



Arboricultural Survey and Planning Integration Report

at

**St Catherine's School,
Cross Deep,
Twickenham,
London.
TW1 4QJ**

15th March 2024



C O N T E N T S

Section	Subject	Page
	Instructions	1
	Summary	1
	Documents Supplied	2
1	Scope of Survey	2
2	Survey Method	2
3	Ecology Informative	3
4	The Site	3
5	Subject Trees	4
6	The Proposal	4
7	Arboricultural Landscape Integration	5
8	Post Development Pressure	5
9	Tree Protection Measures	6
10	Conclusions	7
11	Recommendations	8
	Appendix A Schedule of Subject Trees	
	Appendix B Site Plan – Existing and Proposed Layouts	
	Appendix C RPA Radii Table	
	Appendix D BS5837 Extract – Tree Protection Fencing	
	Appendix E BS5837 Extract – Tree Protection Fencing (light support)	
	Appendix F Ground Protection Sheets	
	Appendix G Site Monitoring Form	

The statements made in this Report do not take account of the effects of extremes of climate, vandalism or accident, whether physical, chemical or fire. Quaife Woodlands cannot therefore accept any liability in connection with these factors, nor where prescribed work is not carried out in a correct and professional manner in accordance with current good practice. The authority of this Report ceases at any stated time limit within it, or if none stated after two years from the date of the survey or when any site conditions change, or pruning or other works unspecified in the Report are carried out to, or affecting, the Subject Trees, whichever is the sooner.



LOCATION	St Catherine's School, Cross Deep, Twickenham, London TW1 4QJ	REF: AR/4149-r/jq
CLIENT	St Catherine's School, Instructing agent: Pam Self Tim Ronalds Architects	DATE OF REPORT 15th March 2024
REPORT PREPARED BY	J. Quaife, AA Registered Consultant Dip.Arb.(RFS), F.Arbor.A, CEnv.	DATE(S) OF INSPECTION 30 th August, 2022
SURVEY INSPECTOR(S)	J. Quaife, AA Registered Consultant Dip.Arb.(RFS), F.Arbor.A, CEnv.	SHEET No. 1 of 8

LOCAL AUTHORITY	London Borough of Richmond upon Thames
CONTACT	Arboricultural Officer - Paul Maher 020 8891 411 Paul.Maher@RichmondandWandsworth.gov.uk

Please note that abbreviations introduced in [square brackets] are used throughout the report.

INSTRUCTIONS

Issued by – Pam Self of Tim Ronalds Architects on behalf of St Catherine's School

TERMS OF REFERENCE – To survey the subject trees to assess their general condition and to provide a report to support the proposed development that safeguards the long term well being of the subject trees in a sustainable manner.

The content and format of this Report as written are for the exclusive use of the Client. It may not be sold, lent, hired out or divulged to any third party not directly involved in the subject matter without our written consent.

Summary

The proposal is to construct a new music and art building to be two storeys in height, and to replace the existing Music Building and the single-storey extension to the Lodge.

This report sets out the measures by which all the subject trees can be maintained unharmed by the construction work in compliance with BS5837 (other than the dead tree). Consequently there is no necessity to plant replacement trees in respect of this application, but two new trees are to be planted for landscape enhancement.

The spatial relationship of the subject trees to the school buildings will remain unaltered.

Documents Supplied

- Tim Ronalds Architects drawing SCT 001B, existing site plan, dated 6th July, 2022
- Tim Ronalds Architects drawing SCT 100J, proposed ground floor plan, dated 27th November 2023
- Caneparo Associates drawing 002, Proposed Construction Arrangements, dated November 2023
- Caneparo Associates drawing 003, Proposed Construction Arrangement B, dated November 2023
- RBKC Pre-application advice ref:22/P0033/PREAPP, dated 2nd August, 2022

Scope of Survey

- 1.1 The survey is concerned with the arboricultural aspects of the site only.
- 1.2 The entire property is within the CA8 Twickenham Riverside Conservation Area. I could find no reference to there being a Tree Preservation Order applying to the property on the RBKC website.
- 1.3 No discussions took place between the surveyor and any other party.
- 1.4 The trees were inspected on the basis of the Visual Tree Assessment method expounded by Mattheck and Breloer (The body language of trees, DoE booklet Research for Amenity Trees No. 4, 1994).
- 1.5 The survey was undertaken in accordance with British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations [BS5837] with modification.
- 1.6 This report sets out the Root Protection Area [RPA], described by the RPA radius [RPR] derived from Section 4.6 of BS5837 and adjusted to accommodate existing site features.
- 1.7 Any pruning works will be required to be in accordance with British Standard 3998:2010 Tree work - Recommendations [BS3998].
- 1.8 This report does not cover the specific arrangements that may be required in connection with the installation of underground services.
- 1.9 This report sets out the working specifications of tree protection measures, but the specifications of engineering and design features are matters for which we can only provide enough detail in principle to demonstrate the feasibility of the scheme.

