Arboricultural Report

Demolition of Existing House
and Building of Three New Dwellings
Romany
Rowan Lane
Ashley Heath
TF9 4PT

Commissioned by:	**Surveyed and reported on by:**
David Evans DEP Architects	David Bailey *BSc(hons),M.Arbor.A,cert.Arb*(RFS)

Survey date:	**Report date:**
28th April 2021	5th July 2021

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Arboricultural ASSOCIATION Professional Member

Contents

1.0 Summary

1.1 It is proposed to demolish an existing building and build three new dwellings, access and garages.

1.2 There are eleven category B and six category C trees on site. In addition to this there are two category B and one Category C trees. The majority of trees are of high quality significantly adding to the character and appearance of the area.

1.3 Four category C trees will need to be removed to allow the development to take place. No noticeable harm will come to the amenity provided by trees to the locality.

1.4 The use of a cellular confinement system and special engineering will allow the drive and corner of the garage to be created in rooting areas without significant damage to the trees.

1.5 Significant improvements to the rooting area of trees can be provided by removing the old drive and improving the soil below it.

1.6 Trees can be effectively protected during the building process by using protective fencing.

1.7 The proposal is arboriculturally sound.

2.0 Instructions

2.1 I am instructed by David Evans of DEP Architects to undertake a tree survey at Romany.

2.2 The proposal is to demolish the existing dwelling and build three new dwellings access and garages on the large plot of land.

2.3 There are a number of trees on or next to the site. Many trees are of high quality and considerably add to the character and appearance of the area.

2.4 I am to produce a tree report to support the planning application.

2.5 The report is to be compliant with BS5837:2012.[1]

3.0 Preliminary Matters

3.1 The survey and report cover only arboricultural matters relating to trees that will be affected by the proposal.

3.2 The report deals with identifying the benefits and constraints trees will impose on the development site, if trees will need to be removed to allow construction, how remaining specimens can be protected and how retained trees will affect the site.

3.3 Statutory protection of trees, either tree preservation orders, conservation area status or historical planning conditions have not been investigated. However it is understood the site lies within an Area type tree preservation order placed in 1966. It is likely that some of the older trees will be covered by the TPO with newer trees not falling within an age where they are protected

3.4 Plans supplied to myself:

i) Site plan and proposal supplied by DEP.

Plans I have produced to accompany this report:

i) Tree Constraints Plan PC21/476/TCP
ii) Tree Protection Plan PC21/476/TPP

3.5 Where buildings are constructed close to trees, reference should be made to the NHBC Standards 2021.[2] This document, updated yearly, gives appropriate foundation depths for buildings close to trees. It is recommended that the soil's modified plasticity index is investigated to consider the likelihood of soil movement

[1] BS5837:2012 Trees in relation to design, demolition and construction - Recommendations. British Standards Institute.
[2] National House Builders Council Standards 2021 Part 4, Chapter 2 Building near trees. www.nhbc.co.uk

with moisture change. This will allow the appropriate foundation depth to be calculated.

3.6 The data, views and opinions of this report relate to the survey undertaken on the date shown and does not take into account the effects of extreme weather conditions, vandalism or accidental damage. Neither can the effects of poorly executed tree surgery work, not complying to current good practice, be predicted. Old Oak Tree Care cannot accept liability in connection with these factors. This report requires renewal in two years from the date of survey, or as soon as site conditions, tree health or tree structural conditions significantly alter.

4.0 Method of Survey

4.1 The survey was undertaken on 28th April 2021.

4.2 Trees were surveyed to measure height, trunk diameter, crown spread and height, health, structural condition, estimated remaining life and overall quality.

4.3 Information was gathered to comply with section 4.4.2 of BS5837.

4.4 Stem diameters were measured using a surveyor's tape. Crown spreads and heights were estimated using a laser rangefinder. Heights were estimated using the height function of the laser rangefinder.

4.5 Where trees could not be reached when off-site, dimensions were estimated.

5.0 Site Details

5.1 The site is a single dwelling in a large plot of land along with garages and outbuildings. The extensive garden has many trees within it, the majority being large and mature.

5.2 To the north, east and south are similar properties and gardens. In a westerly direction is Rowan Lane with further properties and gardens beyond it.

5.3 The local area is one where bespoke houses have been positioned amongst the trees. Many of the mainly oaks are older than the properties around them.

5.4 The profile of the site is in the main flat but, towards the east of the site, the ground level falls away.

5.5 Viewing the Cranfield soil map[3], it appears that the soil is a freely draining very acid sandy and loamy soil. Soil of this kind provides a good medium for tree growth. The modified plasticity index of the soil is not known.

