

BS5837 Arboricultural Impact Assessment



21 The Headway, Ewell, KT17 1UN

Client: **Inevitable Developments Ltd**

Job Reference: 03638Rv2

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July 2022

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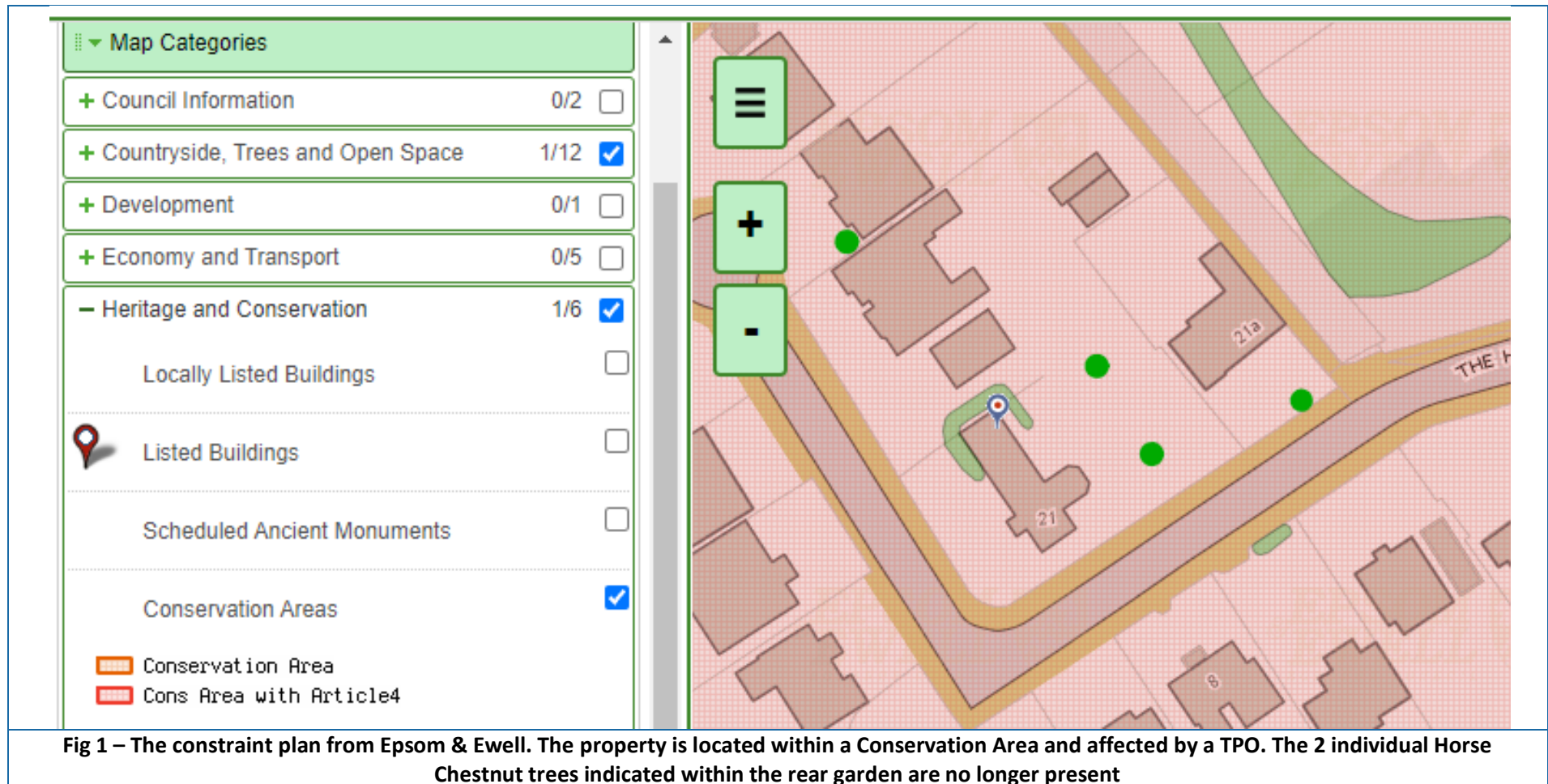
1. Executive Summary

- 1.1 Tamla Trees Ltd has been appointed by Inevitable Developments Ltd to provide advice on the arboricultural issues relating to proposed development which can be described as: *“Provision of new rear extension to existing property”*. We surveyed the site on 8.9.2021. The survey accorded with BS5837:2012 *“Trees in relation to design, demolition and construction – Recommendations”*.
- 1.2 The proposal results in the removal of T1 (Cypress). No other trees are removed to facilitate the proposal but T3 (Cypress) is noted to be in decline and should be removed on safety grounds.
- 1.3 The main constraint trees are TG2 (Scots Pine x 2) which are large mature trees close to the existing building. There is a minor encroachment into the Root Protection Area (RPA) of the southern tree in this group but at a distance and to a level that we believe within the tolerable threshold subject to the high level of tree protection proposed being installed prior to any on site works and maintained for the duration of the build.
- 1.4 Following objections from the local authority tree officer the proposed side extension has been removed.
- 1.5 The tree issues can be summarised as: **Effective Tree Protection (excavation & construction)> Site Services (Soakaway) works> Site operative knowledge of tree protection issues> Soft landscaping to make good.**
- 1.6 The site is located within the Ewell Village Conservation Area. TPO 57 (1972) makes reference to 2 x Horse Chestnut trees within the rear garden which are no longer present.
- 1.7 The Scots Pine referenced as TG2 & T11 also appear the subject of this TPO (G7 – TPO 57). **The extent of tree issues require a high level of contractor competence on implementing this proposal.** Subject to the working practices detailed within this report there should be no discernible impact on the site trees. This report is based on the revised client plans ref: ITE-201028-PS-001 - Proposed Ground Floor Layout Drawing v15

2. Statutory Protection

2.1 At the time of writing we are advised as follows:

Conservation Area Status	
Is the site located within a Conservation Area?	Yes Ewell Village
Notes: (i) All trees larger than 7.5cm diameter at 1.5m above ground level are subject to regulations within a Conservation Area. Exemptions apply for trees which are dead and dangerous but clarification before any tree works is advised. A notification is required in many circumstances.	
Tree Preservation Order Status	
Are inspected trees subject to a TPO?	Yes
Type of TPO	Area Individual Group Woodland
TPO Reference	TPO 57
Date TPO Made	1972
Notes: (i) The type and details of any TPO determine which trees are 'protected'. Exemptions apply for trees which are dead and dangerous but clarification before any tree works is advised. An application may be required before undertaking works. (ii) Epsom & Ewell Council indicates the property to be located within a Conservation Area and affected by a TPO.	



3. Terms of Reference

- 3.1 [BS5837:2012](#) 'Trees in relation to design, demolition and construction – recommendations'
- 3.2 [BS3998:2010](#) 'Tree work – recommendations'
- 3.3 Arboricultural Associations Approved Tree Work Contractors [List](#)
- 3.4 <https://www.trees.org.uk/Help-Advice/Help-for-Tree-Owners/Guide-to-Tree-Pruning>
- 3.5 [NJUG 4 – National Joint Utilities Group](#) "Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees. Volume 4, issue 2. London: NJUG 2007" To include [Operatives Hand-out Guidance](#)
- 3.6 Foundation design, tree species water use - [NHBC Chapter 4.2 Building near trees](#)
- 3.7 TDAG Trees Planning & Development – [A guide for delivery](#)
- 3.8 TDAG Trees in Hard Landscapes – [a guide for delivery](#)
- 3.9 TDAG Tree Species Selection for Green Infrastructure – [a guide for specifiers](#)
- 3.10 BGS Open-Source Soil Data <http://www.bgs.ac.uk/nercsoilportal/maps.html>
- 3.11 HSE (2014) Avoiding danger from underground services: <https://www.hse.gov.uk/pubns/books/hsg47.htm>
- 3.12 Eissenstat & Yanai (1997) The ecology of root lifespan. *Advances in Ecological Research*, 27, 1-60.
- 3.13 Hendricks & Pregitzer (1992) The demography of fine roots in a northern hardwood forest. *Ecology*, 73, 1094-1104.
- 3.14 BRE Digest 412: Desiccation in clay soils.
- 3.15 Matheny & Clark (1998) Trees and Development: A Technical Guide to Preservation of Trees During Land Development.
- 3.16 <https://www.epsom-ewell.gov.uk/tree-information-and-preservation-orders>
- 3.17 https://www.epsom-ewell.gov.uk/sites/default/files/documents/residents/planning/planning_policy/Ewell%20Village%20CA%20Article%204%282%29%20Direction%20sealed%203%20Feb%202000%20confirmed%20Legal%20Sep%202014.pdf

4. The Trees

4.1 The trees can be summarised as follows:

BS 5837 Cat	A	B	C	U
Specific Trees	-	T7, T8, T9, T11 TG2, H1	T1, T2, T4, T5, T6, T10 TG1	T3
Total Number	None	4 individuals, 1 group and 1 hedge	6 individuals and 1 group	Individual

4.2 These tree locations and a summary of their visual contributions can be summarized as follows:


BS 5837 Cat	A	B	C
The Headway Providing screening amenity between properties	-	H1	-
The Headway Providing amenity between properties and contributing to the local and public tree scape	-	T7, T8, T9, T11 7 TG1	T2, T4, T5, T6, T10 & TG1

4.3 There were no hedgerows that qualify for consideration under the 1997 Hedgerow Regulations.

5.0 Arboricultural Impact Assessment

5.1 Site Specific Soils

- 5.1.1 Soil is an important factor in tree growth and the type of underlying soil can impact on successful integration of new developments.
- 5.1.2 A free draining sandy soil containing sand/gravel is likely to lead to water being accessible in the upper horizons during the growing season and available at greater depths and trees will generally be forced to explore a larger volume/ depth on such soils. The structure of such soil also makes compression more difficult (by heavy construction plant) and root penetration is easier for the trees. By comparison, a clay soil is more easily compressed, particularly when wet and compression can have a greater impact on tree health.
- 5.1.3 British Geology Survey (BGS) data indicates the site is located within what is defined as clay (up to 39m in depth).¹

	Soil Description
	<p>Bedrock Deposits: Lambeth Group - Clay, Silt And Sand. Sedimentary Bedrock formed approximately 48 to 59 million years ago in the Palaeogene Period. Local environment previously dominated by swamps, estuaries, and deltas.</p> <p>Superficial Deposit: None recorded</p>

¹ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html?>

Underlying Soil Material contains Clay	Yes
Soil Type increased rooting depth profile?	No
Increased risk of soil compaction due to soil type	Yes

- 5.1.4 All comments regarding soils should be verified with onsite geotechnical investigations and laboratory testing with foundation depth and design undertaken by a structural engineer comments regarding soils should be verified with onsite geotechnical investigations and laboratory testing with foundation depth and design undertaken by a structural engineer in accordance with the requirements of NHBC Chapter 4.2.
- 5.1.5 BS5837 indicates: 4.6.2 *“The RPA for each tree should initially be plotted as a circle centred on the base of the stem. Where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution.”* It advises at Section 4.6.3 That any deviation in the RPA from the original circular plot should take account of a number of site-specific factors.
- 5.1.6 BS5837 recognises that the root morphology of trees may be affected by a number of factors and in certain situations the plotting of RPA’s will deviate from the circle to reflect site specific considerations. It is our experience that to consider structures such as driveways, houses and garages as areas trees cannot utilise for rooting (and to then modify RPA plotting where they exist within an identified RPA) is too simplistic and not aligned with how trees actually utilise soil.
- 5.1.7 Within around 3 to 4m of the base of mature trees there will generally be a structural root system providing both support and the main structure/ root architecture for smaller roots to originate. These larger roots have the very real capacity to be influence by any significant structures (footings, roads to adoptable standard construction etc) where there may be a physical obstruction close to them and this can affect root morphology in such locations. In addition to this there will generally be a noticeable increase in structural rooting to the southwest of mature trees in the UK to reflect the prevailing wind direction, particularly where a tree may be isolated/ open grown increasing its wind exposure. Root growth and location will also be influenced by the presence of other trees, structures sheltering trees etc all of which can combine to affect the shape and location of a structural root system.