Survey Method

- 2.1 The survey was conducted from ground level with the aid of binoculars.

- 2.2 No tissue samples were taken nor was any internal investigation of the subject trees undertaken.
- 2.3 No soil samples were taken.
- 2.4 The stem diameters [SD] were measured or estimated in centimetres at 1.5 metres above ground level and otherwise in accordance with Annex C of BS5837.
- 2.5 The height of each subject tree was estimated with a clinometer.
- 2.6 The crown diameters were estimated by pacing or visually where access was restricted.
- 2.7 The positions of the subject trees are plotted at Appendix B derived from the supplied plan. Please note that the attached plan is for indicative purposes only.

Ecology Informative

- 3.1 Bats are protected under the Wildlife & Countryside Act 1981 and subsequent legislation and The Conservation of Habitats and Species Regulations 2010 and it is an offence to deliberately or recklessly disturb them or damage their roosts. Trees should be inspected before any works commence and if the presence of bats is suspected advice will need to be sought from the Natural England Bat Line on 0845 1300228. Further advice on bats is available from The Bat Conservation Trust (020 7627 2629).
- 3.2 Tree work should as far as is possible avoid the bird nesting season, which officially (Natural England) is from February until August, although the busiest time is from 1st March until 31st July. However, other than the removal of a dead tree no other tree work is proposed.
- 3.3 Please also be aware that ecology is governed principally by;
 - the Wildlife and Countryside Act 1981 (as amended by the CRoW Act 2000),
 - the Conservation of Habitats and Species Regulations 2010,
 - the Wild Mammals (Protection) Act 1996, and
 - the Natural Environment and Rural Communities (NERC) Act 2006.
- 3.4 I have completed the Bat Conservation Trust's 3-day course on bats and am conversant with the BS986 Micro-Guide for arboriculturists and the Natural England Bat Habitat Assessment Guidance 2010, and I could not see any indication of bat roosts in the subject trees that are affected by this proposal.

The Site

- 4.1 The subject property is situated on the western side of the road Cross Deep and occupies the land between Grotto Road to the north and Popes Grove to the south with a road frontage of some 110 metres. There is a playing field extending some 90 metres or so west of the buildings south of Grotto Road. Overall the land is level.
- 4.2 With reference to the British Geological Survey Geology of Britain Viewer the indicated soil parent material is the London Clay Formation with some silt. This is a shrinkable soil which is susceptible to compaction which is harmful to tree roots.

4.3 I am not an expert on soils and although I have some working knowledge of them, if accurate soil analysis is required then a soil specialist should be contacted.

Subject Trees

5.1 The 7 individual subject trees and group of olives are listed in the schedule at Appendix A. One, sycamore T1, is off site and with no direct relevance but I have included it as it was marked on the plan. One tree T6 is dead, and T3 is a shrub.

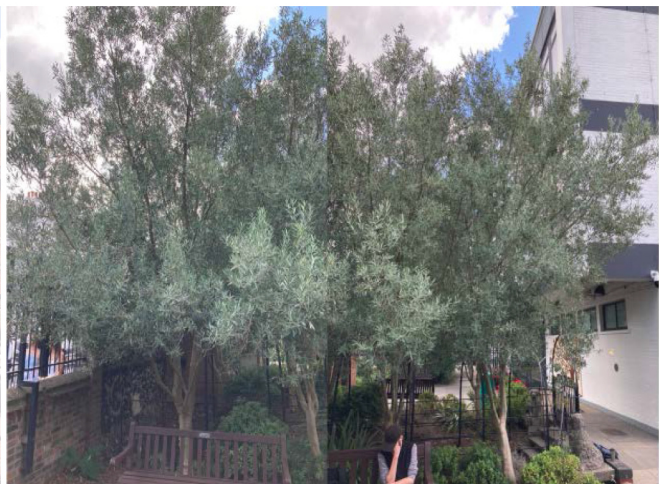
Table 1. Subject Trees – species and grades

Species	A	B	C	U	Totals
Sycamore	1	-	-	-	1
Walnut	-	-	1	-	1
Silver birch	-	1	-	-	1
Holly	-	-	1	-	1
Yew	-	1	-	-	1
Olives - group of 8	-	1	-	-	1
Totals	1	3	2	0	6

5.2 There are also eight olive trees in two parallel lines at 90° to the frontage, and to each side of steps down to a tunnel under Cross Deep leading to Pope's Grotto (both structures being listed).



