HAMPS VALLEY LIMITED

BS 5837:2012 Tree Survey Report

& Arboricultural Impact Assessment

Location;

Land to the rear of 14 Market Place,
Leek,
Staffordshire, ST13 5HH

Date of Inspection;

08th August 2018

Commissioned by;

LC Construction Ltd.

Survey carried out by;

Kristian Turner. FdSc Arb. Tech Arbor A
Arboriculturual Association Professional Tree Inspector.

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1.0:Summary

1.1: Hamps Valley Ltd Tree Experts was commissioned in August 2018 by LC Construction to conduct a preliminary tree survey under the guidelines of **BRITISH STANDARDS 5837:2012** *Recommendations for trees in relation to design, demolition and construction.* (BS5837) and an Arboricultural Impact Assessment (AIA) of the proposed development of an area of land to the rear of 14 Market Place, Leek Staffordshire.

1.2: The primary purpose of this report is to make an appraisal of the trees that stand on the afore mentioned land rear of 14 Market Place. This report evaluates the condition and amenity value of the trees assesses any constraints they may impose on re-development proposals. This report provides information on any tree that should be removed and how the trees being retained should be protected during the development process.

1.3: The tree survey of the application site was carried out by Kristian Turner (of Hamps Valley Ltd) on the 08th August 2018 during daylight hours.

1.4: The appraisal found that of the one individual and one group of trees surveyed, all are of a standard that they should be considered a restraint on planning.
Any trees to be retained should be protected taking into account the minimum distances for tree protection barriers advocated in BS5837:2012. See Fig 3 for the extent of such protective barriers required around each of the retained trees.

1.5: Full details of arboricultural works recommended for the trees are listed in chapter 8 of this report.

For further information on this survey and report, contact;
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2.0:Introduction

2.1: Background and commission

Hamps Valley Ltd Tree Experts was commissioned in August 2018 by LC Construction Ltd to conduct a preliminary tree survey under the guidelines of **BRITISH STANDARDS 5837:2012** *Recommendations for trees in relation to design, demolition and construction.* (BS5837) and an Arboricultural Impact Assessment (AIA) of the proposed development of an area of land to the rear of 14 Market Place, Leek, Staffordshire.

Our current understanding of the proposed development is that it will include:

- A new development for a dwelling
- Amenity landscaping and planting.

2.2: Aims of the survey

This arboricultural assessment aims to

- evaluate the condition and amenity value of the trees on site.
- advise on how the trees are likely to impact on the proposed development.
- advise on how the proposed development is likely to impact upon the trees.
- provide information on any trees that should be removed.
- provide information on how those trees being retained should be protected during development process.

2.3: Site Context

The survey site lies at the Northern end of the Wilko car park in Leek. It is surrounded by walls or the walls of buildings. On the West boundary of the site a wall has been removed. Running along the outside edge of this boundary is a cobbled path, this path has a wall running parallel to the site on its Western edge. Behind this wall lies the tree group containing T2 and T3. T1 is located in the Northwest corner of the site. The land in the site has several levels, the most noticeable change in height runs from West to East within 2m from T1. The difference in height from the higher ground to the North of the site to that of the lower ground in the South is approximately 1.5 metres. The ground within the site has been previously worked and excavated.

Fig 1: Survey site location shown by red arrow. (Google Maps 2018)

Fig 2: The change in ground level, looking from the South of the site. T1 with the basel shoots and epicormic growth on the trunk in the NW corner.

Fig 3: Looking to the West boundary. Showing the cobbled path, wall and the tree group on the other side of the wall.

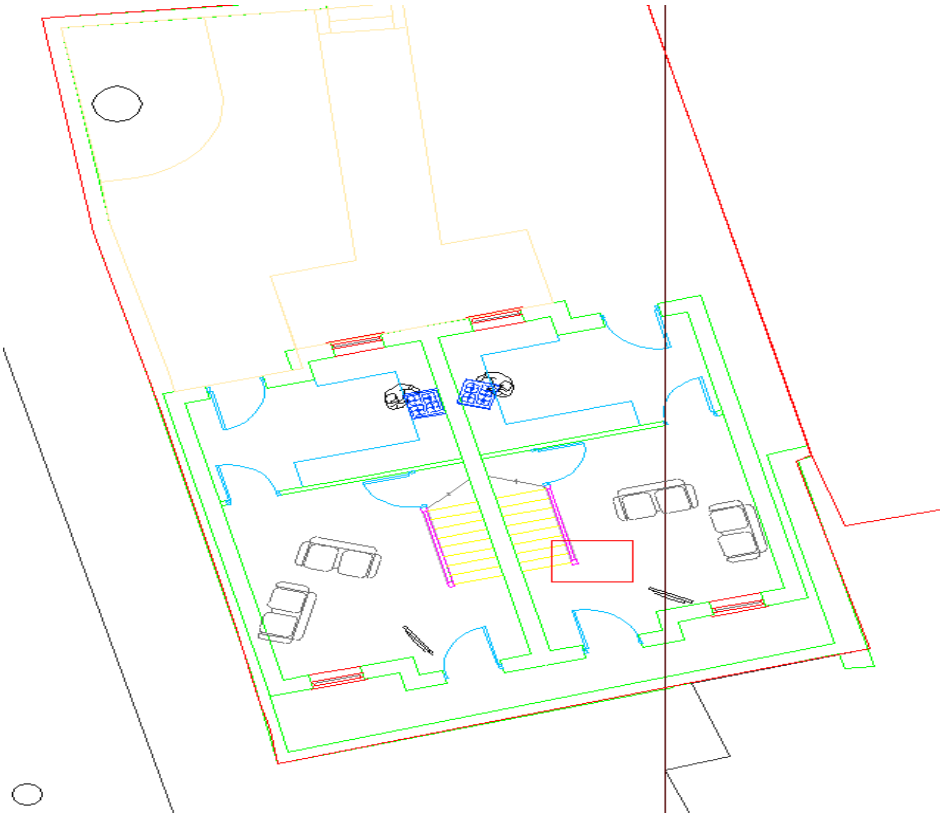

Fig 4. Proposed development. (DPD Consultants 2018)

3.0: Survey Methodology, Collection and Assessment of Data

3.1: Survey Methodology

The site was surveyed by Kristian Tuner, 08th August 2018. The inspection only consists of a visual tree assessment, no decay detection or other specialised equipment was used. The survey was carried out from ground level. The weather during the survey was overcast with intermittent spells of sunshine and rain.. Visibility was good, although occasionally impeded by the rain.

3.2: Tree height, crown spread and canopy height were estimated; a tape measure was used for all other dimensions, although in some instances the undergrowth prevented access to the trees in this case all of the tree measurements were estimated.

Data was collected to comply with the recommendations of BS5837:2012 *Trees in relation to construction* (BS5837).