[3] Cranfield Soil and Agrifood Institute Soilscapes. www.landis.org.uk/soilscapes/

6.0 Extract Tree Schedule

6.1 All tree data is supplied in Appendix E. Table 1 and 2, below, gives a summary of information.

6.2 Table 1 gives a brief description and breakdown of tree categories for single trees, groups and hedges.

Category	Description of category	Number
A	High quality with an estimated remaining life span of at least 40 years. Particularly good examples of their species, especially if rare or unusual. They will be visually important and may have significant conservation or historical values.	0
B	Moderate quality and expected to remain between 20 to 40 years. Might have been included as a category A, but downgraded by impaired conditions. Possibly lacking special qualities to be regarded as Category A. Group which collectively increases its value from C to B or a particularly effective screen.	11
C	Low quality with an expected lifespan of 10 to 20 years or below 150mm in diameter. Unremarkable trees, either young, impaired or poor species. Unlikely to increase in quality as time goes by. No conservation or cultural value.	6
U	Those in such a condition that they cannot be realistically retained as living trees for longer than 10 years. Serious structural or physiological problems. Also dead trees.	0
Group	Trees of similar species, size or character which are grouped together. The number of the group is given together with the categorisation.	2 - B 1 - C
Hedge	Groups of trees planted in lines as a hedge. Trees originally planted as a hedge but have not been managed in some time, reverting back to a line of trees. The number of the hedge is given together with its categorisation.	0

Table 1: Number of categorised trees, groups and hedges. A brief description of categorisation together with colour coding. Appendix E gives full detail.

6.3 A brief description of trees and features are given in table 2. A key to the table is found below it.

No.	Species	Height	Stem Dia.	Cat.	Comment
Ok1	Oak	19	850	B	0
Ch2	Cherry	6	225	C	0
Ok3	Oak	22	625	B	0
Ok4	Oak	14	425	B	0
Ok5	Oak	20	650	B	0
Cy6	Cypress	15	400	C	0
Ok7	Oak	19	575	B	0

Ok8	Oak	21	700	B	0
Ok9	Oak	22	825	B	0
SB10	Silver Birch	11	350	C	0
Ok11	Oak	22	800	B	0
SP12	Scots Pine	20	400	B	0
Ok13	Oak	16	400	B	0
Ok14	Oak	22	675	B	0
SB15	Silver Birch	15	350	C	0
SB16	Silver Birch	17	350	C	0
Ch17	Cherry	13	275	C	0
G18	Group	20	700	B	Oak and some smaller silver birch
G19	Group	15	300	C	cypress, silver birch and oak group
G20	Group	20	400	B	like of oaks by Rowan Lane

Table 2: Extract Tree Schedule (Key below)

No: Tree identifier using letters to indicate species and a sequential number. G indicates a group, H indicates a hedge.

Species: Tree species using the common name.

Height: Height in metres.

Stem Dia: Stem diameter measured at 1.5 metres from the ground in millimetres.

Cat: Category in relation to BS5837. See Appendix C for details on categorisation. Note: Numbers for sub-categorisation are not used.

Comments: Comments, if necessary. 0 if none.

7.0 Arboricultural Impact Assessment

7.1 The proposal could be built without removing any current tree. However, in the interest of creating a high-quality living environment in proximity to trees some tree removals are proposed

7.2 Ch2 is a small category C tree of little amenity value to the area. This tree should be removed to allow an access drive to plot 1. Additionally, the category cypress Cy6 should be removed from the garden of plot 1 to prevent this small conifer detracting the amenity provided by larger higher quality native trees in Group 19.

7.3 The category C birch SB16 and cherry Ch17 should be removed to reduce proximity issues to plot 3. These trees are of low quality but replacement plantings a little further to the east will allow a widening of species in the area which will provide high amenity to it. Species such as lime or alder would add and increased diversity and wildlife value to the site.

7.4 The new buildings will be clear of the crowns of all trees. The garage of plot 1 will have a small amount of crown overhang over it but this is minimal. It is not expected that trees will be considered as negative aspects of the site, rather a positive, creating a green and leafy place in which to live and work.

7.5 The majority of large trees on the site have been managed to allow good light penetration underneath the crowns of trees. Direct sunlight will be achievable in parts of all gardens throughout the day. The character of the area is not one of unobstructed sunlight, rather a wooded landscape. Any claims by new owners over lack of direct sunlight issues caused by trees would not have merit given the trees were in place when the new buildings were purchased.

7.6 The design of the buildings follows the lead of other properties within Ashley Heath, embracing the trees of the area and creating housing close to trees which provide a quiet and peaceful connection with the natural world around them. The majority of trees will be protected by tree preservation orders and the Council will have no problems with refusal of consent to fell trees in proximity to buildings given this is the natural order of relationship between trees and housing on Ashley Heath.