Four southern olives



Four northern olives (composite photograph)

5.3 These will not be affected by the proposal and the screening they provide is appreciated.

5.4 Overall the trees are in reasonable condition (other than dead tree T6) and none of them presents any significant risk.

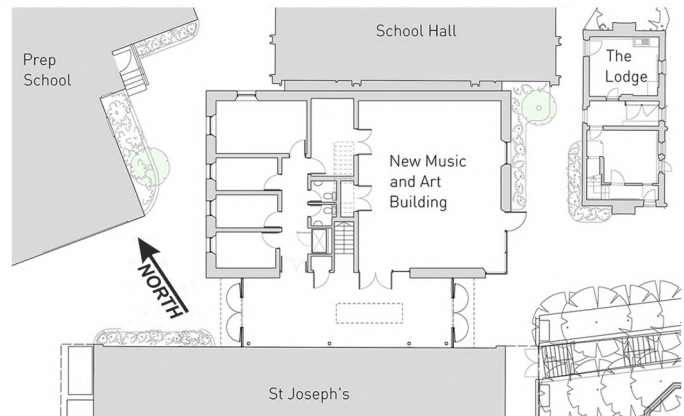
The Proposal

6.1 The proposal is to construct a new music and art building to be two storeys in height to replace the existing Music Building, and to remove the single-storey extension to the Lodge.

Arboricultural Landscape Integration

7.1 All the subject trees along with the shrub are to be retained and no pruning is envisaged in relation to the proposal.

7.2 Two new trees are to be planted in the positions shown in the proposal plan extract right. They should be of species with a reasonably compact habit and modest mature size. They will not be visible from outside the site and will not be material to the proposal but I mention them so that the proposal is fully explained.



7.3 The species that might be considered are, for the eastern tree in a very confined position a fastigiate from: *Prunus amanogawa*, *Amelanchier alnifolia* 'Obelisk', *Malus trilobata*, *Crataegus monogyna* Stricta,

and for the western tree with more space; *Arbutus unedo* native but only in Ireland and Northern Ireland), *Cornus kousa* Chinensis, *Cornas mas* Variegata, *Sorbus aucuparia* Joseph Rock, *Acer palmatum* Bloodgood, *Euonymus europaeus* Red Cascade

These are just suggestions of mine.

7.4 Overall the arboricultural landscape impact of the proposal will be neutral.

Post Development Pressure

8.1 The concept of post development pressure is not that routine maintenance work to maintain clearances and the proportionality of trees is unacceptable. The term should more accurately be one of irresistible post development pressure where the spatial or physical relationship of a retained tree to a structure or feature demands pruning or removal that is inappropriate, but to which the local planning authority could not reasonably refuse consent.

8.2 The spatial relationship of the retained trees to the new buildings will be very much the same as at present, and accordingly there will be no appreciable post development pressure, and certainly none that would oblige the Council to give consent to inappropriate tree works.

Tree Protection Measures

- 9.1 The BS5837 gives a Root Protection Area [RPA] for each retained tree by reference to Section 4.6 in the BS. The RPA is an estimation of the area of the root system that would need to be retained to sustain the condition of the tree if all the other roots outside it were to be severed. The RPA represents a smaller proportion, (on average only a third), of a tree's root system and consequently whilst the RPA is particularly important to ensure that there are no adverse effects upon stability, if an encroachment does not reduce the overall assimilative function of the root system significantly it is unlikely to cause harm. However, as with any factor relating to trees each individual situation must be justified in site-specific terms.
- 9.2 The RPA is usually described as a circle with a radius (Root Protection Area Radius [RPR]) of the prescribed distance within which no unspecified activity should occur, though the shape and position of the RPA can be modified by an arboriculturist to meet individual site conditions according to the probable distribution of the tree roots. Intrusion into the RPA can take place only where the ground is adequately protected in accordance with the requirements of Section 6.2.3 of BS5837 or where work is carried out to an agreed design and working method.
- 9.3 The RPA of the sycamore T1 does not extend into the subject site and is not a material consideration for this proposal.
- 9.4 Quaife Woodlands uses a tabular method to derive rounded-up RPA radii in half-metre graduations (Appendix C). I have plotted the circular RPAs at Appendix C, but have adjusted their shapes due to Grotto Road and the boundary wall to the south (see the photographs at Appendix A).
- 9.5 **Tree Protection Fencing** The combined zones of RPAs form the Construction Exclusion Zone (hatched in blue at Appendix B). They will be protected by a Tree Protection Fence [TPF] comprising steel mesh panels of 1.8 metres in height ('Heras'). These panels will be mounted on a scaffolding frame as shown at Figure 2 of BS5837 (Appendix D) for the silver birch T4, but elsewhere the panels can be mounted on blocks and braced as shown at Figure 3 of BS5837 (Appendix E).
- 9.6 There will be no construction access past the walnut T2 and consequently no tree protection is necessary.
- 9.7 The TPF is to be erected initially and is to remain in place for the duration of all construction work and only then removed.
- 9.8 **Ground Protection** The existing entrance off Grotto Road adjacent to the silver birch T4 (see photograph at Appendix A) will be widened for construction access to the area identified at Appendix B. The width of it is to allow for turning arcs of large vehicles, which will enter and leave in forward gear. The area of the surfacing within the RPA will have load dissipation sheeting (Appendix F) laid. If GRP it will need to be in triple layers, but a single layer if steel. At the southern end, the construction use area will not extend into the fenced RPA of holly T5. This protection will remain in place until the construction use area is taken up and the playing field restored.