3.3: Trees are dynamic living organisms and although their health and structure can be assessed, an absolutely safe assessment is not realistic as unpredictable failure can never be ruled out. Trees are also susceptible to climatic conditions and more extreme weather, including high winds, drought and snow. These conditions can cause healthy trees to fail. Hamps Valley Ltd cannot be held liable for any such failures. It would be advisable to re-inspect after any period of severe weather. Therefore this report is only valid in relation too; the weather, the condition of the trees and the condition of the site on the day of the investigation.

3.4: No soil samples were taken for analysis on this investigation.

3.5: Any site information, history or legal descriptions given are taken as accurate.

3.6: The report is only valid as a whole, any alterations or omissions invalidate it entirely. The report is valid for six months only. Any legal matters that arise from this report are not the responsibility of Hamps Valley Ltd and the consultant is not required for any further testimony or investigations unless relevant new arrangements are made.

3.7: **Survey personnel**. Kristian Turner has 15 years experience working with trees in the Arboricultural industry. He currently holds a FdSc in Arboriculture after studying at the Central University of Lancashire, is a Technician grade member of the Arboricultural Association and is a Professional Tree Inspector through the Arboricultural Association. Kristian is consistently upgrading and expanding his Arboricultural knowledge with continuous professional development, attending training courses and lectures through the Arboricultural Association and reading recently published papers on trees and Arboriculture.

4.0: Data Collection

The tree location plan is shown appendix 1.

4.1: The trees are plotted individually and have their root protection area (RPA) and canopy spread shown with the tree identifiers.

4.2: Key to report

4.3: Reference number

4.4: Species name is given as the common

4.5: The height is the measurement from ground level to the highest point of the tree to the nearest meter.

4.6: Stem diameter at 1.5m from ground level given in mm. # denotes estimated measurement (where access is unattainable)

4.7: Crown spread given at North (N), East (E), South (S), West (W) in meters.

4.8: Height of the first significant branch and direction of growth in meters (2m W) and the height of the canopy in meters.

4.9: The age of the tree as categorised in one of the following age brackets;

Young (Y), Semi-mature (SM),

Mature (M), Over mature (OM), Veteran (V).

4.10: General observations of the structure and physiological condition.

4.11: Estimated remaining contribution, in years (<10, 10+, >20, >40, 40+)

4.12: Category U or A to C grading (Table 1)

Table 1: Cascade Chart for tree quality Assessment. (BS5837:2012)

Table 1 Cascade chart for tree quality assessment

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

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Table 2: Category Grading of Trees on Site

Abbreviation	Description	Category	Colour Code
U	Trees which should be removed irrespective of any development proposal	Fell	Dark red
A	Trees of high quality whose retention is most desirable	High	Light
B	Trees of moderate quality whose retention is desirable	Moderate	Mid blue
C	Trees of low quality which could be retained	Low	Grey

5.0: Tree Survey

5.1: General observations

The British Standard BS5837:2012 *Trees in Relation to Design, Demolition and Construction - Recommendations'* gives recommendations and guidance of the principals that should be applied during the development process to achieve a satisfactory juxtaposition of trees with structures. With regard to the design issues and the assessment of trees on development sites, BS 5837 recognises in section 5.1.1 that:

> *"The constraints imposed by trees, both above and below ground (see Note to 5.2.1) should inform the site layout design, although it is recognized that the competing needs of development mean that trees are only one factor requiring consideration. Certain trees are of such importance and sensitivity as to be major constraints on development or to justify its substantial modification. However, care should be taken to avoid misplaced tree retention; attempts to retain too many or unsuitable trees on a site can result in excessive pressure on the trees during demolition or construction work, or post-completion demands for their removal."*

5.2: BS5837 also adds in 5.1.2 that:

> *"As trees can affect and be affected by many aspects of site operations, during the conception and design process the project arboriculturist should be involved in ongoing review of layout, architectural, engineering and landscape drawings. All members of the design team should be made aware of the requirements for the successful retention of the retained trees and should make provision for these throughout the development process."*

5.3: BS5837 advises that the physical size of trees can: dominate new development and give rise to concern about safety, cause obstruction of light and views, and incite objections about falling leaves and debris. These factors are most important when taking into consideration the juxtaposition of trees and new development, and usually this can only be resolved by allowing sufficient space for the trees or by removing the trees.

5.4: The Trees

For the purpose of this report the trees have been treated as;

- 1 individual tree
- 1 group of trees containing 4 trees. (T2 & T3 have been plotted to show the extent of canopy spread and RPA for the group)

5.5: T1 Mature Lime, 20m high. Cat A. The tree is in fair condition. Previous tree work has left the tree with a high canopy. The tree sits on the higher ground within the site. The excavation to change the ground level has happened within the RPA of this tree, although no major root severance is noticeable on the edge of the cut ground. the tree is located very close to a wall, just to the West of the tree, the ground on the other side of the wall is also lower than the tree, Fig 2.

5.6: T2 and T3 (the two largest trees in the group) are part of a group of trees, 3 Limes and a Holly 17m high. Cat B. Located to the West of the site. They are sitting on higher ground on the opposite side of a wall from the site, Fig 3. The wall seems well built without many large cracks or bulges. This points towards good foundations. This wall will have acted as a barrier to root growth. The cobbled path also has few defects in, again showing the lack of roots growing under it.

6.0: Barriers and Surfaces

6.1: Protective barriers

Barriers for the protection of trees on development sites should be fit for the purpose of excluding construction activity and be appropriate to the type and proximity of the work. In particular, attention should be paid to ensure that such barriers remain rigid and complete during all phases of development. In most instances, barriers should consist of rigid framework comprising vertical post and horizontal rails well braced to resist impacts. An appropriate fence type should then be securely fixed to this framework with clamps or wire. . The protection of the subject trees and their subsequent health and future potential is totally dependent upon all persons operating within the site. Communications are vitally important to ensure that all parties understand the reasons for tree protection and the existence of the barriers.

6.2: It is imperative that these barriers, as specified in British Standard BS 5837 2012 '*Trees in Relation to Design, Demolition and Construction - Recommendations'*, should be put up around the retained trees prior to the commencement of any construction operations. It is expected that the erection of tree protection barriers will be conditional on on the approval of a planning application that calls for their use. To avoid any ambiguity the precise location of the tree protective barriers should be agreed on site with the local authority arboricultural officer and then marked out clearly on the ground.