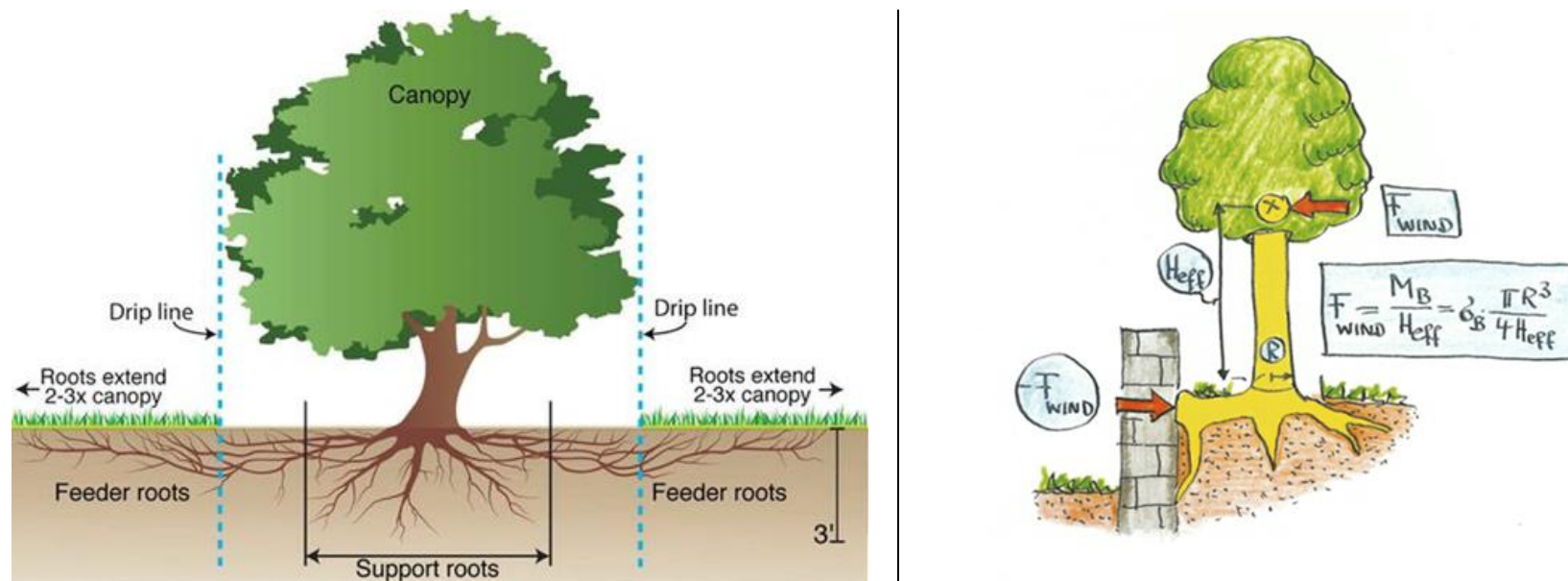


Fig 2 – Open grown trees or those with minimal obstructions close to their stems will have a network of structural roots supporting feeder/ fine root growth beyond (above left). In certain situations root morphology can be affected by structures close to the main stem (above right: Mattheck)

5.1.8 Beyond the structural (and generally permanent) root system will be a network of smaller roots which in turn subdivide to fine roots. Fine roots will also be found throughout the root system (i.e. both close to and distant from a tree) to maximise soil resource uptake and reflect underlying soil conditions. Some larger roots (>25mm and sometimes much larger) can extend away from this area and remain permanent particularly where there may be a constant supply of water (such as a broken downpipe on a building some distance away) which encourages a roots development. Generally the smaller roots (<10mm and particularly fibrous roots) outside of the immediate structural root plate can be considered to be in a state of constant change. They will grow seasonally and tree roots generally grow at night. Small fibrous roots are also mostly short lived (ranging from anything

between 10 days to over a year²). The cyclical death and decay of roots releases both nitrogen and carbon into the soil and is an important part of soil nutrient cycling process. The extent and location of the trees fine root system reflects a trees resource requirement (as resources are removed from certain areas of the soil and exploited in others) as well as the resource capacity required to form such a fibrous root system. Fine roots produced near the soil surface tend to live longer than those deeper in the soil³. The fine root system shows species variation and will also vary in depth (depending on species dynamics and underlying soil conditions). Adopted highways generally have a footing that extends < 0.5m and most UK residential properties have footings in the range of 0.5-1.5m depth. Trees will easily root below these depths and this is evidenced by the fact that every year in the UK there are thousands of tree related subsidence cases.

² Eissenstat & Yanai (1997) The ecology of root lifespan. *Advances in Ecological Research*, 27, 1-60.

³ Hendricks & Pregitzer (1992) The demography of fine roots in a northern hardwood forest. *Ecology*, 73, 1094-1104.

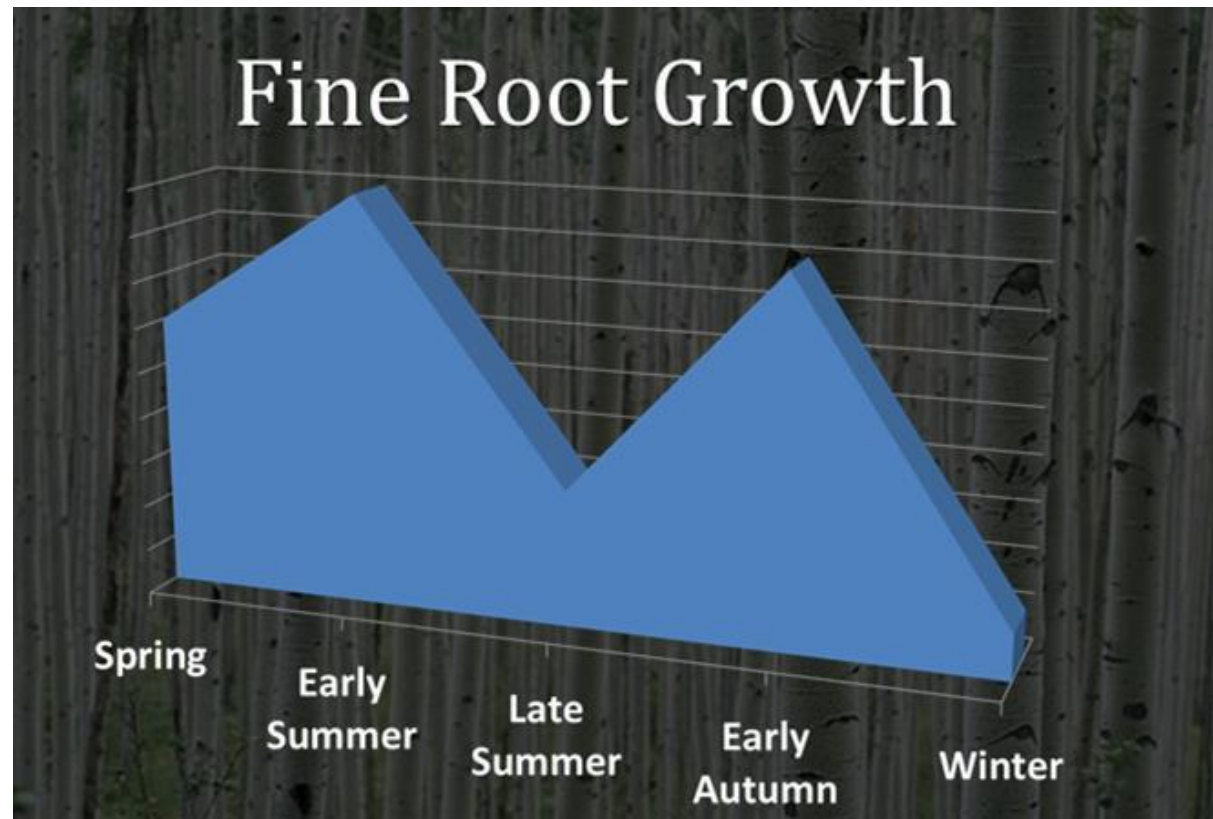


Fig 3 – Fine root growth is (generally) seasonal peaking in late spring and again in early autumn but dying back in winter dormant periods when photosynthetic production ceases. This is an important part of the soil nutrient cycle and demonstrates that a static RPA as calculated by BS5837 is a ‘simplistic’ view of the tree rooting dynamic. (Image Source: Tamla Trees)

5.1.9 The fine root system shows species variation and will also vary in depth (depending on species dynamics and underlying soil conditions). Adopted highways generally have a footing that extends < 0.5m and most UK residential properties have footings in the range of 0.5-1.5m depth. Trees will easily root below these depths and this is evidenced by the fact that every year in the UK there are thousands of tree related subsidence cases.

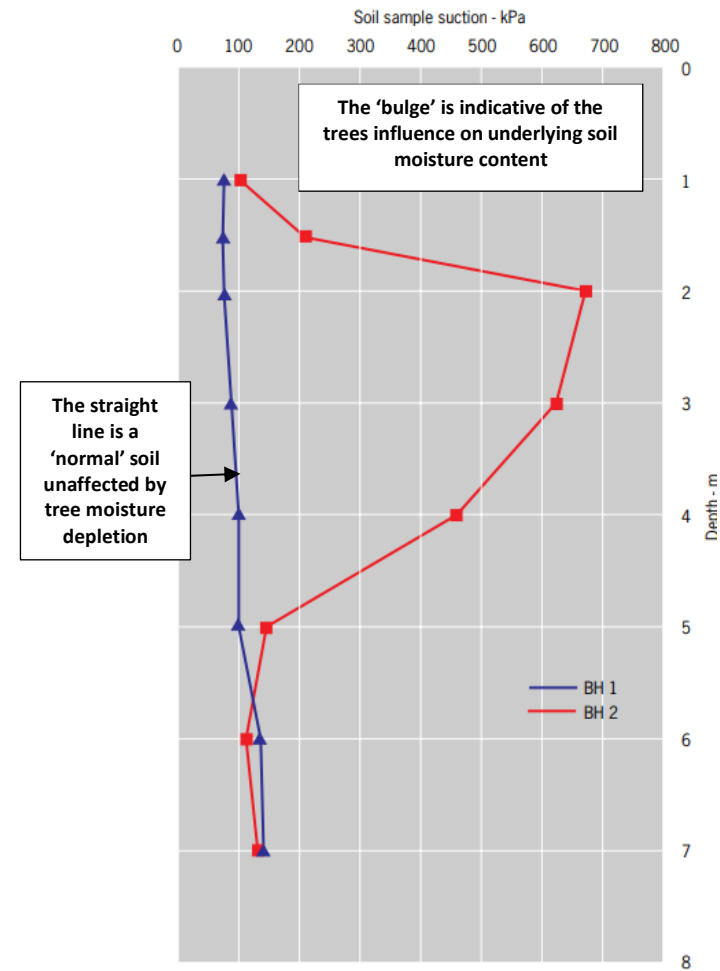
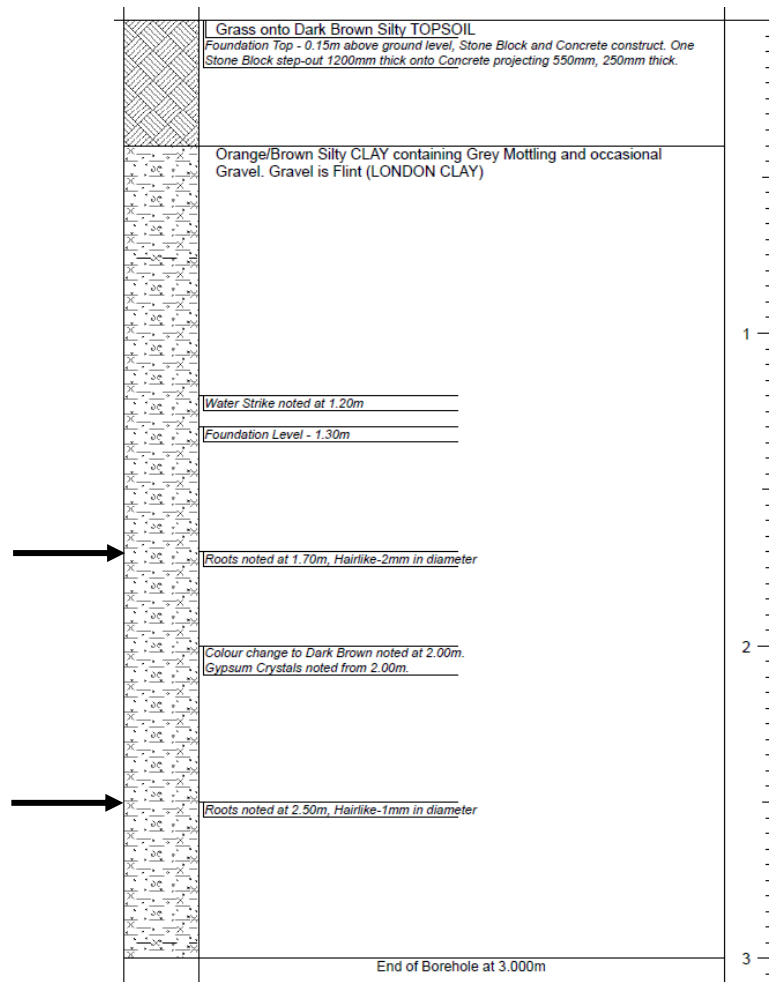