7.7 Demolition of the old building and initial site deliveries will need to use the current site entrance. At 7 metres high, the crown height of Ok1 will not prevent vehicles from reaching the site. The use of 5m high bridge barriers on either side of the tree will prevent delivery cranes or excavators reaching high enough to damage branches of it. Additionally, being a single storey building, a relatively small excavator should be used for demolition and should always pull material onto the hard standing, not grass or soil.

7.8 Small areas of coverage of root protection areas (RPA) will be required by the garage and entrance drive to Plot 1. However, construction techniques within RPAs can be adjusted to prevent significant harm to trees and the soil they rely on. Section 9 deals with these issues.

7.9 Towards the end of the construction process the old entrance to the site will be blocked off and the gravel of the drive removed. It is likely that soil below has been compacted by vehicular movement over it but not to a degree where the rooting of Ok1 has been majorly prevented. The use of an airspade to break up compacted soil and the introduction of an organic compost will help to increase biotic activity within the soil to increase its decompaction and potential as a useful rooting area.

8.0 Tree Protection

8.1 Appendix A and B show the crown spread and root protection area (RPA) of each tree. The area covered by these items require careful consideration within the design and construction process as damage to the tree within these areas will be very harmful to it. These zones are primarily set aside for the tree.

8.2 RPAs do not show the total extent of the tree's roots. The RPA is likely to be just one-third of the tree's total root system. This design tool recommends an area of 12 times the diameter of the tree's trunk, or mathematical equivalent for multi-stemmed trees, to be set aside for the tree and protected. This will ensure that a core area of rooting can be protected from harm allowing the tree to be retained without significant damage or reduction in longevity.

8.3 It is recommended that RPAs are initially drawn as a circle around the tree. However, the presence of poor rooting areas such as under housing, roads, significant walls, watercourses, historical damage or buried obstructions will alter this. In this case, all RPAs have been drawn as circles given no significant barriers to tree rooting were observed.

8.4 Protected RPAs are to be kept clear of refuse, materials, fuels and chemicals. These items should also be prevented from leaking into the RPAs.

8.5 Fencing should be in place before any deliveries, plant, site offices or skips arrive on site. No demolition or construction work should take place until the fencing is fully erected.

8.6 Protective fencing similar to that shown in BS5837, shown in Appendix D, is to be used to protect RPAs from vehicular and foot access. The fencing is to be securely joined and attached to immovable objects to prevent it from being moved. Fencing should be firmly attached into the ground and will require tools to move it.

8.7 Fencing distances are shown in purple in Appendix B.

8.8 Any boundary fencing passing through RPAs should have post holes dug by hand avoiding severance of tree roots over 25mm in diameter. Should gravel boards be used, they are not to be dug into the ground.

8.9 Underground services are not to enter RPAs. Should a service run be required within an RPA then a site-specific method statement is to be produced to show how this will not cause damage to trees.

9.0 Work within Root Protection Areas

9.1 For Plot 1 the entrance drive and part of the garage will need to be built over the RPA of the oak tree Ok1.The use of special engineering allowing, essentially, a no-dig construction technique will ensure no significant harm will occur to the tree. The amount of RPA coverage is not excessive. Table 3 sets this out.

Tree	Total RPA	RPA covered by drive	RPA covered by garage	Total covered
Ok1	327m^2	16m^2	2m^2	6%

Table 3: Excavations within RPAs

9.2 Although any excavation with an RPA should be avoided if possible, what is proposed is just a small part of these trees RPAs. Mitigation (section 10) will be put in place to aid tree health.

9.3 A no-dig foundation technique will need to be used along with a three-dimensional cellular confinement system (TDCCS) to prevent compaction of the soil below it. Part of the northern and western wall of the garage will need to be constructed on a pad and beam foundation technique. A 2 metre section of the northern part of the garages floor will have a void underneath it to ensure soil is not compacted.

9.4 The final surface of the TDCCS will need to be permeable to allow water and air to reach the soil below. Gravel, pavers or porous tarmac are all suitable options.

9.5 Appendix F is a checklist and method statement for the use of Cell Web, a well know TDCCS.

10.0 Mitigation

10.1 Mitigation for what is proposed will come in three forms. Firstly, the removal of hardstanding next to Ok1, the old driveway and improvement of of the soil will increase the rooting potential for Ok1, a large and important category B tree.

10.2 Secondly, the small amount of building work within the drive to Plot 1 can be carried out using recognised no-dig construction techniques which will not significantly harm the oak.

10.3 Thirdly, although tree cover will not be significantly altered the removal of Ch17 and SB16, category C trees at the north of the site, will cause a small loss of amenity provided by trees within this area. Two high-quality longer lasting trees can be planted further to the east where they can grow to replace and improve upon the amenity provided by the current trees.

10.4 It is clear that a number of technical issues are raised by this planning application. However, the use of special engineering to avoid damage to trees are well used and documented. Should planning permission be granted, it would be expected that an arboricultural method statement is produced to show precisely how demolition, construction, work close to trees and planting is achieved.