6.3: Location of protective barriers: British Standard BS 5837 advocates the use of "root protection areas" (RPAs), formed by calculating a circle 12x the stem diameter for single-stem trees . For trees with multiple stems one of two calculations should be used

a) For trees with two to five stems. the combined stem diameter should be calculated as follows:

$$\sqrt{(\text{stem diameter 1})^2 + (\text{stem diameter 2})^2 \ldots + (\text{stem diameter 5})^2}$$

b) For trees with more than five stems, the combined stem diameter should be calculated as follows:

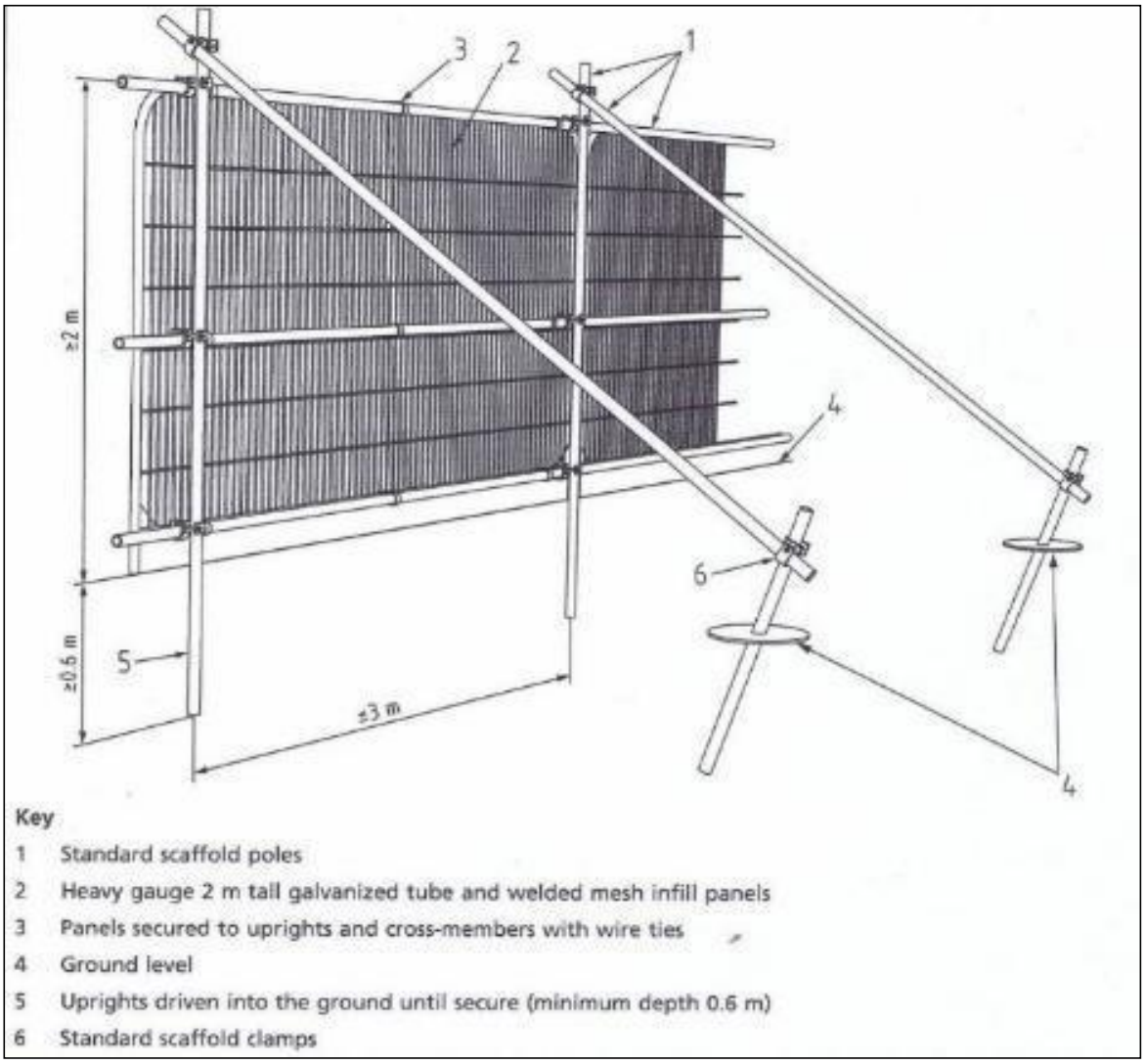
$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

Table 3: example RPA dimensions from BS5837:2012

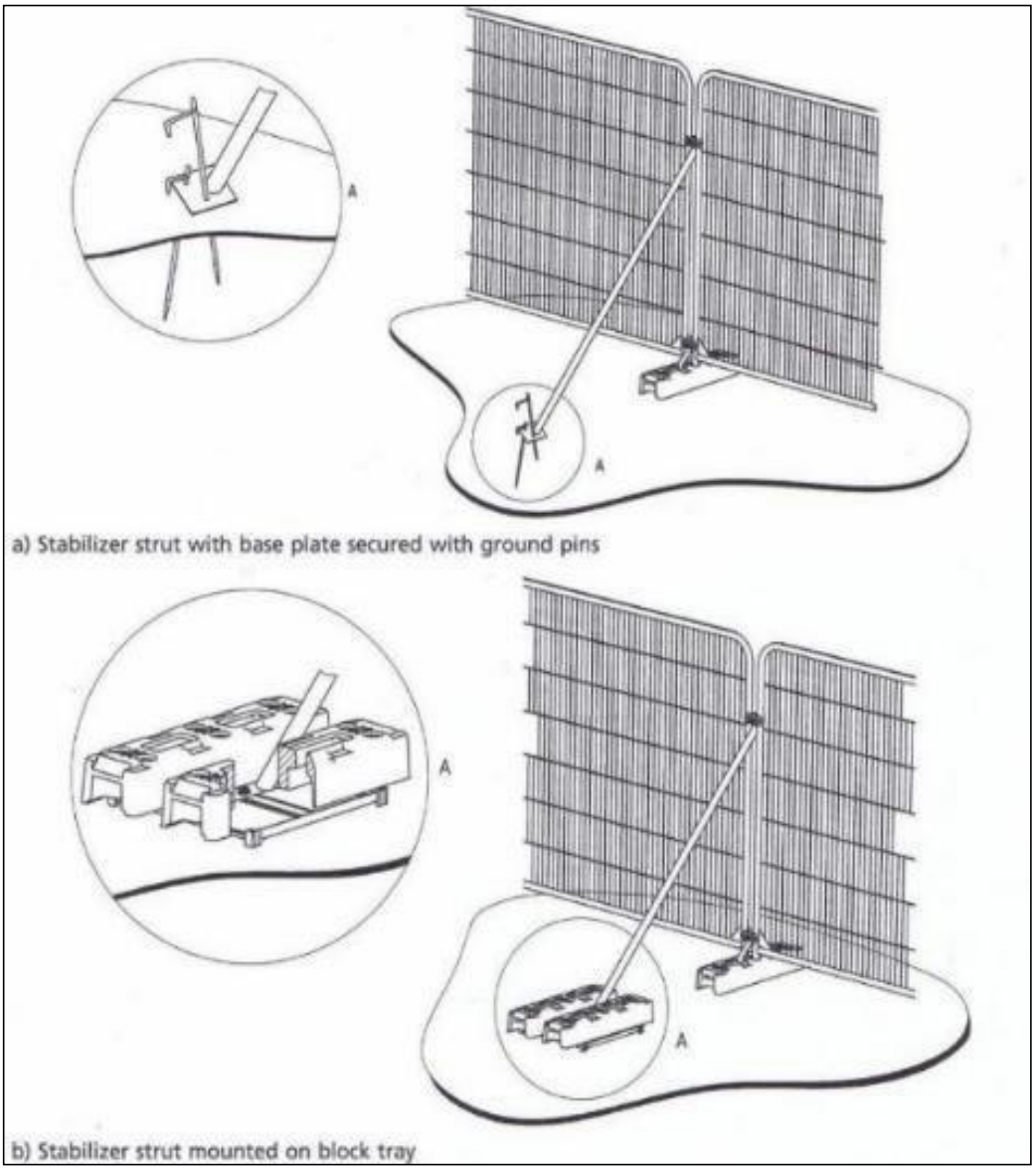
Single stem diameter mm	Radius of nominal circle m	RPA m²	Single stem diameter mm	Radius of nominal circle m	RPA m²
75	0.90	3	675	8.10	206
100	1.20	5	700	8.40	222
125	1.50	7	725	8.70	238
150	1.80	10	750	9.00	255
175	2.10	14	775	9.30	272
200	2.40	18	800	9.60	290
225	2.70	23	825	9.90	308
250	3.00	28	850	10.20	327
275	3.30	34	875	10.50	346
300	3.60	41	900	10.80	366
325	3.90	48	925	11.10	387
350	4.20	55	950	11.40	408
375	4.50	64	975	11.70	430
400	4.80	72	1 000	12.00	452
425	5.10	81	1 025	12.30	475
450	5.40	92	1 050	12.60	499
475	5.70	102	1 075	12.90	519
500	6.00	113	1 100	13.20	547
525	6.30	124	1 125	13.50	573
550	6.60	137	1 150	13.80	598
575	6.90	150	1 175	14.10	625
600	7.20	163	1 200	14.40	652
625	7.50	177	1 225	14.70	679
650	7.80	191	1 250+	15.00	707