Fig 4 – Borehole log 10m from mature Oak tree on clay soil detailing fine roots to depths of 2.5m indicated with arrows (Source: Tamla Trees project) and annotated soil moisture depletion by trees showing a peak influence at 2m and extending to 5m (above right)

5.1.10 Against this backdrop rooting information seeking to manipulate RPA shapes to account for the presence of houses, garages etc outside of the immediate zone of structural rooting (3-4m) is not considered appropriate. Unless ground obstructions are present within the immediate structural rooting area or to such a depth as to nullify potential fine root growth (below basements or retaining wall step changes in levels for example) Tamlatarees Ltd will show RPA's in a circular fashion but seek to maximise the quality and positioning of specified tree protection measures and encourage ground treatments (such as mulching – see Section 5.7). **Clients and developers must implement these measures for them to be effective. A failure to protect trees during the development process adversely affects soil and roots. Symptoms may not present themselves for a number of years following the development as the tree(s) enter a spiral of potentially irreversible decline.**



Fig 5 - Manion's spiral of tree decline for Norway Spruce (modified by Mrkva 1993)

5.1.11 BS5837 Section 4.6.3 Site Specific Assessment:

Section	Consideration	Site Specific Comments
4.6.3 (a)	<i>the morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads, structures, and underground apparatus);</i>	<ul style="list-style-type: none"> The morphology of rooting of trees close to the existing hard surfacing may have experienced localised surface level manipulations but roots will extend below them given the likely minimal nature of any footing. The age of TG2 & T11 (Scots Pine) relative to the building is unclear but this appears a long-standing relationship and the trees will likely be bracing against and 'sling shot' rooting below the footings of the property and neighbouring property. This structural rooting relationship remains unchanged as there are not proposed changes to the footing of the existing building in this location.
4.6.3.(b)	<i>topography and drainage;</i>	<ul style="list-style-type: none"> The site has a minor slope down west to east but there are no adverse topographical soil level changes or evidence of water pooling close to trees.
4.6.4.(c)	<i>the soil type and structure;</i>	<ul style="list-style-type: none"> Soil is indicated by the BGS as a clay. Clays have a greater bulk density and are more prone to ground compaction. As a result we have indicated high levels of protective fencing to avoid compression of the ground and adverse impacts on the underlying rooting medium. This will only be effective if these are instated immediately prior to all site works and maintained for the duration of the works.
4.6.4.(d)	<i>the likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management.</i>	<ul style="list-style-type: none"> TG2/ T11 (<i>Pinus</i> spp) shows a high tolerance to potential root disturbance⁴. Research data is not available for <i>Cupressus</i> spp Hand digging of the relevant service connections where located within the RPA of retained trees will be used to limit the potential impact from such works and this relates to the initial soakaway pipes shown within the RPA of TG2 (unless further redesign can remove them completely from this area).

⁴ Matheny & Clark (1998) Trees and Development: A Technical Guide to Preservation of Trees During Land Development

5.2 Root Protection Area (RPA) Incursions

5.2.1 The following incursions into the RPA's of trees to be retained have been identified:

BS 5837 Cat	A	B	C	Summary
RPA Incursion	-	TG2	-	<p>Foundations/ Extension (rear) – There is a partial encroachment into the RPA of the southern tree in TG2. We believe at the distance shown any roots in this area will likely be small seasonal feeder roots which as detailed elsewhere in this report are in a state of constant change.</p> <p>It seems unlikely that structural rooting >25mm will be in this location and subject to the high-quality tree protection being installed as detailed within the Tree Protection Plan at Appendix 6 of this report we do not feel there will be an adverse impact on this tree.</p> <p>The contractors should proceed with caution as it relates to any excavation works always stopping in the event roots >25mm are encountered.</p> <p>Services – The proposed soak away connection pipes within the RPA of TG2 will be hand dug and the pipework fed below them. The chamber itself is located outside the RPA of the trees.</p> <p>NJUG 4 – National Joint Utilities Group “Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees. Volume 4, issue 2. London: NJUG 2007”.</p> <p>Contractors (demo & construction) must be made aware of this requirement.</p>

5.2.2 The relative incursions into the RPA are summarised as follows

Tree Number	RPA Total (Sqm)	Incursion (Sqm)	As % of trees RPA
TG2	197	61 (ex)	30% (ex)
		12 (pr)	6% (pr)*
T9	152	9 (ex)	6% (ex)
		1.2 (pr)	0.8% (pr)

Note: EX - Existing, PR – Proposed *Side extension removed completely to address tree officer concerns.

5.2.3 It is recognised that BS5837 recommends all structures be placed outside the RPA of retained trees: 5.3.1 *The default position should be that structures (see 3.10) are located outside the RPAs of trees to be retained. However, where there is an overriding justification for construction within the RPA, technical solutions might be available that prevent damage to the tree(s) (see Clause 7). If operations within the RPA are proposed, the project arboriculturist should: a) demonstrate that the tree(s) can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA; b) propose a series of mitigation measure.*

5.2.4 It is considered in this instance that there is ‘overriding justification’ on the basis the incursion within the RPA of TG2 (Scots Pine) is so minimal (6%) and the remaining garden area is high quality rooting (soft surface). In addition it is at a distance relative to the southern tree where we would not envisage structural or permanent rooting in this area. In relation to T9 (Sycamore) the RPA is disproportionately large given the historical pollard management/ stem diameter of this tree and the proposed footprint area is already hard standing. The side extension has been completely removed following concerns raised by the tree officer so the remaining incursion is a very minor element (0.8%) from the proposed rear extension and in no way will negatively impact the rooting, or health and stability of this tree.

Tree & Development Risk Indicator

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- Our assessment has confirmed the presence of probable underlying CLAY soil
- The distance of footing work from TG2 and pile and T9 are considered well within the tolerable threshold for these trees.
- The Tree & Development Risk Indicator (TDRI™) is therefore **LOW**.
- **Note:** This level of risk is a visual guide only and is only relevant if **all advised tree protective measures are put in place prior to any on site activity and maintained for the duration of the works.**
- **Note:** Only on-site testing can confirm the local soil conditions below foundation level but available information suggests the presence of a CLAY subsoil.

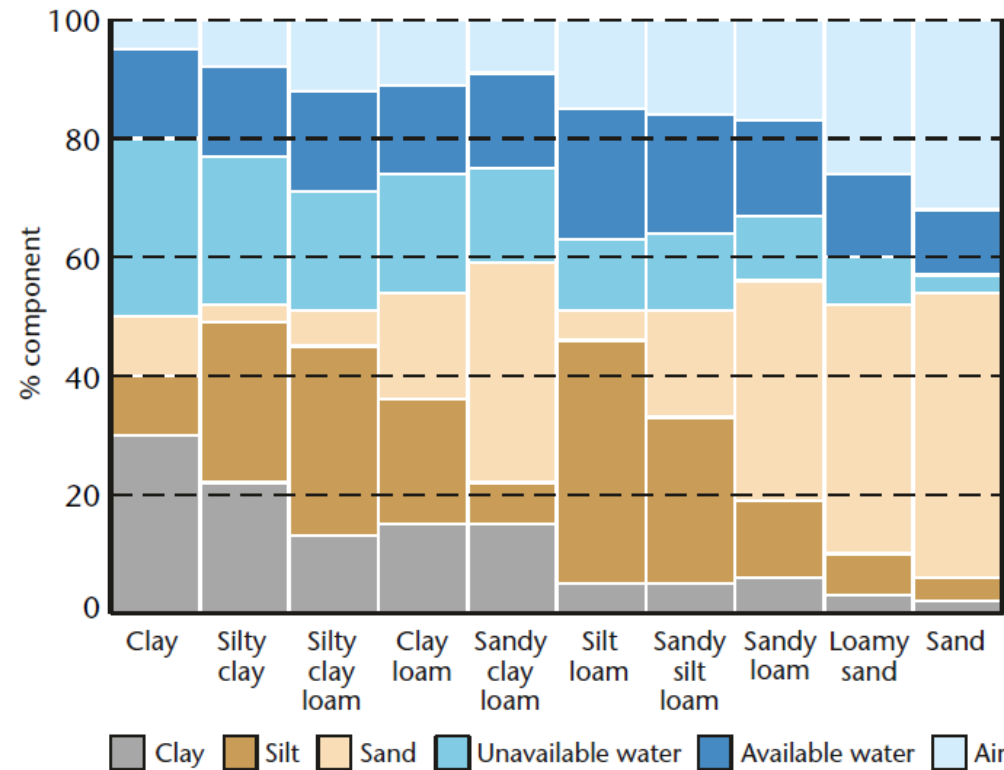


Fig 6 – Diagram showing the typical particulate composition and air/ water content at field capacity for mineral soil types⁵ The variation in soil type has a direct bearing on the potential impact of adverse construction techniques (such as soil compaction) as well as overall root system morphology & development. Clay soils tend to have shallower rooting as moisture remains readily available while soils containing free draining gravel and sand can encourage deeper rooting based on reduce soil bulk density and greater seasonal variations in moisture availability. The underlying clay suggests high levels of available bound water and a reduction in potential moisture stress.

⁵ Forestry Commission (2005) The Influence of Soils and Species on Tree Root Depth

5.3 Tree Loss

5.3.1 The proposal results in the removal of T1 (Cypress) where canopy thinning is already evident. It seems very unlikely the council would consider the tree appropriate for inclusion within a new TPO.

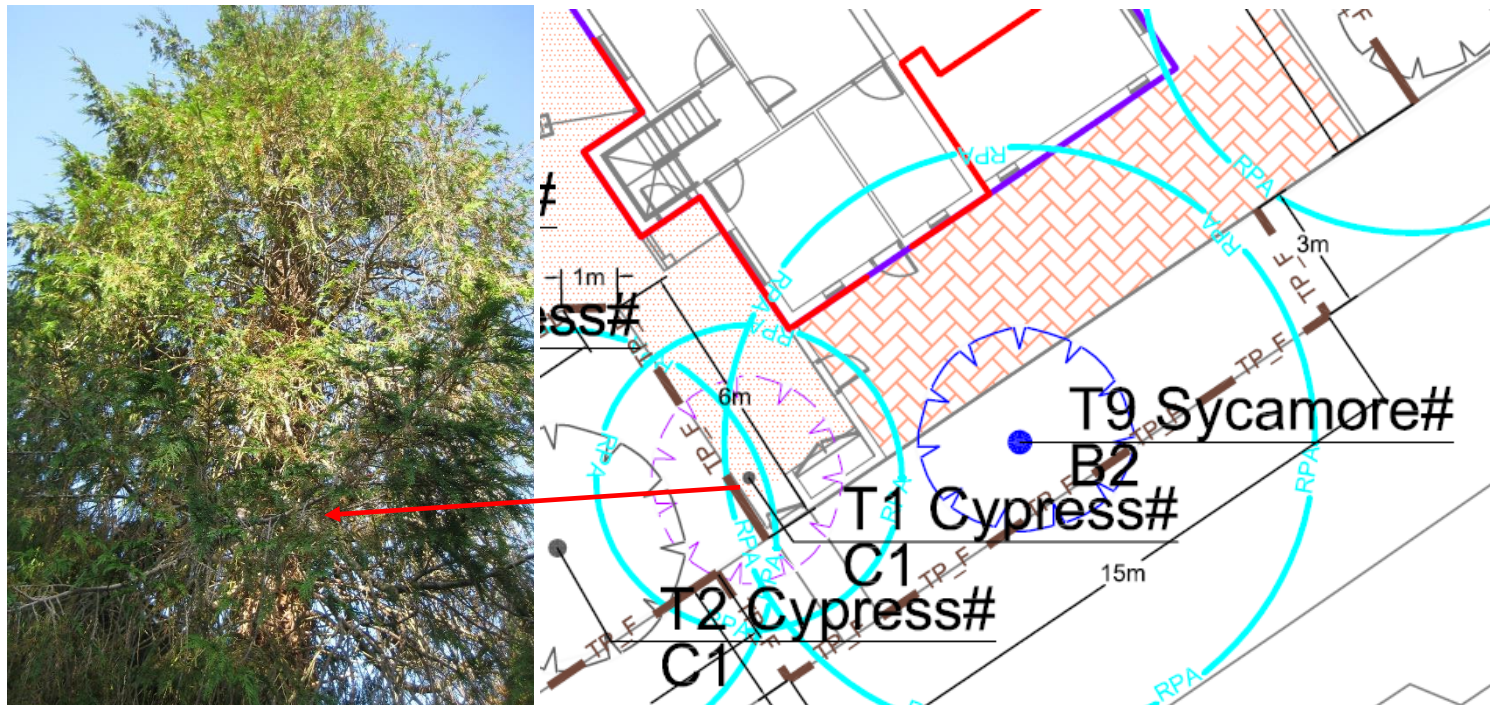


Fig 7 – T1 is proposed for removal

Tree Surgery

Tree No.	Species	Proposed Tree Works	BS Cat

Proposed Removal

Tree No.	Species	Proposed Tree Works	BS Cat
T1	Cypress	Remove	C1
T3	Cypress	Remove on health and safety grounds	U

5.3.2 **Birds** - In the event future tree works are required to be completed between 1st March & the 31st July (inclusive) a due diligence check for nesting birds must be completed before work starts in order to comply with the Wildlife & Countryside Act 1981. This check should be recorded in the Site-Specific Risk Assessment. If active nests are found work should not take place until the young have fledged.