11.0 Conclusion

11.1 The proposal is to demolish an existing dwelling and build three new dwellings, garages and access on the large plot, Romany.

11.2 Surveyed are eleven category B and six category C trees. Additionally, there are two category B and one category C groups of trees.

11.3 Four category C trees should be removed to make construction of the driveway to plot 1 easier and increase room between trees and plot 3. An additional tree should be removed to allow better viewing of higher quality trees.

11.4 The use of a cellular confinement system along with a pad and beam construction technique will ensure the rooting area of Ok1 is not significantly damaged by construction of the drive and garage.

11.5 All of the large and significant trees on the site will remain significantly adding to the appeal of the new properties. The amenity provided by trees to the local area will not be significantly affected.

11.6 Fencing will ensure retained trees can be suitably protected during the build.

11.7 The proposal is arboriculturally sound and complies with British Standard 5837:2012 Trees in relation to design, demolition and construction: Recommendations.

Appendix A

Romany, Rowan Lane, Ashley Heath

Tree Constraints Plan
Showing all trees, crown dimensions, tree categories and root protection areas (RPAs)

SCALE :	DATE :
1 : 500 @ A3	07/07/2021

David Bailey Old Oak Tree Care 01630 673216
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Map reference:
PC21/476/TCP

Legend

Crown Spread
Root Protection Area
Category 'A'
Category 'B'
Category 'C'
Category 'U'

0 40m

Appendix B

Romany, Rowan Lane, Ashley Heath

Tree Protection Plan
Showing all retained trees, crown dimensions, tree categories and root protection areas (RPAs), special engineering and fencing

SCALE :	DATE :
1 : 500 @ A3	07/07/2021

David Bailey Old Oak Tree Care 01630 673216
07813 808174 oldoaktree@talktalk.net

Map reference: PC21/476/TPP

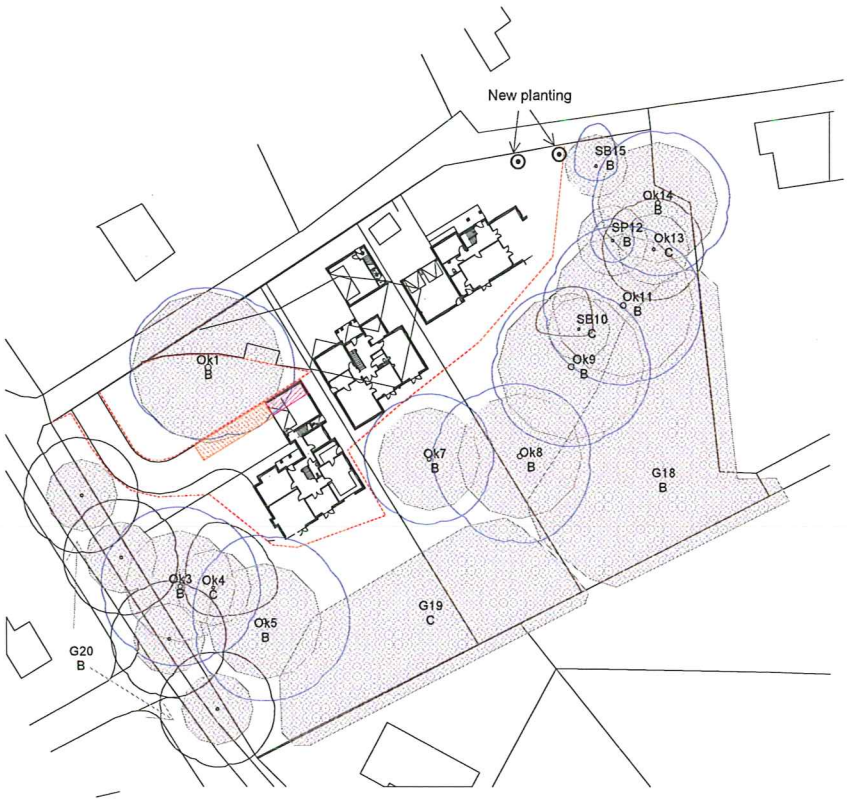
Legend

Protective Fencing | TDCCS | Construction Area Covered under No-Dig Technique

Crown Spread | Root Protection Area

Category 'A' | Category 'B' | Category 'C' | Category 'U'