6.4: Specification for the tree protection barriers: The default specification for tree protection barriers should normally consist of a vertical and horizontal scaffold framework, well braced to resist vehicle impacts. The vertical tubes should be spaced at a maximum interval of 3m and driven securely into the ground. Onto this framework, proprietary welded mesh panels ('heras') should be securely fixed. Care should be exercised when locating the vertical poles to avoid underground services and, in the case of the bracing poles, also to avoid contact with structural roots. The general specification for the protective barriers is outlined in Fig 8:

Fig8: Specification for protective barriers



6.5: In this case, the site circumstances may not necessitate the default level of protection and it may be possible to agree an alternative specification with the local planning authority. For example, 2m tall 'Heras' panels on rubber or concrete feet would provide an adequate level of protection from cars, vans, pedestrians and manually operated plant machinery in certain areas. The fence panels could be joined together using anti-tamper couplers, installed so that they can only be removed from inside the fence. The panels should be supported on the inner side by stabilizer struts, which should normally be attached to a base plate secured with ground pins



Figures 9a and 9b- Panel support specifications

6.6: Whatever the level of protection utilised, no storage of materials or any construction operations should occur within any of the fenced off areas. Ideally, a notice similar to that shown below should be attached to the barriers.

Figure 10: Example of notice to be erected

6.7: Prohibited Activities

The following activities shall not be carried out under any circumstances:

a. no fires to be lit on site within 10m of the nearest point of the canopy of any retained tree on or adjacent to the proposal site;
b. no equipment, signage, fencing etc. shall be attached to or be supported by any retained tree on or adjacent to the application site;
c. no temporary access within designated RPA without the prior written approval of the LPA;
d. no mixing of cement, dispensing of fuels or chemicals within 10 metres of the tree stem of any retained tree on or adjacent to the application site;
e. no soakaways to be routed within the RPA of any retained tree on or adjacent to the application site;
f. no stripping of topsoil, excavations or changing of levels to occur within the RPA of any retained tree on or adjacent to the application site;
g. no topsoil, building materials or other to be stored within the RPA of any retained tree on or adjacent to the application site; and
h. no alterations or variations of the approved works or tree protection schemes shall be carried out without the

prior written approval of the district planning authority.

6.8: Methodology - excavation with RPAs

To avoid damage to tree roots, the existing ground levels should be retained within the RPAs of all trees. The ground within the RPAs of the trees should not be disturbed, and the topsoil should remain. Consequently, it may be necessary to undertake any excavation works within RPAs by hand. As a general rule, tree roots with a diameter of 25 mm or less can be severed cleanly (by use of a handsaw or sharp secateurs) without any detrimental effect to the health and stability to the tree. However, if roots of a diameter greater than 25 mm are encountered, the local authority Arboricultural Officer and/or Arboricultural Consultant should be consulted as to implications their severance would present to the health and stability of the tree. If this method is employed, it would be prudent to prepare a simple method statement based on the enclosed guidance taken from National Joint Utilities Group (NJUG) Publication Volume 4: 2007 '*Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees.*

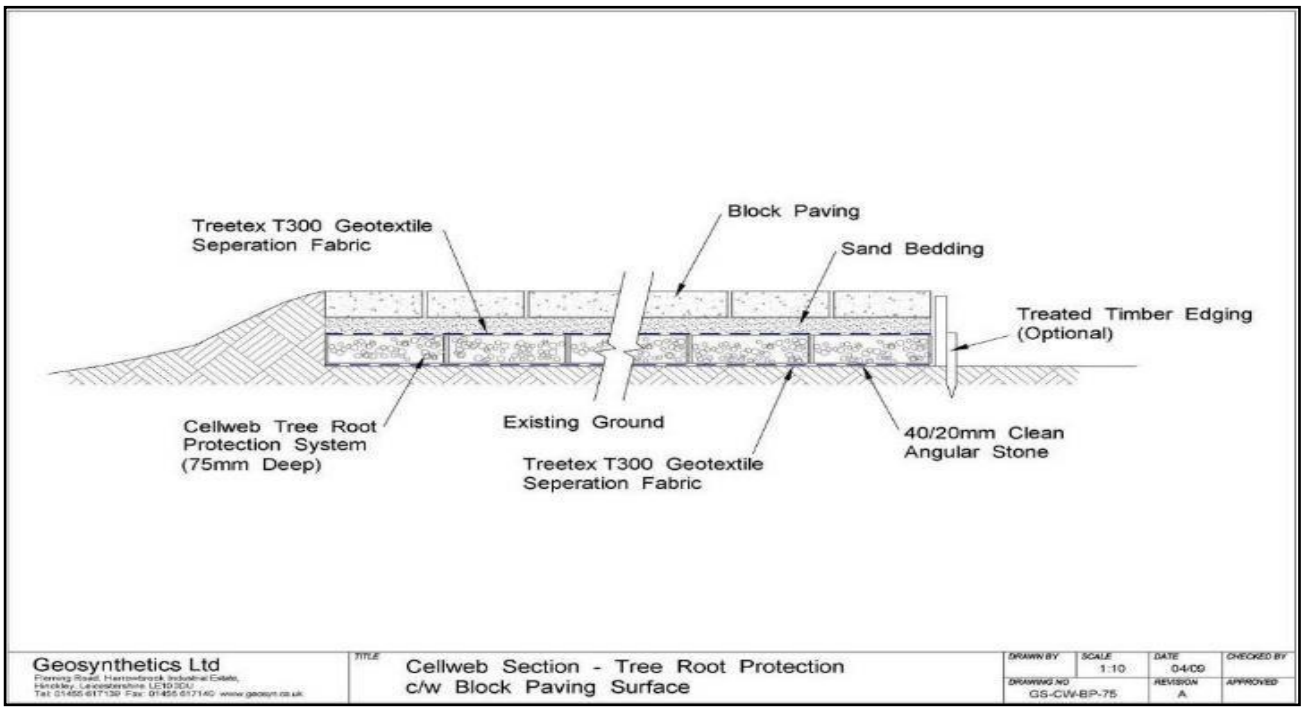
6.9: Methodology - temporary ground protection within RPAs -