5.3.3 **Bats** – It should be noted that in England and Wales, the relevant legislation is the Wildlife and Countryside Act (1981) (as amended); the Countryside and Rights of Way Act, 2000; the Natural Environment and Rural Communities Act (NERC, 2006); and by the Conservation of Habitats and Species Regulations (2010).

Tree Pruning Indicator

^

- The relationship between trees and the property remain largely unchanged given the side extension element has now been removed.
- The presence of the Conservation Area (& TPO for TG2) means the council retain control over the extent of pruning or removal works as well as the frequency of any tree pruning.
- **Note:** This is an indicative assessment. All and any future works should be undertaken in accordance with BS3998 (Tree Works) and we recommend the use of Arboricultural Association approved contractors.⁶

5.3.4 Please note that this is not a health and safety assessment report but the proximity of TG2 (Scots Pine) to the property is such that vigilance for the emergence of any fungal pathogens is advised with 3 specific examples shown visually on the following page. The suitability of TG2 relative to the existing building is a complicated issue on the basis that they are very large and now ageing trees and it is not unreasonable to imagine some level of homeowner concerns. It is not unlikely that this species will shed branches in high wind events and this is difficult to mitigate against given the limited tree management options available given the species/ canopy form.

⁶ <https://www.trees.org.uk/ARB-Approved-Contractor-Directory>




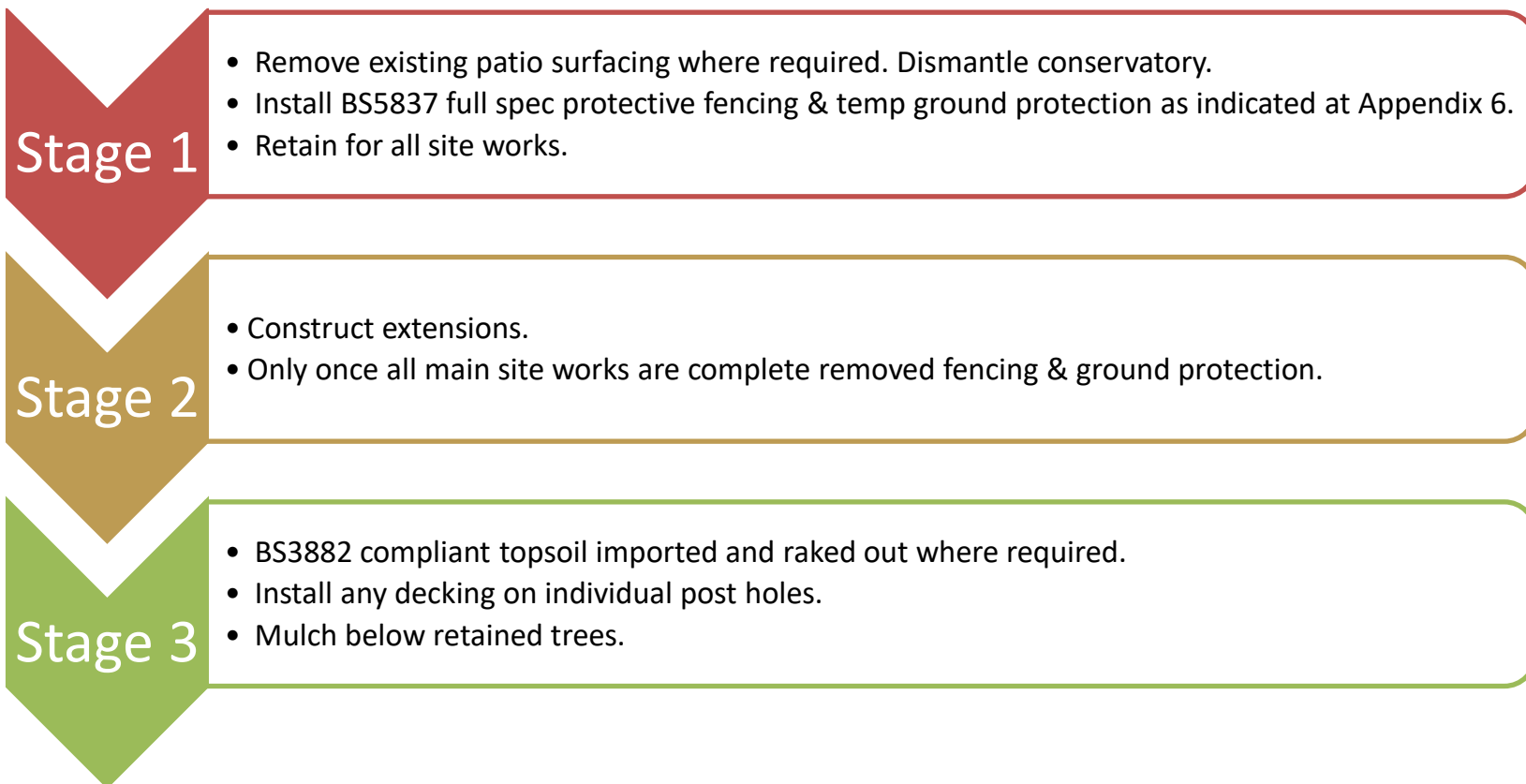
Name	Tree Species Generally Affected	Image	Significance
<p><i>Armillaria</i> spp Honey Fungus</p>	<p>All</p>		<ul style="list-style-type: none"> • Can lead to rapid decline and death. • Upon removal all dead wood should be removed from soil (stumps ground etc.) to reduce further infections
<p><i>Phaeolus schweinitzii</i> Velvet Top Fungus</p>	<p>Conifers and mainly Pine</p>		<ul style="list-style-type: none"> • Can cause a significant rot leading to brittle failure events. • Rot starts in roots and progresses up stems.
<p><i>Sparassis crispa</i> Cauliflower Fungus</p>	<p>Conifers and mainly Pine and Cedar</p>		<ul style="list-style-type: none"> • Can cause brittle failure events

Fig 8 – Fungal pathogens to note relative to Scots Pine. The emergence of any fungi on or near trees should stimulate seeking additional advice on health and safety issues.

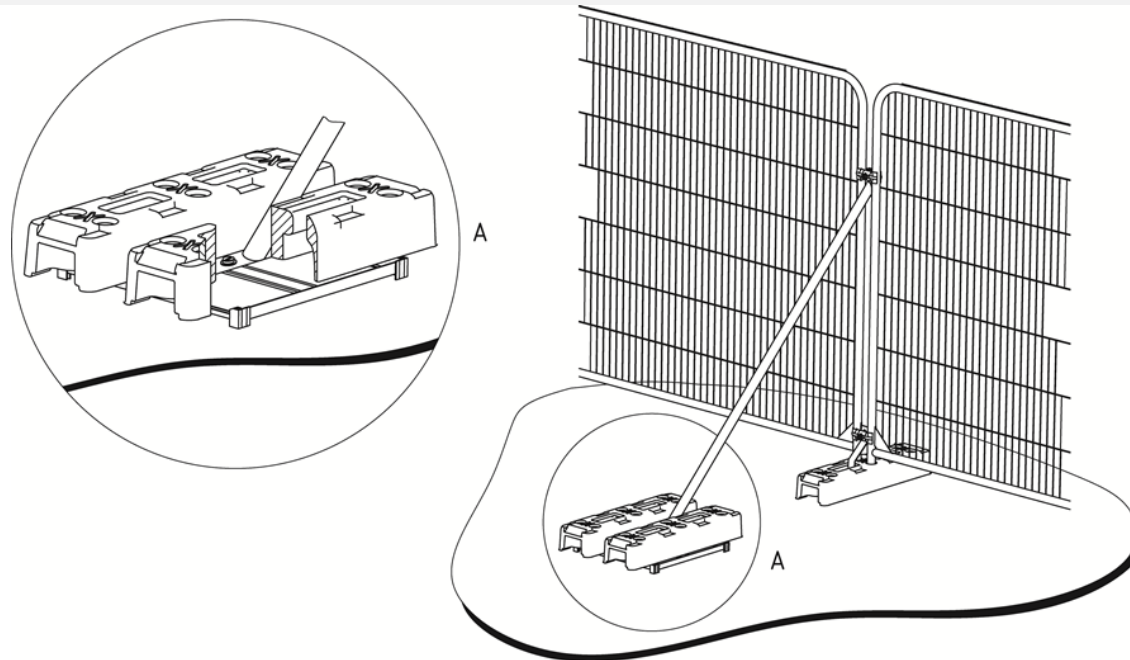
5.4 Demolition & Foundations

5.4.1 The proposal requires no demolition works other than the removal of the existing patio (by hand) and dismantling the rear conservatory. The removal of the side extension to satisfy concerns raised regarding T9 (Sycamore) means a traditional strip footing is now proposed. The proposed tree protection procedure can be summarised as follows:



5.4.2 High quality BS5837 compliant tree protection will be installed prior to any on site works:

Tree Protection



Overview

- *Tree protection required internally to site and for verge area adjacent to T9.*
- *Installed prior to any on site works.*
- *Note: To be marked with signs (inset) and purpose to be briefed to all ground workers.*
- *Maintained for duration of the build.*

Threat Level to Retained Trees

LOW

5.4.3 All internal tree protection must be appropriately signed to ensure that all site operatives know its purpose.

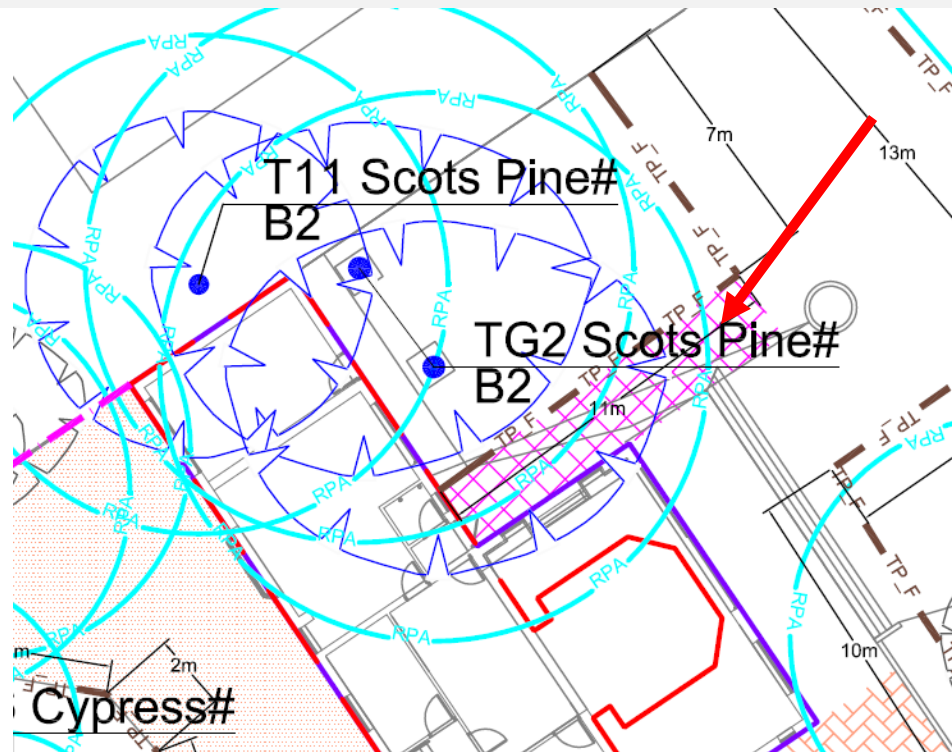


e: info@tamlatrees.com w: tamlatrees.com o: 01252 811 233
Tamla Trees Registered England & Wales Companies Act 2006 Reg No: 08815629