0 40m



Appendix C Tree Categories

Table 1 of BS5837:2012

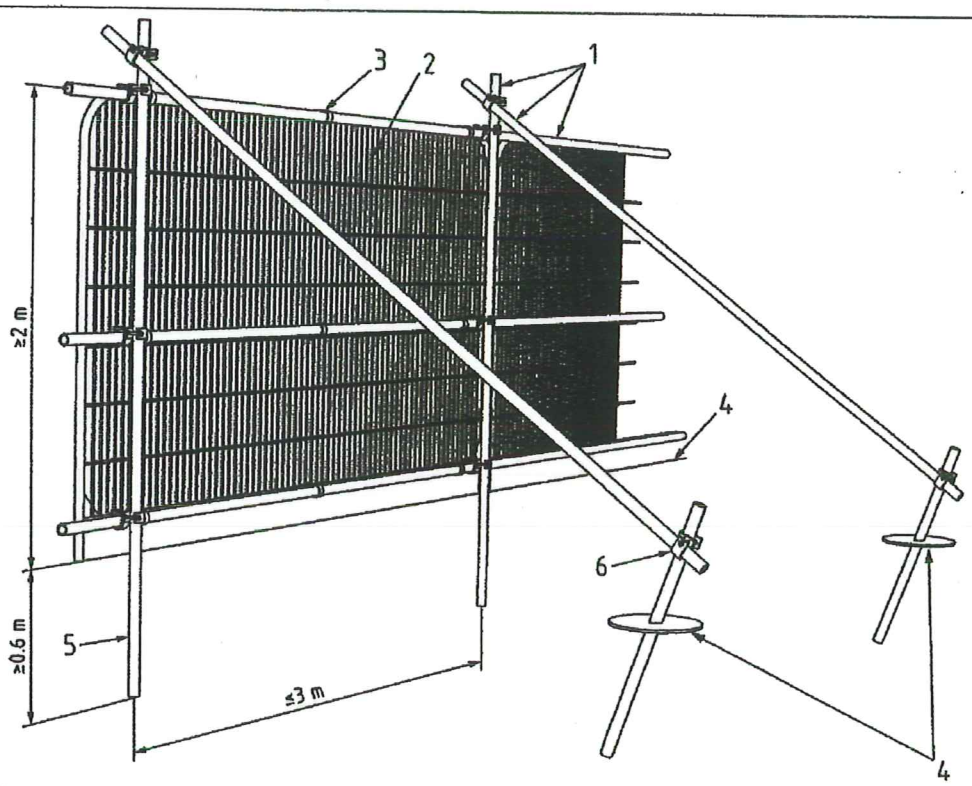
Table 1 Cascade chart for tree quality assessment

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

Appendix D

Figure 2 of BS5837:2012

Figure 2 **Default specification for protective barrier**



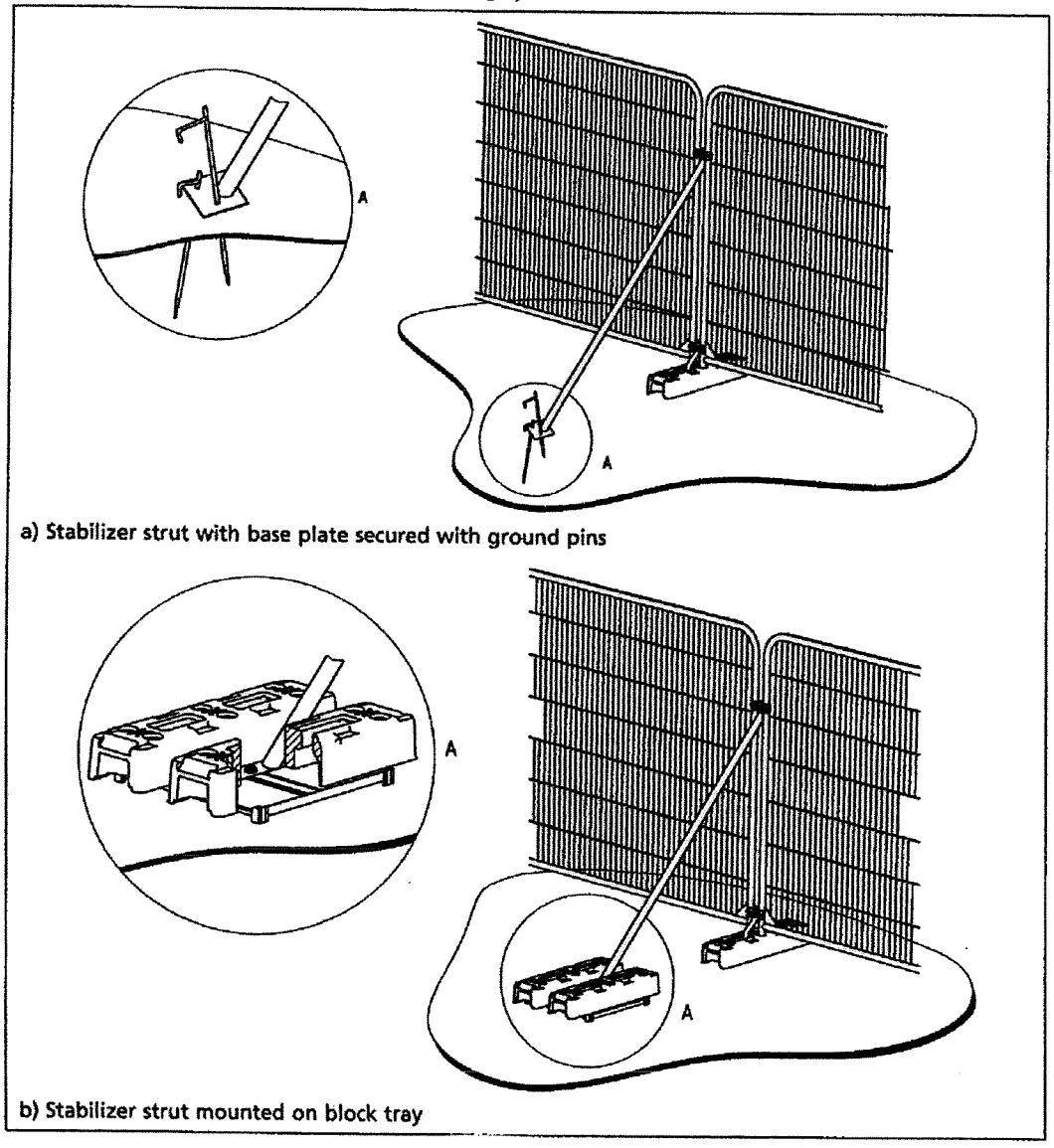
Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