It may be a requirement for new vehicular access across RPA's. Any such access must not result in changes to the existing soil structure with corresponding damage to the health and condition of the tree's root system. Section 9.3 of BS5837:2012 makes provision for such situations by recommending that access/working zones within the protection areas may be acceptable when created by using a combination of barriers and appropriate ground protection: In this instance steel road plates or an alternative system such as 'Groundtrax' should be utilised.

6.10: Methodology - special surfaces

When the proposed driveway is installed in the vicinity of it is possible that roots may be encountered. Within the RPAs of these trees any possible root injury can be mitigated by the utilisation of 'special surfaces' incorporating a 'no dig' methodology as recommended in Arboricultural Practice Note 12: 2007 "Through the Trees to Development " (APN 12). Cellular confinement systems such as 'Geoweb' and 'Cellwebb' can be used to implement the principals of APN 12 (Figure 11).

Figure 11– Example special surface



6.11: When utilised correctly with free draining aggregates and a permeable surface, these cellular confinement systems provide a shallow and free draining base that support the passage of vehicles whilst allowing water and oxygen to permeate down to tree roots. This enables a 'no dig' construction technique to be used avoiding the severance of trees roots and preventing soil compaction around tree. This method of surface construction is specifically designed for use within the RPAs of retained trees.

6.12: Please note it is important not to treat the example above as finalised specification. It is provided as an indication of construction methods suitable for use to reduce damage to the root systems of retained trees by soil compaction and direct mechanical injury. It is therefore recommended that a qualified and competent engineer assess the suitability of the recommended specifications and finalise the details prior to commencement of any works.

6.13: Scaffolding

The erection of any scaffolding within the RPA of any tree must be verified with the architect after agreement with the local planning authority. The weight and downward pressure during use of any scaffolding within the RPA of any tree must be supported on bearers of a sufficient size, such as scaffolding boards. The aim of the bearers is to spread the working load across the RPA. The access point for the scaffolding should be outside the RPA.

7.0: Structural Damage

7.1: The potential risk for any direct or indirect structural damage to the proposed development being associated with the trees on and adjacent to the site is dependent on diverse factors, such as: tree species and age, soil type, foundation depth, climate, etc. This complex interaction of tree, soil, building and other influencing factors is so inherently unpredictable, that any accurate prediction of such incidence is impractical without detailed investigation and is outside the remit of this report and it is recommended that a structural engineer be consulted on this matter. Further information on this can be found in the following papers:

(i) National House Building Council (NHBC) Standards Chapter 4.2 Building near trees,

(ii) Building Research Establishment (BRE) Digest 63 Soils and foundations: 1,

(iii) Building Research Establishment (BRE) Digest 64 Soils and foundations: 2,

(iv) Building Research Establishment (BRE) Digest 67 Soils and foundations: 3,

(v) Building Research Establishment (BRE) Digest 240 Low-rise buildings on shrinkable clay soils: Part 1,

(vi) Building Research Establishment (BRE) Digest 241 Low-rise buildings on shrinkable clay soils: Part 2,

(vii) Building Research Establishment (BRE) Digest 242, Low-rise buildings on shrinkable clay soils: Part 3 and;

Building Research Establishment (BRE) Digest 298 Low-rise building foundations; the influence of trees in clay soil

8.0: Conclusions, Tree Protection Plan and Arboricultural Impact Assessment (AIA)

8.1: The excavation that has previously occurred within the RPA of T1 will have caused damage to the root system of the tree. All efforts must be made to prevent further damage to the tree or its roots. The partial loss of some of the roots system from T1 will cause stress to the tree, this may manifest into parts of the crown dying. Re inspection is recommended within two years.

8.2: The only work required for the trees is too remove major deadwood. T1 should have the basel and epicormic shoots removed from the base.

Due to the previous digging operations some roots of T1 have been left torn and ragged. These should be propely pruned with bypass secateurs to leave clean cuts, where possible the pruning cuts should be taken back to root junctions.

8.3: **The Tree Protection Plan**

The Tree Protection Plan for tree and RPA protection is to place RPA barriers as shown in appendix 2. Barriers are to be placed along the edge of the higher ground.

Ground protection will be installed as shown in appendix 2, the area for the paved patio. All areas requiring ground protection will have the correct ground layer installed. Remove the top 50 mm of soil. Sub base of sharp sand, 75m deep Cellweb using

clean angular stone type 4/20 with a base layer of sand on top ready for finishing layer, which will be laid after completion of building works. The protection will be pinned to a wooden edging on all sides to keep in place. This can remain on the inside of the finishing kerbs or left in situ against pre-existing walls.
Where it is necessary to move or work within the RPA of a tree the correct type of ground protection should be used. Using an Arboricultural consultant to check ground protection and RPA barriers is recommended.
Digging for services will be kept to the South side of the land, out of the plotted RPA's.

8.4: The following action points must be met to stop detrimental impact on the RPA ;

- Correct root pruning
- The erecting of, and abiding by RPA barriers
- Installation of permanent ground protection
- Vehicles must use the pre-existing hard standing.
- Strict adherents to the Arboricultrual Method Statement (AMS).

8.5: **Arboricultural Impact Assessment**
All impact on the local trees will be negated by using the tree protection plan and keeping to the AMS. The partial loss of some of the roots system from T1 will cause stress to the tree, this may manifest into parts of the crown dying. Should this happen the dead areas should be removed.
The impact of the trees on the proposed development; the tree group with T2 & T3 will cast shade over the proposed development. Due to the tree species, honeydew will cause an issue to anything placed under the trees. Care should be taken when locating skylights, parking areas and patio areas. Seasonal leaf drop may cause an issue to gutters, especially valleys on roofs. No soil samples were taken for this report.