Fig 9 – Professional grade weatherproof tree protection signs no smaller than 297 x 420 mm (A3) will be located at 5m intervals and all ‘return’ faces for tree protective fencing

5.4.4 Temporary ground protection is proposed to increase the working area around the rear extension relative to TG2.

Temporary Ground Protection



Overview

- *Temporary ground protection to allow movement around extension but within the RPA of TG2.*
- *Maintained for duration of the build.*

Threat Level to Retained Trees

LOW

5.4.5 The relevant level of protection should be consistent with the movement requirements:

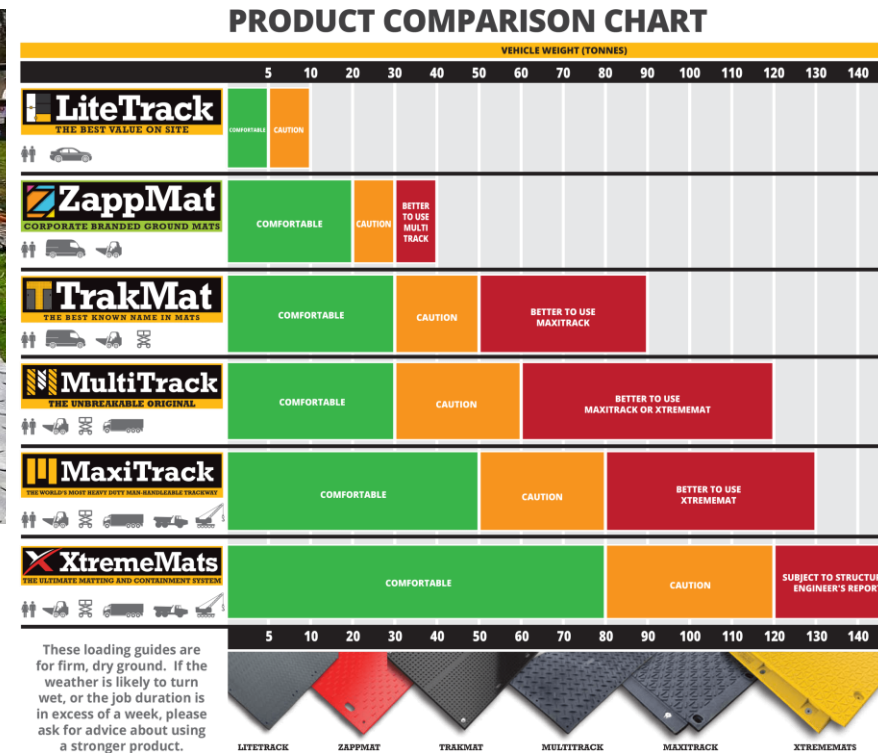


Fig 10 –The construction firm/ contractors must ensure that any areas where fencing may be moved (temporary) leads to exposed ground being covered with suitable temporary ground protection. This approach maximises the integrity of retained tree RPA’s.



Fig 11 – Temporary ground protection is an effective way of allowing access through the RPA of retained trees. It must be installed prior to any on site activity and maintained for the duration of all works to be effective. Above left Tamla Trees project ground protection in place and above right being removed following the completion of site works. (Note: depending on the length of time it is in place it will adversely affect underlying grass ground cover which will need reseeded/ turfed accordingly)

5.4.6 **Site Manager/ Consultant Sign Off:** At this point a site inspection is required to confirm the appropriate tree protection measures have been completed.

Date of Inspection	Compliance with Tree Protection Plan?		
	Yes		No
Rectification Actions (insert notes)			
Site Manager Signature:			
Print Name:			
Arboricultural Consultant Signature:			
Print Name:			

SITE TREES ARE NOW ADEQUATELY PROTECTED AND CONSTRUCTION ACTIVITY CAN COMMENCE

5.5 Surfaces near Trees

- 5.5.1 No new surfaces are proposed within the RPA of retained trees. In the event of decking or similar this should be supported on individual post holes installed using the principles of hand digging and root retention detailed elsewhere within this report. Following development there will be a need to 'made good' by raking out BS3882 compliant topsoil. The affected garden areas can then be seeded/ turfed/ landscaped as required.



Fig 12 – All 'making good' topsoil will be BS3882 compliant and raked out by hand to no greater depth than 100mm. The garden areas can then be turfed/ mulched/ planted as required.

5.6 Site Service Provision

- 5.6.1 The proposed soakaway connections will be hand dug with the route seeking to maximise spatial distance from retained trees and avoid incursions into RPA's where possible.

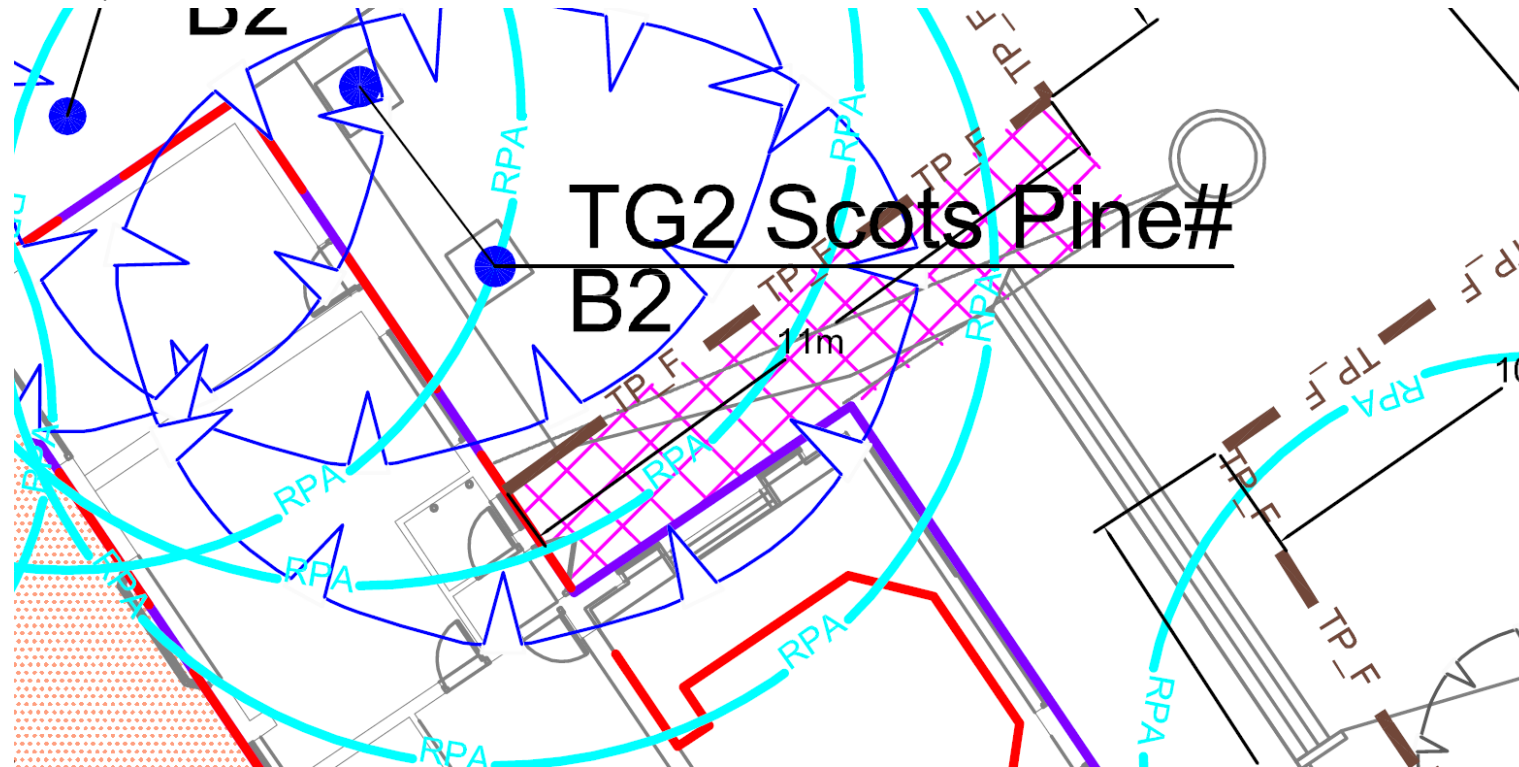


Fig 13 – The soakaway chamber is located completely outside the RPA of TG2. Efforts at installation will be made to move the pipework further from the trees but any excavation to install will be undertaken by hand. The open excavation will be photographed. (Note: client to make contractor aware)

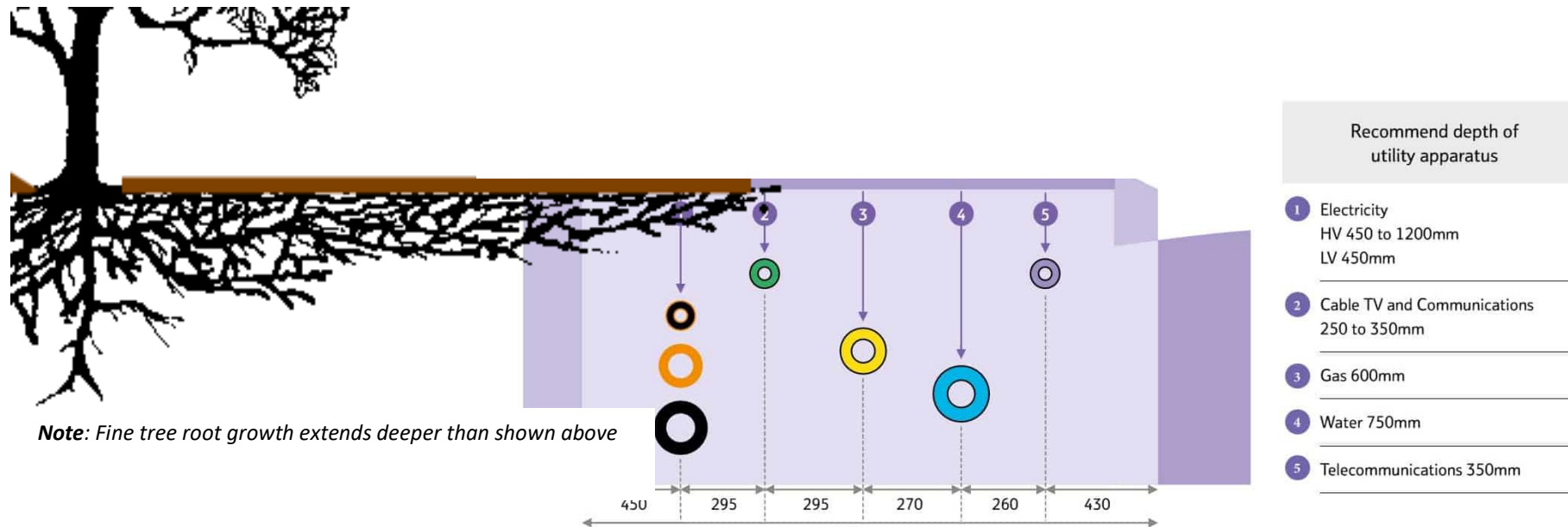


Fig 14 – Annotated service installation depth drawing (source: Thorne & Derrick). Service installations occupy the same soil volume/ depth where the greatest level of tree roots will likely be found but on this project, none are proposed within the RPA but full detail is not yet known/ advised.