Appendix D (continued)

Figure 3 of BS5837:2012

Figure 3 **Examples of above-ground stabilizing systems**



a) Stabilizer strut with base plate secured with ground pins

b) Stabilizer strut mounted on block tray

Appendix E Tree Schedule - Key

Where measurements are estimated due to lack of access or vegetation, a * denotes this.

Tree Number -	Identification for specific tree. Using a couple of letters to help with species identification together with a number. Groups or hedges will be identified as Gr.
Species-	Tree species, using common name.
Height-	Taken using angular triangulation function of a laser rangefinder.
Diameter-	Taken by measuring circumference with a tape measure and applying Pi equation or by measuring circumference by eye if entire circumference is not accessible (in this case denoted by *).
Crown spread-	Radius of crown at four cardinal points, north, east, south and west measured by laser rangefinder. (Estimates denoted with a *).
Crown height-	Height of lowest branch at each cardinal point. Measured by laser rangefinder. (Estimates denoted with a *).
Age bracket-	Estimated life stage of tree ranging from young, mid-aged, early-mature, mature and over-mature.
Physiological condition-	Assessment of health and vitality of the tree. Good, fair, poor or dead. Fair or poor will have more details attached.
Structural condition-	Assessment of physical structure of tree. Good, fair, poor or dead. Fair or poor will have more details attached.
Years remaining-	Estimate of likely useful life of tree taking into account age, species, character, situation and likely management requirements.
Quality assessment-	Subjective assessment. Either A-very good, B-good, C-reasonable or U-unsuitable for retention. See appendix C for more details.
RPA radius-	Positioning of root protection area (RPA) measured from centre of the tree to the radius. This is for circular RPAs. Where RPAs have been adjusted for site conditions and are no longer circular this value will not be correct.
RPA area-	Area of RPA irrespective of its shape.
Notes:	Any notable comments on group make up, physiological, structural condition or notable features.

