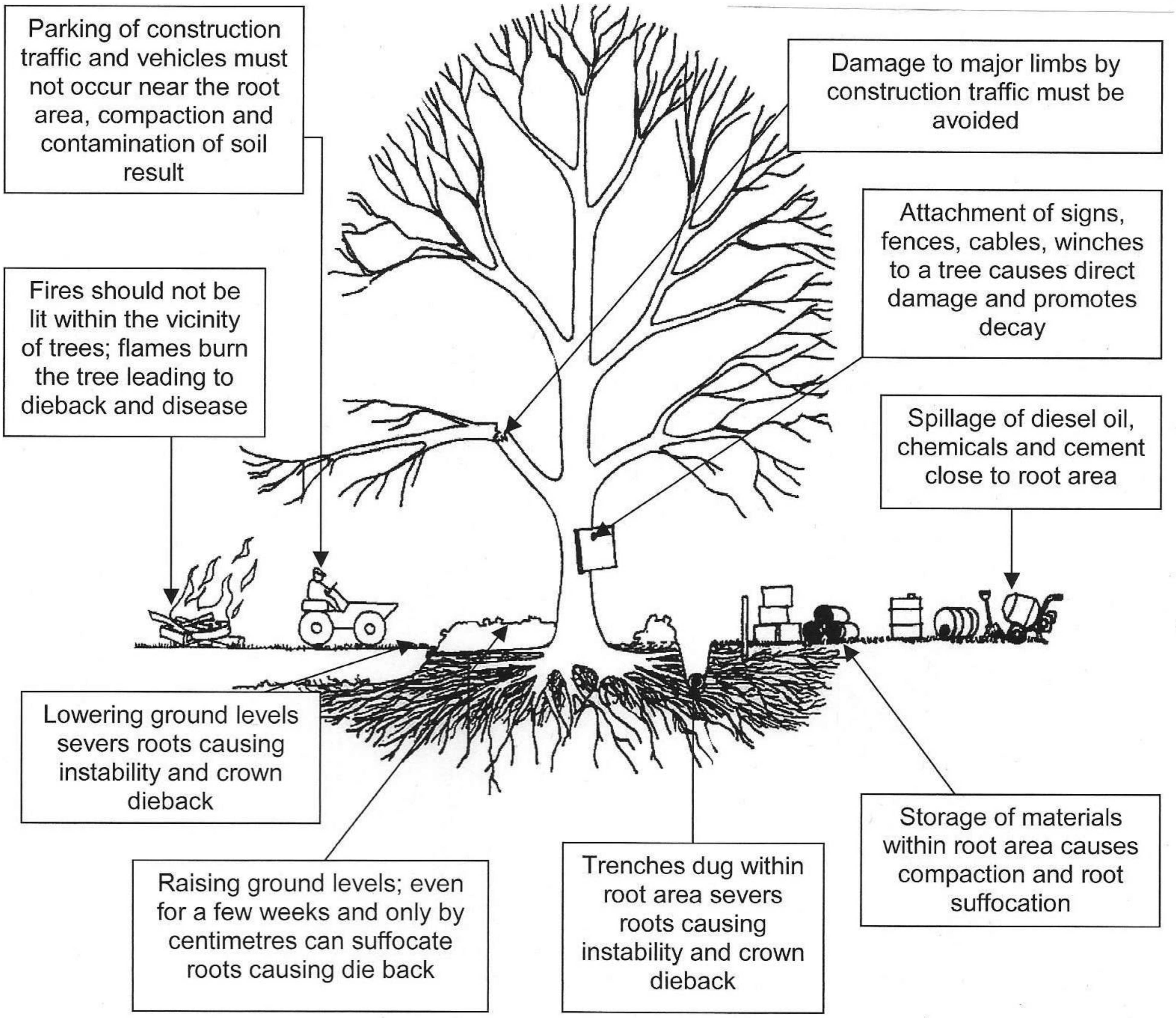
**TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS AND/OR ARE THE SUBJECTS OF A TREE PRESERVATION ORDER.**

**CONTRAVENTION OF A TREE PRESERVATION ORDER MAY LEAD TO CRIMINAL PROSECUTION**

**ANY INCURSION INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY**

PROTECTIVE FENCING. THIS FENCING MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND DRAWINGS FOR THIS DEVELOPMENT.

# COMMON CAUSES OF TREE DEATH ON DEVELOPMENT SITES




## INSTALATION OF THE CORRECT PROTECTIVE FENCING CAN PREVENT DEATHS OCCURING

**PLEASE USE COPIES OF THIS AS AN ON-SITE POSTER FOR PERSONNEL**