5.6.1 **Soakaway Pipe Hand Dig Excavation** - Any activity to excavate within the RPA has the capacity to cause root damage but the level of damage must be considered in the context of the species, soil, and location. Areas of excavations will be identified/ marked on site by way of site meeting before they are undertaken.

PLEASE NOTE THIS OPERATION HAS AN ELEVATED CAPACITY TO CAUSE DAMAGE TO TREE ROOTS

5.6.2 **Planning the excavation:** A 'toolbox talk' will spot mark and agree the locations and working practices. In the event tree roots are encountered work will stop and progress with hand tools only.



Fig 15 – Advised tools/ materials which should be available for all excavation works within RPA

5.6.3 Digging around tree roots is a skill and operatives must proceed with caution. Once a root is located it is often necessary to use a combination of hand tools and a stiff hand brush to track and 'trace' the roots location. Spot marking roots >25mm with spray paint is advised. All roots >25mm in diameter will be retained. Please also note that retention of all roots where possible (including fibrous ones) is advised.

- 5.6.4 **How deep?** – The excavation need only be 500mm deep (pile heads) and 75-100mm for the connecting ground beam. The excavation will usually not be wider than 500mm. Any exposed roots must be covered/ wrapped in hessian if being left uncovered for longer than 12 hours. Once the first 500mm is excavated and confirmation that roots >25mm established the remaining pile can be augured/ driven mechanically.
- 5.6.5 **WARNING:** Breaking the ground has the potential to uncover services/ destabilise adjacent structures etc. Some general advice from the HSE can be found [here](#). The site-specific assessment of this project is such that we do not consider there to be a risk of significant root damage from either a strip (TG2) or pile and beam footing (T9).
- 5.6.6 **Root Wrapping/ Protection:** In the event the footing works expose any roots >25mm in diameter these must be wrapped or protected with a covering of soil if left exposed overnight or for longer than any single 4-hour period.

Root Wrapping



Overview

- Any exposed roots >25mm should be wrapped in hessian (example left) if exposed overnight or for any 4-hour period.
- Spot marking with spray paint to highlight locations also advised.
- Alternatively roots can be covered over with topsoil to maintain moisture retention.
- Example Tamla Trees project on London Plane (left)

Threat Level to Retained Trees

LOW

5.7 Ground Level Changes

- 5.7.1 We encourage the use of composted bark mulch below tree canopies where possible to aid water retention and increase soil microbial activity. This is particularly relevant to mature retained trees and, in this case, TG2 (Scots Pine).

Mulching



Overview

- *Circular area edged to 50-100mm depth to stop mulch from 'creeping' on to surround lawn.*
- *Composted mulch then spread around below tree by hand – no need to lift or remove underlying grass.*
- *Mulch topped up annually/ as required.*
- *Positive benefits for mulched trees*

Threat Level to Retained Trees

LOW

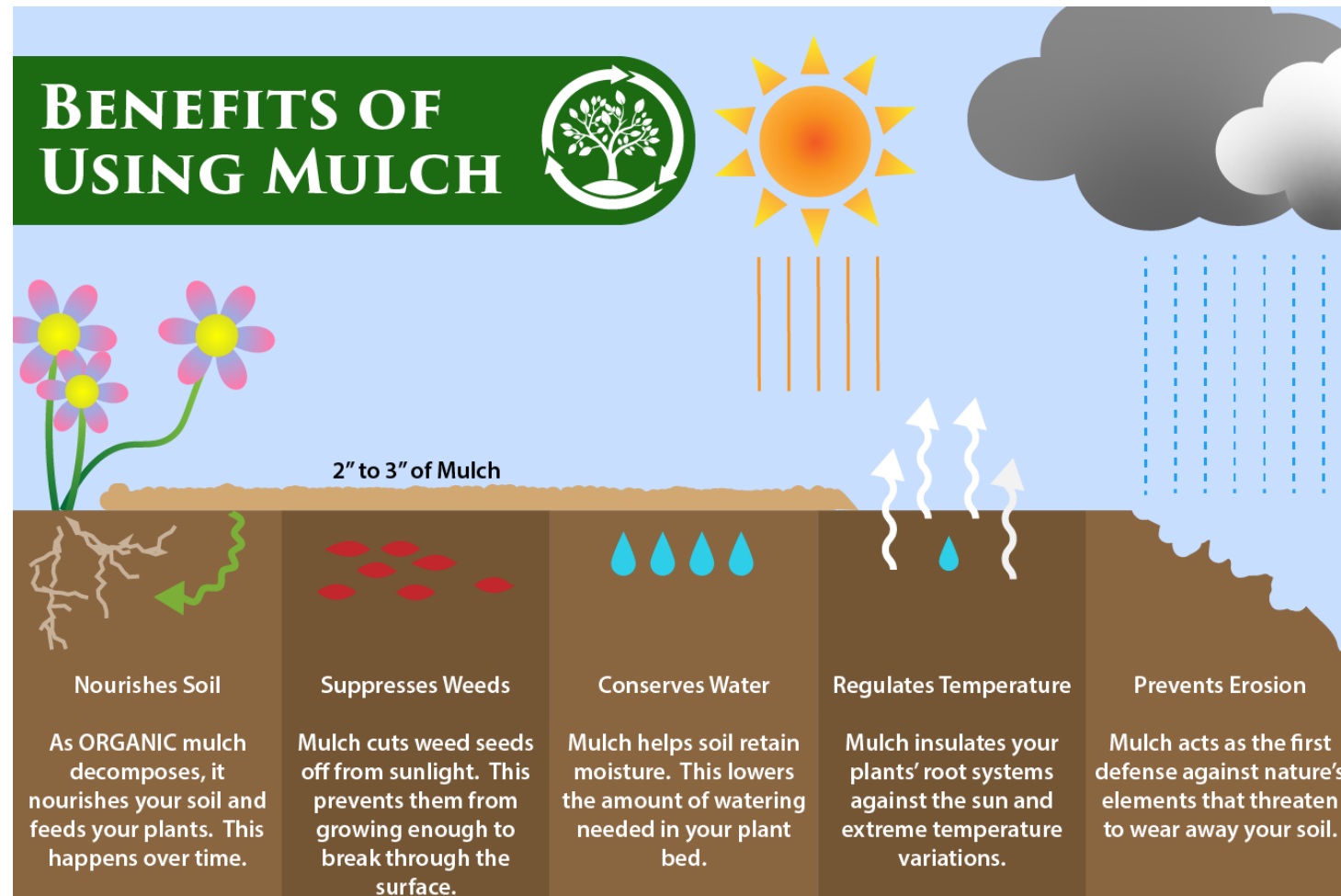



Fig 16 – Benefits of Mulch (Image Source 1st Stop Landscape Supply (US))

5.7.2 Where soft landscape planting occurs within the RPA of retained trees, we advise the use of small pot sizes and plug planting where possible to minimize the risk of root disturbance.

<h2>Plug and Pot Planting</h2>	
	<p style="text-align: center;">Overview</p> <ul style="list-style-type: none"> • Within 1.5m of retained trees planting should be with plug stock (left) • Small plant pot sizes <3l utilised for new planting in further areas. • Hand dug planting holes. • Top dressed in compacted bark mulch/ soil as appropriate. • Watered weekly May – September during season 1 & 2
Threat Level to Retained Trees	LOW

5.8 Tree Shading of Proposal

- 5.8.1 The modern aspect/ open plan and large glazing areas mean shading issues are not considered relevant, particularly as the relationship between trees and the building remain largely unchanged.

5.9 Arboricultural Project Supervision

- 5.9.1 Most damage to trees on developments sites is caused inadvertently and to ensure continued protection during development a system of site monitoring is normal.
- 5.9.2 Basic checks will be undertaken as the construction phase progresses to ensure that protective fencing remains intact and ensure the proposed works close to trees are completed in accordance with this report. Any unforeseen issues can be identified and discussed with the consulting arboriculturalist before any damage to trees occurs.
- 5.9.3 This approach allows a strong working relationship with the site manager/ construction staff to identify issues that may affect retained trees and ensure they are addressed before they escalate.
- 5.9.4 After each site inspection is completed, a formal record will be sent to the local authority. On this basis we would advise the following inspection regime:

Visit Detail	Date	Status
1st Site Inspection Attend site once tree protection is in place. Inspect/ Toolbox talk with site operatives regarding tree protection measures and pile and beam footing. Update local authority on findings.	TBC	Incomplete
Mid Development Site Inspection Attend site to inspect and confirm protection measures remain in place. Update local authority on findings.	TBC	Incomplete
Final Site Inspection Final site visit to confirm that no damage has been done to retained trees/ identify any remedial actions in the event damage has occurred. Assess any required tree surgery following construction. Update local authority and project team on findings.	TBC	Incomplete

Note: Actual visit dates subject to change/ confirmation depending on project program.

Appendix 1 – BS5837 Survey Key

BS 5837 Cat	Description
A	Those of high quality and value: in such a condition as to be able to make a substantial contribution (> 40 years)
B	Those trees of moderate quality and value: those in such a condition as to make a significant contribution (> 20 years)
C	Those trees of low quality and value: currently in an adequate condition to remain until new planting could be established (> 10 years)
U	Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed regardless of development (< 10 years)

Note: Subcategories are denoted in the tree survey data (A1, B1, C2 etc.). You are referred to BS5837 for further detail if required.

Tree No.	T (tree), G (group), H (hedge), W (woodland) + Ref No.
Species	Common Name
Ht (m)	Measured height in metres
DBH (m)	Diameter at 1.5m above ground level
No of stems	An indication of the trees form @1.5m (1 = single stem, m/s = multi-stemmed)
Branch Spread	In m to cardinal points
Cr Ht Clearance (m)	Overall height of lowest branches from the ground level on side of proposed development
Life Stage	Young, Semi-Mature, Early Mature, Mature, Over-Mature
General Observations	Observations on the condition of the tree(s)
Tree Work Specification	Proposed tree works in accordance with BS3998
BS Cat	See above
Life Exp	Estimated remaining contribution in years.
RPA Radius(m)	Radius of the trees Root Protection Area measured from the trunk to the edge of the RPA circle in metres

Appendix 2 – BS5837 Tree Classification

The classification of trees is undertaken during the survey to inform decisions as they relate to designs and retention/ removal. The ‘value’ of a tree in terms of its visual amenity is subjective and the full condition of a tree may not be apparent given access and other site-specific factors. If a tree is proposed for retention in many respects its BS category is irrelevant. We encourage the retention of all trees where the design realistically allows this with the exception of U cat trees (as these are usually ‘defect’ trees). There should not be a presumption that all C category trees can or should be removed. Generally A & B Category trees are those of greatest value to a development and designs should be manipulated to retain these where possible. Further detail on classification of trees is contained at Section 4.5 of BS5837. Some selective extracts are detailed below:

4.5.2 The purpose of the tree categorization method, which should be applied by an arboriculturist, is to identify the quality and value (in a non-fiscal sense) of the existing tree stock, allowing informed decisions to be made concerning which trees should be removed or retained in the event of development occurring.

4.5.5 When determining the appropriate category for any given tree, group, or woodland (see 4.4), the arboriculturist should start by considering whether the tree falls within the scope of category U. Assuming that it does not, the arboriculturist should then proceed on the presumption that all trees are considered according to the criteria for inclusion in category A. Trees that do not meet these criteria should then be considered in light of the criteria for inclusion in category B. This process should be repeated, as required, until the appropriate quality or value assessment is reached.

*4.5.6 Trees of generally high quality and/or value which have a defect or defects that do not reduce their retention span below the suggested 40-year threshold, should be placed in category A, i.e. they should not be downgraded as a result of minor imperfections. **Tamla Trees Note:** We do not apply a simple >40 = Cat A approach as many trees will have retention values in excess of 40 years but not be considered Cat A.*

4.5.11 The tree survey might identify the presence of veteran trees on the site. The implications of their presence on the use of the surrounding land should be assessed at the earliest possible stage of the design process. Where such trees are to be retained, particular care should be taken in the design to accommodate them in a setting that aids their long-term retention.

Please note assessments are made based on available access and factors can affect full inspections (3rd party tree location, extensive basal undergrowth, ivy etc). This survey is not a full health and safety inspection although obvious defects (where noted) will be identified.

BS5837 Table 1 is shown on the following page and provides detail on the relevant categorisation. Elements of this remain subjective and if a tree is shown for retention its category is somewhat irrelevant as we consider all trees should be afforded the same value/ protection if to be retained.