Appendix E — Tree Schedule

Tree number	Species	Height (m)	Diameter (mm)	N Crown spread (m)	E	S	W	N Crown Height (m)	E	S	W	Age bracket	Physiological Condition	Structural Condition	Years remaining	Quality assessment	RPA radius(m)	RPA Area (m2)	Notes
Ok1	Oak	19	850	11	12	10	11	7	7	7	7	mature	good	good	>40	B	10.2	326.8513	0
Ch2	Cherry	6	225	3	3	3	3	2	2	2	2	mature	good	good	10 to 20	C	2.7	22.90221	0
Ok3	Oak	22	625	11	11	11	11	4	4	4	4	mature	good	good	>40	B	7.5	176.7146	0
Ok4	Oak	14	425	9	4	4	5	10	7	5	10	mature	good	good	>40	B	5.1	81.71282	0
Ok5	Oak	20	650	12	12	11	10	4	4	5	10	mature	good	good	>40	B	7.8	191.1345	0
Cy6	Cypress	15	400	3	3	3	3	2	2	2	2	mature	good	good	10 to 20	C	4.8	72.38229	0
Ok7	Oak	19	575	9	9	9	9	3	3	3	3	mature	good	good	>40	B	6.9	149.5712	0
Ok8	Oak	21	700	10	10	10	12	6	6	6	6	mature	good	good	>40	B	8.4	221.6708	0
Ok9	Oak	22	825	11	11	11	11	4	4	4	4	mature	good	good	>40	B	9.9	307.9075	0
SB10	Silver Birch	11	350	6	2	1	6	4	4	4	4	mature	good	good	10 to 20	C	4.2	55.41769	0
Ok11	Oak	22	800	11	11	11	11	4	4	4	4	mature	good	good	>40	B	9.6	289.5292	0
SP12	Scots Pine	20	400	3	3	3	3	10	10	10	10	mature	good	good	20 to 40	B	4.8	72.38229	0
Ok13	Oak	16	400	7	7	7	7	5	5	5	5	early-matu	good	good	>40	B	4.8	72.38229	0
Ok14	Oak	22	675	10	10	10	9	8	8	8	8	mature	good	good	>40	B	8.1	206.1199	0
SB15	Silver Birch	15	350	6	3	2	3	4	4	4	4	mature	good	good	10 to 20	C	4.2	55.41769	0
SB16	Silver Birch	17	350	5	5	5	5	6	6	6	6	mature	good	good	10 to 20	C	4.2	55.41769	0
Ch17	Cherry	13	275	4	4	4	4	3	3	3	3	mature	good	good	10 to 20	C	3.3	34.21194	0
G18	Group	20	700	10	10	10	10	5	5	5	5	mature	good	good	>40	B	8.4	221.6708	Oak and some smaller silver birch
G19	Group	15	300	3	3	3	3	2	2	2	2	mature	good	good	10 to 20	C	3.6	40.71504	cypress, silver birch and oak grou
G20	Group	20	400	7	7	7	7	5	5	5	5	mature	good	good	>40	B	4.8	72.38229	like of oaks by Rowan Lane

CellWeb TRP (Installation Checklist)

Installation of the CellWeb™ Cellular Confinement System within the Root Protection Area of Trees

The following installation checklist can be used on projects where CellWeb™ is being installed as a permanent hard surface, a sub-base, or as temporary root protection during construction works.

The installation procedure can be utilised by the Local Authority (LA) tree officer to ensure that CellWeb™, that is being used for tree root protection, will be effectively installed. Alternatively, it may be more appropriate to request that the installation is certified by arboricultural consultants who are experienced in the installation of CellWeb™ and who can offer installation certification as part of a package endorsed by Geosynthetics.

The completion of the CellWeb™ installation in accordance with this procedure will enable planning conditions to be successfully signed off on completion of the project.

Stage 1 Initial site meeting to assess tree protection requirements in line with the Arboricultural Method Statement (AMS) produced by the developer's arboricultural consultant.

- Check the ground conditions, including the presence of compaction or made ground.

  Is any remedial work required, such as the removal of old hard surfaces and rubble or soil decompaction?

- Compare the existing ground levels with the new levels proposed in the development.

  Do the new levels allow for the depth of hard surfaces installed with a CellWeb™ foundation without excavation?

  Will excavation be required to achieve the proposed levels or to enable site drainage or integration with other water management solutions?

- Assess the suitability of tree protection proposals, including the fencing and ground protection that will be used throughout the demolition and construction phases of development.

  Can CellWeb™ be used as ground protection throughout the development period and also form the foundation for final hard surfaces?

  Is a temporary CellWeb™ installation needed to enable site access for construction traffic over an area designated as requiring tree root protection?

- Consider how utility service installations can be integrated with the installation of CellWeb™.

  Can services be installed before the CellWeb™ is laid, or is it possible to use directional drilling later on in the development?

- Consider how other water management solutions for the site can be integrated with CellWeb™, including porous hard surfaces, drainage and underground storage.

  Has a combined and integrated water management plan been designed that considers retained trees?

  Do the water management solutions for the site consider the water requirements of retained trees?

  Do the storage solutions allow for the slow release of water into areas of the site accessible by tree roots, while also dealing with potential soil pollutants from surface water run-off?

- How are the developers going to ensure that the CellWeb™ is specified and installed effectively?

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Stage 2 Approval of the CellWeb™ site-specific installation method statement, which should include:

- Details of the sensitive removal of existing hard surfacing.
- Details of any remedial de-compaction work required.
- Root investigation procedures where site level changes require limited excavation to allow the installation of CellWeb™.
- A scaled site plan illustrating where the CellWeb™ will be installed that includes both existing and proposed levels.
- Details of how the CellWeb™ tree root protection system will be integrated with other traditional hard surface foundations on site.
- An integrated water management site plan illustrating working porous surfaces, drainage and water storage solutions, with consideration of the physical presence of roots and tree water requirements.
- Details of the CellWeb™ load limit specifications, with site-specific information.
- Engineering drawings provided by Geosynthetics showing the CellWeb™ specification.
- An engineering design indemnity policy based on a site-specific soil assessment.