8.6: Any trees for retention should have substantial barriers erected to protect the RPA.

8.7: The removal of trees and new developments can affect the local landscape. The loss of trees and the impact of new developments can lessened by the planting of new trees that are a suitable species and the correct distance from existing buildings, proposed developments and any utilities above and below ground.

8.8: Having a planting scheme proposed in the planning application can help the LPA to visualise the finished project.
For advice on suitable planting species and locations please use a professional arboricultural consultant working to BS 5837:2012

8.10: Any recommended tree work should be carried out by fully insured and qualified arborists to the British Standards for tree work BS: 3998. 2010.

9.0: Other Considerations

9.1: Trees Subject to Statutory Controls

Certain trees on, adjacent or within the area of the site are may be covered by a Council Tree Preservation Order It will be necessary to check this before work commences The works specified above are necessary for reasonable management and should be acceptable to the local authority. However, tree owners/ managers should appreciate that they may take an alternative point of view and have the option to refuse consent.

9.2: Felling Licence

The felling of trees in the United Kingdom is controlled by the Forestry Commission under the Forestry Act 1967. A 'felling licence' from the Forestry Commission is normally required to fell growing trees, although in any calendar quarter up to 5 cubic metres in any quarter can be felled without licence providing not more than 2 cubic metres are sold. However, certain types of felling are exempt such as the removal of trees that are dead, dying, dangerous and or causing a nuisance.

9.3: Trees outside the Property

Full co-operation and liaison with tree owners will be required to conduct the recommended works on any trees included in this report that are not within the ownership of the applicant. The implications of non-cooperation requires legal interpretation and are beyond the scope of this report. By common law, branches from trees on adjacent properties extending over boundaries can be pruned back to the boundary line without the permission of the owners. However, the material belongs to the tree owner and the same guidance on statutory controls apply, as discussed in section 5.1. These trees may require further permissions, see section 9.1 of this report.

9.4: Implementation of Tree Work

When appointing a tree contractor, only suitably qualified and experienced companies should be used. Always ensure that the contractor carries adequate Public and Products Liability Insurance, along with appropriate Employer's Liability Insurance. The contractor should carry out all tree works to BS 3998:1991 *Recommendations for Tree Work*, as modified by more recent research findings.

9.5: Replacement Trees

Ideally, replacement trees should be planted in mitigation for any being lost and to supplement those existing. For the most effective impact these trees should be 'Extra Heavy Standard Trees' conforming to British Standard 'Nursery Stock BS 3936: Part 1 1992, with a stem girth of 14 to 16 cm at 1m from ground level and a minimum height of 350 cm. They should be secured with twin stakes and cross strut, with tie and flat back spacer. Ideally, an irrigation/aeration pipe should be installed and the soil surface mulched at a radius of 0.5 m from the base of the tree.

9.6: Wildlife

All operations should take account of wildlife needs and be planned to take advantage of weather conditions and season for minimum damage and disturbance.

9.7: Bats

Specific consideration should be given to the possible presence of roosting bats, which are protected under British law by the Wildlife and Countryside Act (WCA) 1981 (as amended), and bats are classified as European Protected Species under The Conservation (Natural Habitats, &c.) Regulations 2010. This makes it an offence to kill, injure or disturb a bat and to destroy any place used for rest or shelter by a bat. The Countryside and Rights of Way Act (CRoW) 2000 strengthens protection given by the WCA and covers 'reckless' damage or disturbance to a bat roost.

9.8: Breeding Birds

Any proposed tree removal should be carried out outside the bird nesting season (which runs approximately from March to September inclusive) to avoid adverse impacts to any nests present. Any proposed works that cannot be timetabled out with the bird nesting season must be immediately preceded by a check for active nests immediately prior to works commencing – this should be undertaken by a suitably-experienced bird ecologist. Clearance works should only take place once this ecologist has confirmed that no active bird nests will be affected by the works. If active nests were found then working restrictions would be put in place until all chicks had fledged. All wild birds and their nests, whilst in use, are protected under the WCA 1981 (as amended) from harm or destruction during the nesting season.

9.9: Future considerations

The remaining trees should be inspected on a regular basis by a qualified arboriculturist. Trees are living organisms whose health and condition can change rapidly. The conclusions and recommendations of this report are valid only for a period of one year. This period of validity maybe reduced in the case of any change in conditions to, or in proximity to, the trees.

10.0: Bibliographical References

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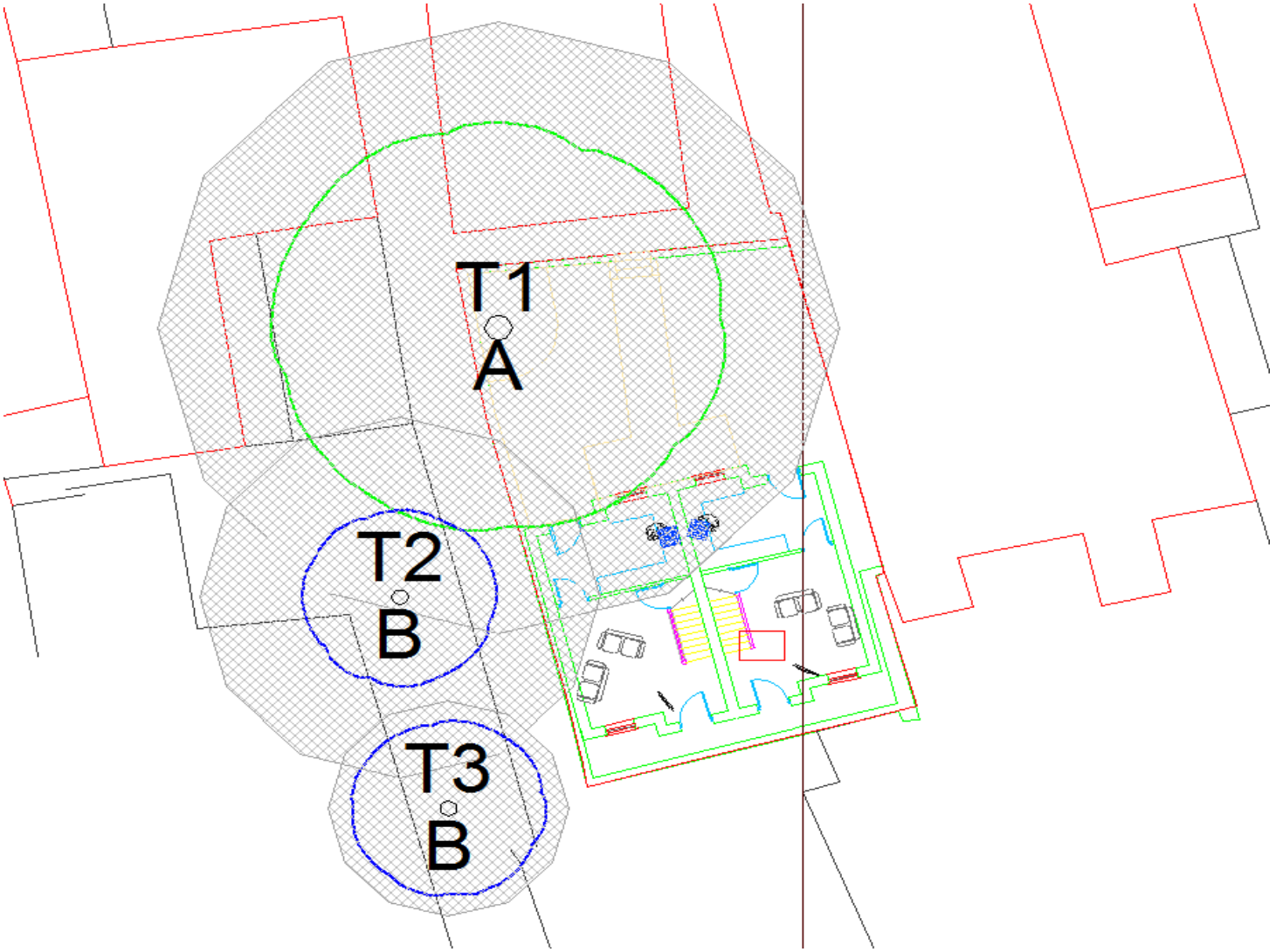
Appendix 1 A plan of the trees on site. The RPAs shown as the shaded areas. The crown spread in coloured outlines.