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (Including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	<ul style="list-style-type: none"> Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>			See Table 2
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix 3 – BS5837 Survey Data

Tree No.	Species	DBH (m)	No of Stems	Ht (m)	Crown Spread				BS Cat	Age Class	Life Expect	Cr Ht (m)	Observation	Recommendations	RPR (m)
					N	E	S	W							
T1	Cypress	0.3	1	10	2.4	2.2	2.5	2.3	C1	Mature	10 to 20	1.6	Borderline U cat given thinning canopy.	Remove to facilitate proposal	3.6
T2	Cypress	0.43	1	11	2.9	3	2.9	2.4	C1	Mature	10 to 20	1.6	V unions. Large and 'Green' and some localised screening but species and location at odds with local garden and street scene.	No works	5.2
T3	Cypress	0.27	1	11	1.8	1.8	2	2	U	Mature	<10	1.6	Thinning canopy indicative of severe decline.	Remove on health and safety grounds	3.2
T4	Cypress	0.29	1	11	1.6	1.5	1.6	1.6	C1	Mature	10 to 20	1.6	V unions. Large and 'Green' and some localised screening but species and location at odds with local garden and street scene.	No works	3.5
T5	Cypress	0.29	1	11	1.9	1.5	2	1.8	C1	Mature	10 to 20	1.6	V unions. Large and 'Green' and some localised screening but species and location at odds with local garden and street scene.	No works	3.5

Tree No.	Species	DBH (m)	No of Stems	Ht (m)	Crown Spread				BS Cat	Age Class	Life Expect	Cr Ht (m)	Observation	Recommendations	RPR (m)
					N	E	S	W							
T6	Cypress	0.38	1	11	2	1.8	1.9	2	C1	Mature	10 to 20	1.6	V unions. Large and 'Green' and some localised screening but species and location at odds with local garden and street scene.	No works	4.6
T7	Sycamore	0.33	1	4	1.7	1.7	1.7	1.7	B2	Mature	> 40	1.7	Managed as pollard. Local feature of character to road.	No works	4
T8	Sycamore	0.32	1	4	1.7	1.7	1.7	1.7	B2	Mature	> 40	1.7	Managed as pollard. Local feature of character to road.	No works	3.8
T9	Sycamore	0.58	1	4	2.7	2.7	2.1	2.4	B2	Mature	> 40	1.7	Managed as pollard. Local feature of character to road.	No works	7
T10	Cypress	0.53	1	11	2.1	2.6	2.7	2	C1	Mature	10 to 20	1.6	V unions. Large and 'Green' and some localised screening but species and location at odds with local garden and street scene. In raised planter.	No works	6.4

Tree No.	Species	DBH (m)	No of Stems	Ht (m)	Crown Spread				BS Cat	Age Class	Life Expect	Cr Ht (m)	Observation	Recommendations	RPR (m)
					N	E	S	W							
T11	Pine (Scots)	0.6	1	16	5	5	5	5	B2	Mature	20 to 40	3.5	Mature 3rd party tree with no access to inspect.	No works	7.2
TG 1	Elder	0.5	1	14	3.5	4	3.5	1.8	C1	Mature	20 to 40	1.6	3rd party trees with no access to inspect. Faced off as lower-level hedge on property side.	No works	6
TG 2	Pine (Scots) x 2	0.66	1	16	4.2	6.7	6	6	B2	Mature	20 to 40	3.5	Close grown and should be managed as a pair. V union on eastern tree. Vigilance of Phaeolus schweinitzii (and any other fungal activity) advised given size and location.	No works	7.9
H1	Cypress	0.3	1	5	1.2	1.2	1.2	1.2	B2	Mature	20 to 40	0.4	Established hedge offering localised screening between properties.	No works	3.6

Appendix 4 – Tree Works Schedule

Tree Surgery

Tree No.	Species	Proposed Tree Works	BS Cat

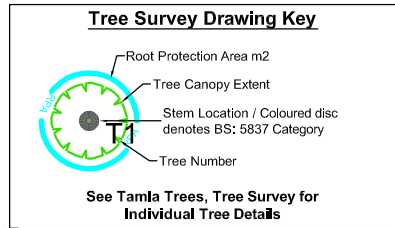
Proposed Removal

Tree No.	Species	Proposed Tree Works	BS Cat
T1	Cypress	Remove	C1
T3	Cypress	Remove on health and safety grounds	U

NOTE: All tree works to be undertaken in accordance with BS 3998:2010 'Tree work - Recommendations'.

Note: We recommend using Arboricultural Association approved contractors who can be sourced [here](#)

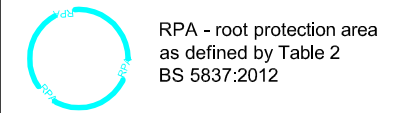
Appendix 5 - Tree Constraints Plan



KEY

Please refer to Tamla Trees report for details

- Category A - Trees of high quality
- Category B - moderate quality
- Category C - low quality
- Category U - Dead, Dying or Defect trees with <10 years retention value



NOTE # Tree positions indicatively mapped due to lack of detailed topographical plan

REV AMENDMENTS DRAWN DATE AUTHD

PROJECT

21 The Headway,
Ewell,
KT17 1UN

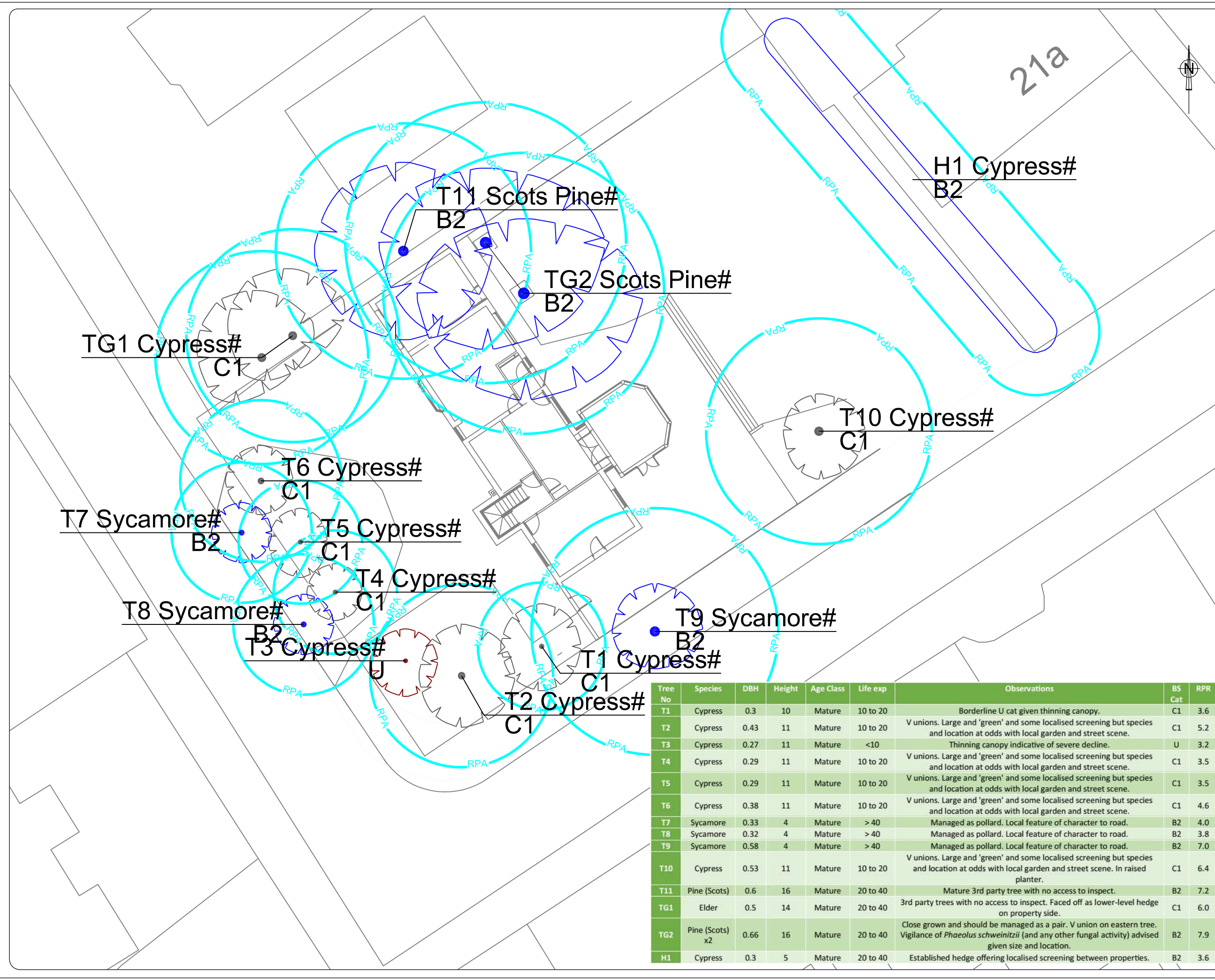
CLIENT

Inevitable Developments Ltd

TITLE
Tree Constraint Plan (TCP)

Job	03638R	Scale	1:200 @ A3	DRG NO		Revision	
Date	21/09/2021	Type	a		03638P_TCP_01		A

Tel: 01252 811 233
Email: Info@tamlatrees.com
Web: www.tamlatrees.com



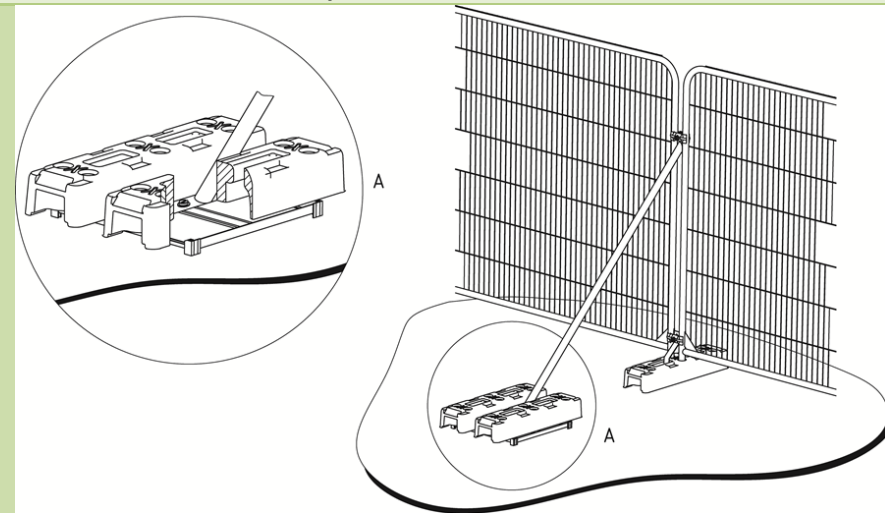
Tree No	Species	DBH	Height	Age Class	Life exp	Observations	BS Cat	RPR
T1	Cypress	0.3	10	Mature	10 to 20	Borderline U cat given thinning canopy.	C1	3.6
T2	Cypress	0.43	11	Mature	10 to 20	V unions. Large and 'green' and some localised screening but species and location at odds with local garden and street scene.	C1	5.2
T3	Cypress	0.27	11	Mature	<10	Thinning canopy indicative of severe decline.	U	3.2
T4	Cypress	0.29	11	Mature	10 to 20	V unions. Large and 'green' and some localised screening but species and location at odds with local garden and street scene.	C1	3.5
T5	Cypress	0.29	11	Mature	10 to 20	V unions. Large and 'green' and some localised screening but species and location at odds with local garden and street scene.	C1	3.5
T6	Cypress	0.38	11	Mature	10 to 20	V unions. Large and 'green' and some localised screening but species and location at odds with local garden and street scene.	C1	4.6
T7	Sycamore	0.33	4	Mature	> 40	Managed as pollard. Local feature of character to road.	B2	4.0
T8	Sycamore	0.32	4	Mature	> 40	Managed as pollard. Local feature of character to road.	B2	3.8
T9	Sycamore	0.58	4	Mature	> 40	Managed as pollard. Local feature of character to road.	B2	7.0
T10	Cypress	0.53	11	Mature	10 to 20	V unions. Large and 'green' and some localised screening but species and location at odds with local garden and street scene. In raised planter.	C1	6.4
T11	Pine (Scots)	0.6	16	Mature	20 to 40	Mature 3rd party tree with no access to inspect.	B2	7.2
TG1	Elder	0.5	14	Mature	20 to 40	3rd party trees with no access to inspect. Faced off as lower-level hedge on property side.	C1	6.0
TG2	Pine (Scots) x2	0.66	16	Mature	20 to 40	Close grown and should be managed as a pair. V union on eastern tree. Vigilance of <i>Phaeolus schweinitzii</i> (and any other fungal activity) advised given size and location.	B2	7.9
H1	Cypress	0.3	5	Mature	20 to 40	Established hedge offering localised screening between properties.	B2	3.6