Stage 3 Site visit before CellWeb™ installation to check that the ground has been prepared in accordance with the AMS. Check:

- Site level layout.
- The need for root investigations where excavation work is required to meet level requirements.
- Soil bulk density (compaction) CBR has been maintained.
- Completion of any site remedial work required before the installation of CellWeb™.

Stage 4 Site visit to check that materials supplied for installation comply with the installation method statement and AMS specifications. Check:

- The specification of the geotextile underlay.
- The specification of the cellular confinement system (depth and product used).
- The specification of the fill material (4/20, 20/20 or 20/40 washed angular stone with site-specific pH if required and appropriate structural load rating).

Stage 5 Site visit to check that the installation methodology meets the manufacturer's specification and is in accordance with the AMS. Check:

- The minimum cell size.
- The orientation of the sheet layout.
- There is sufficient fill to form a cell structure.
- The upper geotextile has been installed to maintain the CellWeb™ sandwich.

Stage 6 Site visit to check that the final surface installation meets the porosity specification in the installation method statement and the AMS.

Stage 7 Project sign off.

Following this checklist should ensure the successful specification and installation of CellWeb™ as a tree root protection system, either as a temporary ground covering during development or as a structural sub-base for permanent porous hard surfaces.

This checklist has been written to enable Local Authority Tree Officers to plan site visits and document checks in a structured way. However, the same procedure can be completed by an independent arboricultural consultant as part of a certification program offered by Geosynthetics Ltd using dedicated arboricultural consultants and approved installers.

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Method Statement

For The Installation of Cellweb Tree Root Protection System.

When considering damage to tree roots, in applications of vehicular access and parking, the risk of oxygen depletion caused by compaction of subsoil's, site clearance damaging the root source and type of reinforcement are areas which need to be given due consideration.

Other risk factors are:

- Creating an impermeable surface
- Causing a rise in the water table due to construction
- Increasing ground level
- Contamination of subsoil's

1. Compaction

When looking at site conditions and use, the following information should be considered to enable a load bearing structure capable of supporting traffic to be proposed:

- Californian Bearing ratio (CBR) – Standard test method for measuring soil strength
- Soil types
- Water table
- Maximum load (vehicles)
- Acceptable rut depth
- Reinforcement type — Cellweb Cellular Confinement 150mm deep
- Type and Depth of engineered infill material — Clean, angular. Usually 40mm to 20mm.

2. Dig (site strip)

Site stripping does damage some root structure prior to construction; however, the use of no-dig construction elevates the access road requiring edge protection.

3. No dig

3.1. Remove surface vegetation	Use a suitable herbicide suitable for the specific vegetation and not harmful to the tree root system
3.2. Place geotextile separation filtration layer	Use a Treetex T300 non woven Goetextile over the prepared sub-grade. Overlap dry joints by 300mm. The three dimensional cell structure, is formed by ultrasonically welding polyethylene (perforated) strips / panels together to create a three dimensional network of interconnecting cells. A high degree of frictional interaction is developed between infill and the cell wall, increasing the stiffness of the system
3.4. Edge restraint	A treated timber edging is usually acceptable.

4. Cellular Confinement and Backfill Material.

Expand the Cellweb 2.56m wide panels to the full 8.1 metre length. Pin the Cellweb panels with staking pins to anchor open the cells and staple adjacent panels together to create a continuous mattress. Infill the Cellweb with a no fines angular granular fill (typically 4-20mm) within each open cell. The use of cellular confinement reduces the bearing pressure on the subsoil by stabilising aggregate surfaces against rutting under wheel loads. Comparisons between cellular confinement and traditional aggregate and geogrid-reinforced structures demonstrate a 50% reduction in construction thickness of the granular material.

5. Surfacing Options

Block Paving:
5.1. Lay second layer of Treetex T300 Geotextile separation fabric over the infilled Cellweb sections
5.2. Lay sharp sand bedding layer compacted with a vibro compaction plate to recommended depth.
5.3. Place block paviors as per manufacturers instructions.

Tarmac:
Place 25mm surcharge of the granular material above the Cellweb system and lay the bitumen base and wearing courses.

Loose Gravel:
5.4. Ensure Cellweb is completely filled.
5.5. Place decorative aggregate to required depth
NOTE: A treated timber edge should be provided to restrict gravel movement.

Grass Blocks:
5.6. Place second layer of Treetex T300 Geotextile separation fabric over the infilled Cellweb sections
5.7. Place 50/50 rootzone bedding layer to the required depth
5.8. Lay recycled Duo Block 500 Grass Protection System infilled with 50/50 rootzone mix.
5.9. Seed as per architects instructions.
(Alternatively the Grass Blocks may be infilled with gravel.)

Concrete Slab
6.0 Lay Cellweb as previous and place second layer of Treetex Geotextile directly over the filled panels. Pour concrete base as specified.

Below are illustrations of the correct stapling procedure for joining both edges and ends of panels together;