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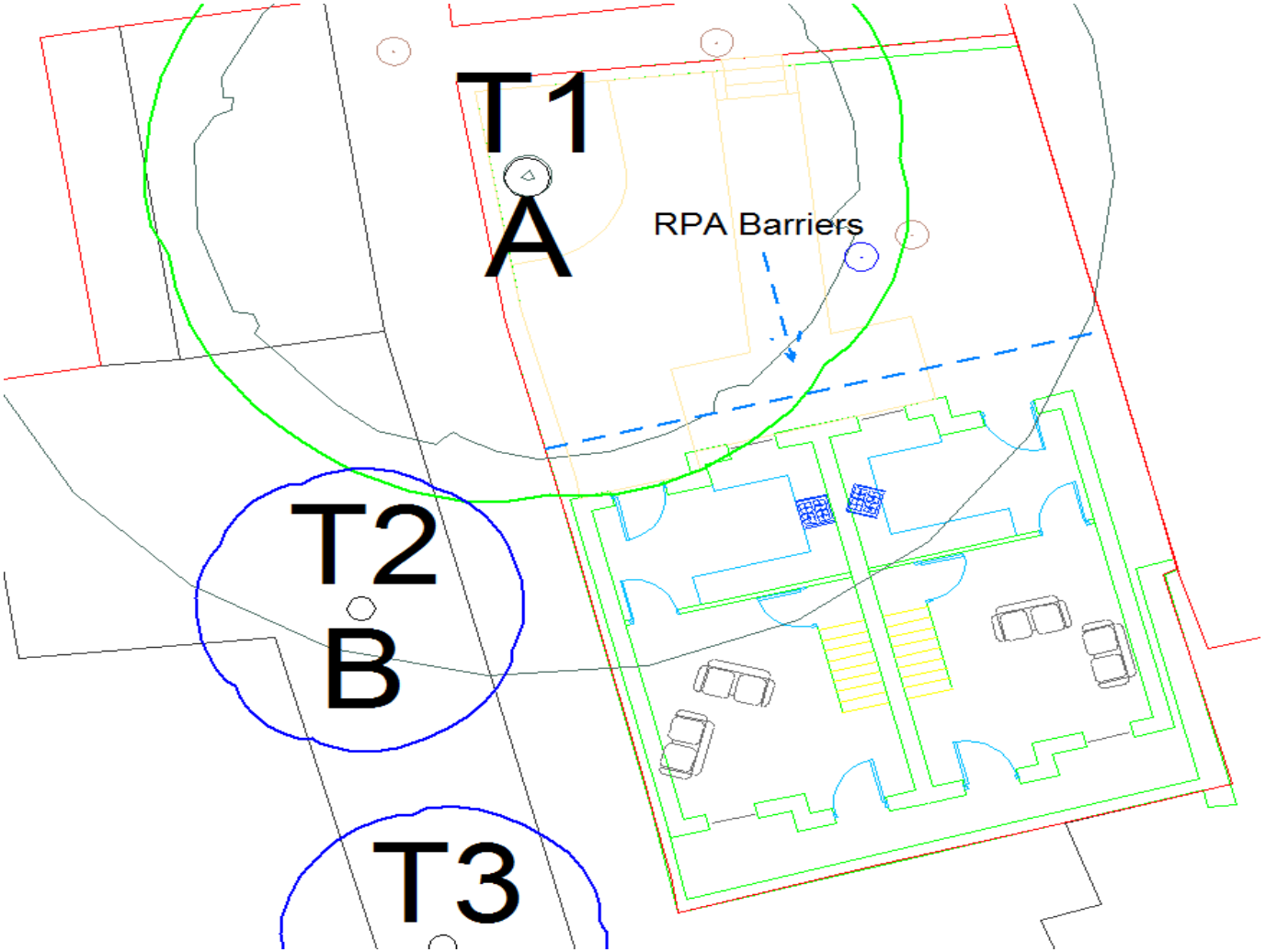
Appendix 2, The RPA barriers shown in Blue. Placed on the edge of the higher ground.