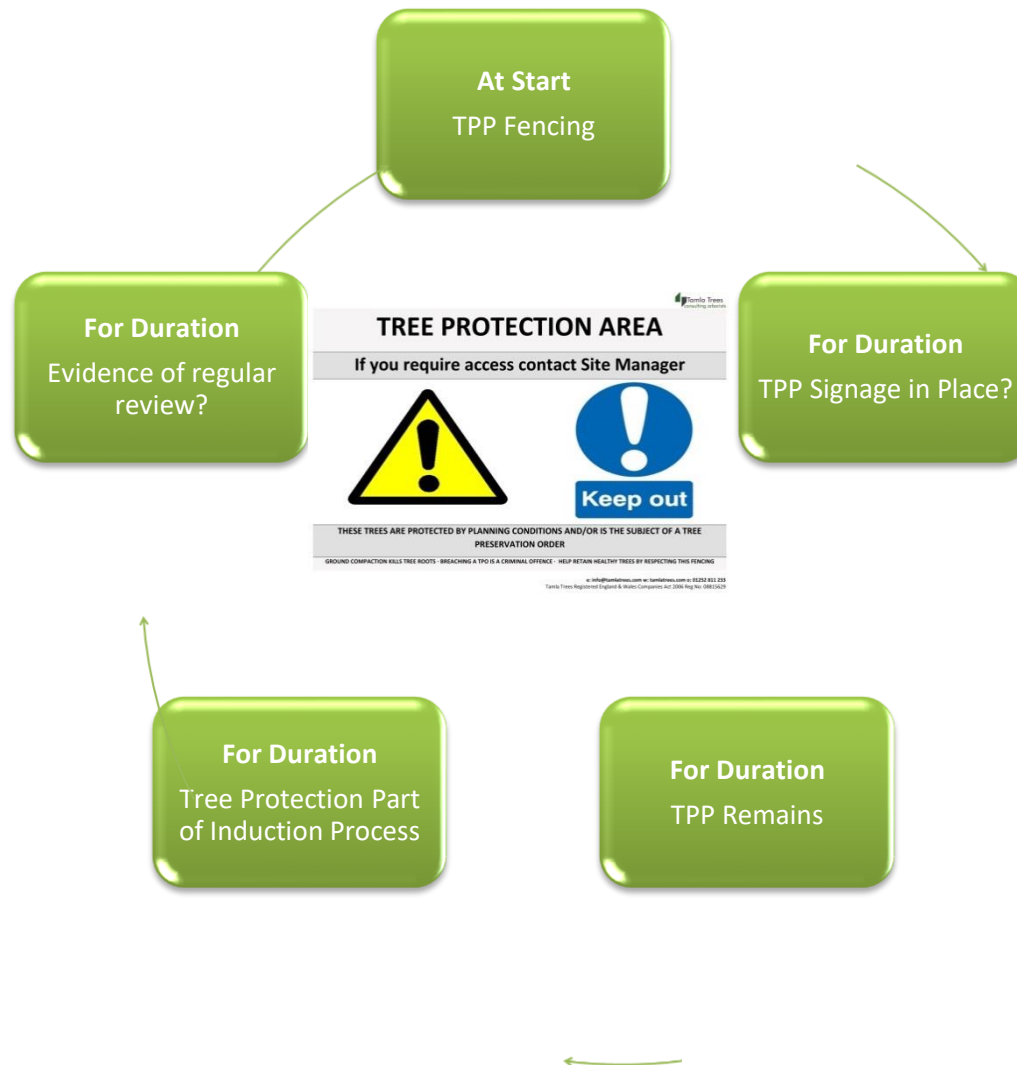
Appendix 6 - Tree Protection Plan

Tree protection is essential to successfully integrate the proposal into the surrounding trees. It is designed to manage the impact on the underlying soil and rooting environment. It must therefore be installed prior to any further site activity. Even apparently minimal tracking of the soil near trees has the capacity to irretrievably modify the soil environment to the detriment of tree health and stability.

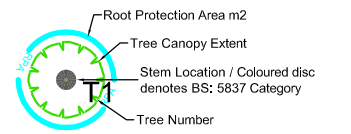
All our fencing specifications accord with advice and guidance within BS 5837. Modifications to fence types are possible but should be discussed prior to implementation. In all other instances the form detailed below should be shown. This offers the best protection to retained trees.

- All tree protection must be in place prior to any site activities. It is recommended that this fencing is installed prior to any site works (including demolition).
- To be effective Tree Protection must remain in place for the duration of the development and form part of the site induction process.
- Fencing spec (right) proposed and installed prior to any on site activity.
- Maintained for the duration of all site works.





Tree Survey Drawing Key



See Tamla Trees, Tree Survey for Individual Tree Details

KEY

Please refer to Tamla Trees report for details

- Category A - Trees of high quality
- Category B - moderate quality
- Category C - low quality
- Category U - Dead, Dying or Defect trees with <10 years retention value

RPA - root protection area as defined by Table 2 BS 5837:2012

Proposed removal - to facilitate Development

Location of protective fencing - BS 5837 Feet Fence (or similar)

Existing boundary acting as protective fencing

Temporary ground protection

Existing drive

Existing paving

NOTE # Tree positions indicatively mapped due to lack of detailed topographical plan

REV AMENDMENTS DRAWN DATE AUTH'D

PROJECT

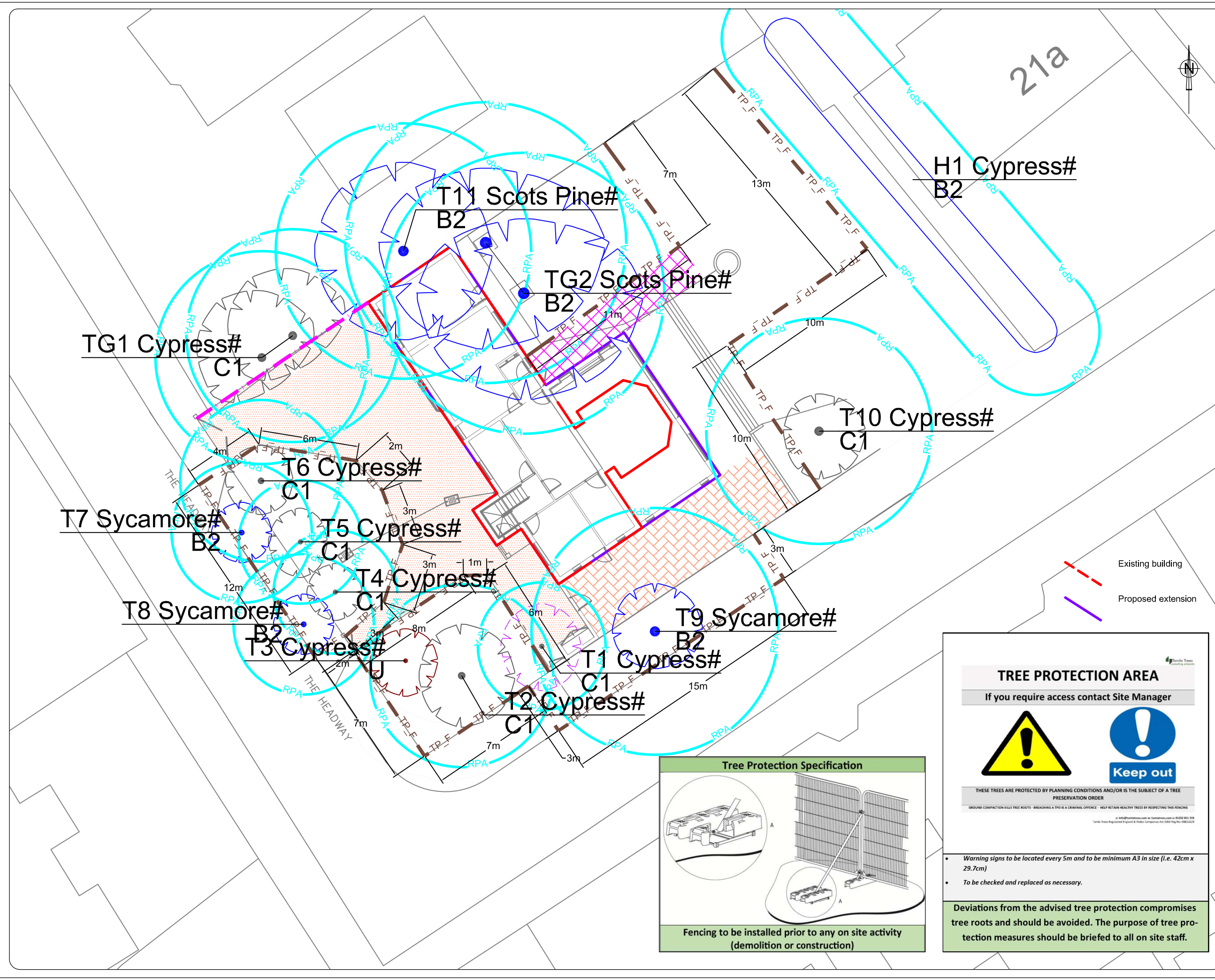
21 The Headway,
Ewell,
KT17 1UN

CLIENT
Inevitable Developments Ltd

TITLE
Tree Protection Plan (TPP)

Job	03638R	Scale	1:200 @ A3	DRG NO		Revision	
Date	26/07/2021	Type	a		03638P_TPP_01		C

Tel: 01252 811 233
Email: Info@tamlatrees.com
Web: www.tamlatrees.com



TREE PROTECTION AREA

If you require access contact Site Manager

THESE TREES ARE PROTECTED BY PLANNING CONDITIONS AND/OR IS THE SUBJECT OF A TREE PRESERVATION ORDER

GROUND COMPACTION KILLS TREE ROOTS - BREACHING A TPO IS A CRIMINAL OFFENCE - HELP RETAIN HEALTHY TREES BY RESPECTING THIS FENCING

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- Warning signs to be located every 5m and to be minimum A3 in size (i.e. 42cm x 29.7cm)
- To be checked and replaced as necessary.

Deviations from the advised tree protection compromises tree roots and should be avoided. The purpose of tree protection measures should be briefed to all on site staff.

Tree Protection Specification

Fencing to be installed prior to any on site activity (demolition or construction)

Appendix 7 – Site Photographs



Image 1 – T9 relative to existing boundary. This tree is under repeat pollard management



Image 2 – The lower stem relationship of TG2 to the existing property



Image 3 – Looking towards T4, T5 & T6

Appendix 8 – Limitations

Full Legal Disclaimer

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Specific - Trees

All tree inspections, unless specified, have been undertaken from ground level and using non-invasive techniques. Comments contained within the report on the condition and risk associated with any tree relate to the condition of the tree at the date and time of survey. Please note that the condition of trees is subject to change. This change may occur but is not limited to biological and non-biological factors as well as mechanical/ physical changes to conditions in the proximity of the tree. Trees should be inspected at intervals relative to risk/ target areas and in accordance with relevant [HSE guidance](#). Tamla Trees Ltd can provide further information on this matter if required. Where full access to trees (Ivy, materials at base, location on 3rd party land) was not possible Tamla Trees Ltd accept no liability for issues that arise.

Please note no statutory control checks have been undertaken (unless specified). Where tree surgery works have been identified these works are based on the assumption that planning is approved, no tree works should be undertaken prior to determination of this application without up-to-date confirmation of the Tree Preservation Order / Conservation Area Status of the vegetation. All works should be undertaken in accordance with the appropriate Duty of Care. This should include, for example, site specific risk assessments and due diligence inspections for the presence of protected species.

Any comment/ measurements relating to 3rd party trees have been made without full access to the tree(s). Should these trees have any impact on the proposed development we would advise you to instruct us to contact the 3rd party and undertake further detailed inspection work.

A legal Duty of Care requires that any tree works specified in this report should be performed by qualified, arboricultural contractors who have been competency tested to determine their suitability for such works in line with Health & Safety Executive Guidelines. Additionally all works should be carried out according to British Standard 3998 (2010) Recommendations for Tree Work.