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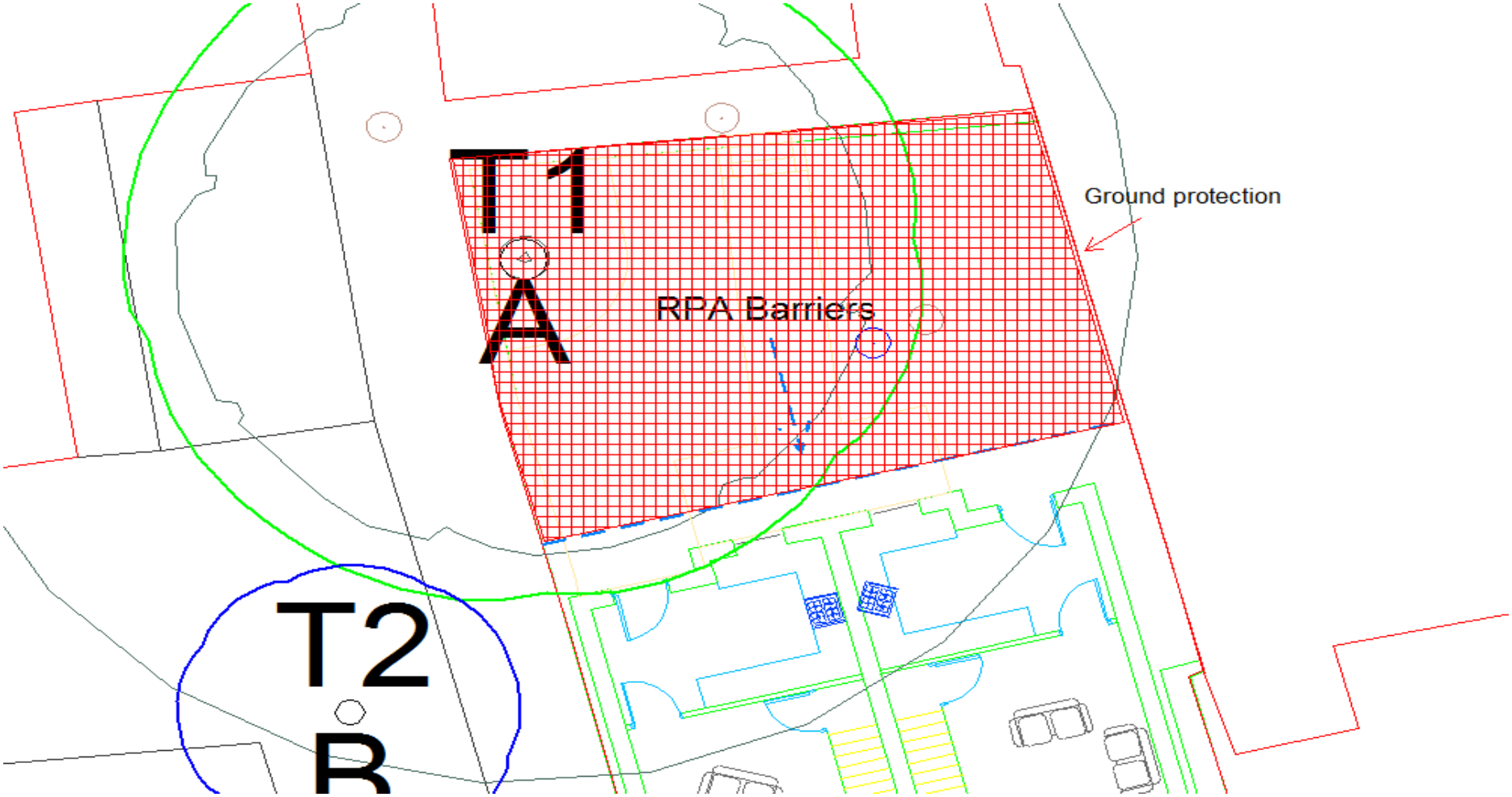
Area for permanent ground protection shown in red hatch. This area will become the paved patio.



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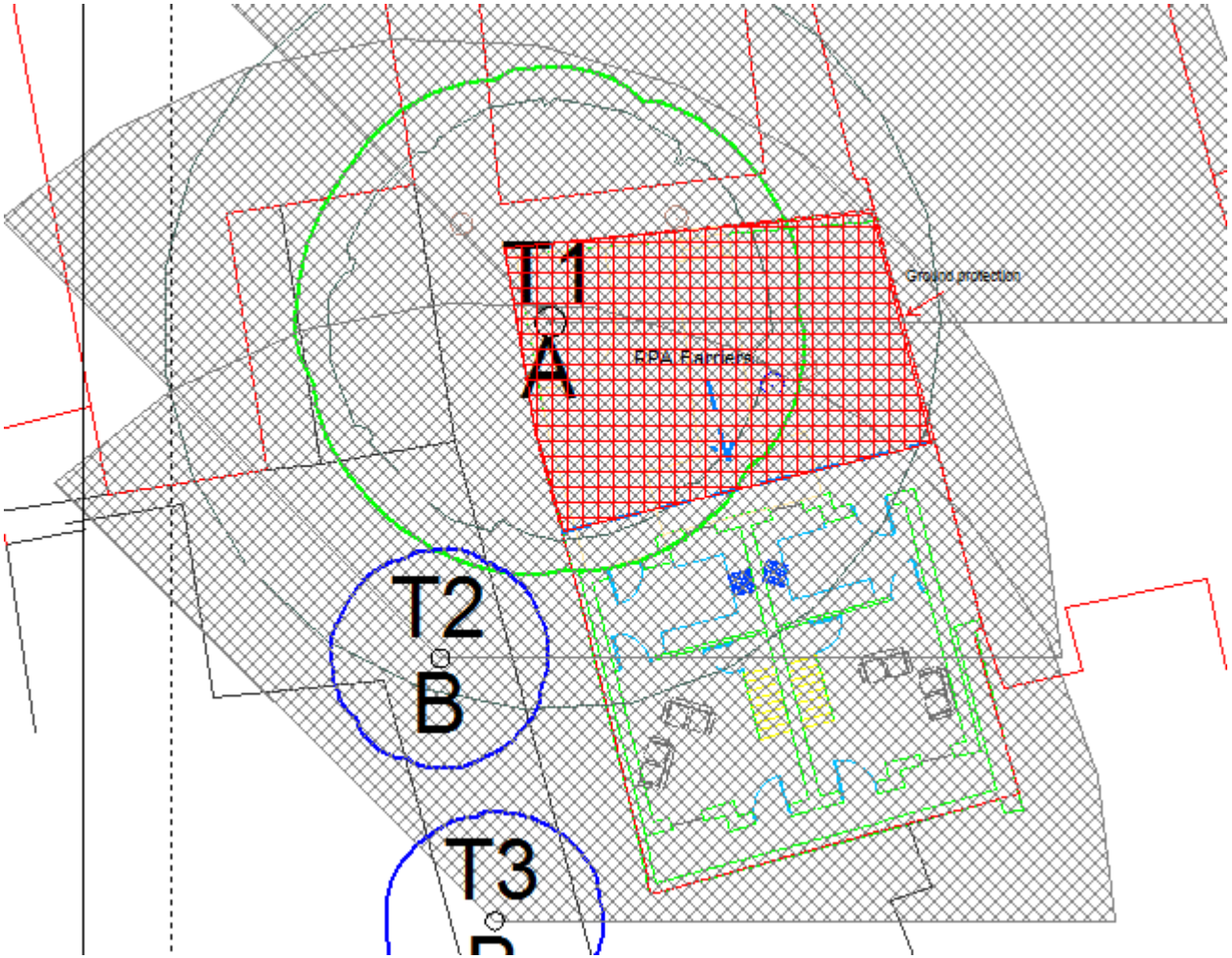
Appendix 3: The shade areas of the trees on site.



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