- 9.9 **Underground Services** I understand that there will be no new underground service that will be in the vicinity of RPAs.
- 9.10 **General Matters** The surface water run-off and soil drainage have not been studied as part of my survey. However, due to the site topography I do not foresee any detrimental effects on the trees in hydrological terms as a result of this development.
- 9.11 There are no hard landscaping proposals that might affect trees.
- 9.12 The protection of the trees will also include recognition of other types of potentially damaging activities, such as the storage of materials (and other substances likely to be toxic to plants), parking, site-building requirements, and the use and parking of plant. One of the main tree protection considerations is the logistical management of the site with the limited space, which is why I have specified the storage area.
- 9.13 **Site Supervision** An initial meeting will be held with the construction manager to ensure the understanding of the principles of tree protection and the actual tree protection measures to be carried out and installed on site for the project.
- 9.14 The physical tree protection measures are static, and consequently it is appropriate to use our "self-regulation" Arboricultural Site Management Report Form (Appendix G). This is a simple form which contains all the site details and contacts, and the site agent emails it to the local authority tree officer and to us at the end of each week, with photographs of the static tree protection measures remaining in place and undamaged. This ensures that the measures do remain in place and that regular assurance is provided to the tree officer, although the tree officer is still free to visit the site unannounced at any time.

Conclusions

- 10.1 All the live subject trees are to be retained.
- 10.2 As a consequence the arboreal landscape character of the property will be conserved in accordance with one of the fundamental design principles of retaining all the trees.
- 10.3 No pruning is anticipated in connection with the proposal.
- 10.4 The subject trees do not cause any significant conflicts in terms of construction activities, nor will any significant issues of post development pressure be likely to emerge that could not be managed with routine maintenance.
- 10.5 The subject trees will all be protected in accordance with current standards and guidance, particularly with logistical planning.
- 10.6 For trees to be sustainable within a development proposal they must be compatible with their surroundings, not just in terms of long-term spatial relationship but also in respect of minimising any potential conflicts to matters of routine maintenance. This proposal achieves this objective.

10.7 I have taken account of the information given to me and my own observations on site and I am satisfied that this scheme is arboriculturally sound and that the long-term well-being of the retained trees will be safeguarded in a sustainable manner.

Recommendations

11.1 The successful integration of the proposal with retained trees will need to take account of the following points:

- i) Implementation of the tree protection measures and methods set out in this Report.
- ii) Site logistics plan to include storage, plant parking/stationing, materials handling
- iii) Site supervision – Following an induction meeting conducted by the project arboriculturist with all those involved in attendance, an individual, e.g. the Site Agent, will be nominated to be responsible for all arboricultural matters on site. This person must:
 - a) be present on site for the majority of the time,
 - b) be aware of the arboricultural responsibilities,
 - c) have the authority to stop any work that is causing, or has the potential to cause harm to any tree,
 - d) be responsible for ensuring that all site operatives are aware of their responsibilities toward trees on site and the consequences of any failure to observe those responsibilities,
 - e) make immediate contact with the local authority and/or the project arboriculturist in the event of any tree related problems occurring, whether actual or potential.

11.2 As a matter of course these points will be resolved in consultation with and subject to the approval of the planning authority through their Arboricultural Officer.

11.3 The sequence of works should be as follows:

- i) installation of TPF and Ground Protection
- ii) main construction
- iii) removal of TPF and Ground Protection

KEY

Pre:	Prefix:	T = Tree	G = Group	H = Hedge		
No	Tree reference number.					
Ht	Tree Height in metres.					
SD	Stem diameter in centimetres at 1.5 metres above ground level and otherwise in accordance with Annex C of BS5837.					
	* Estimated. m Multi-stemmed (bracketed number is single-stem equivalent diameter).					
N-S-E-W	Branch spread in metres to the four compass points – \emptyset average crown diameter.					
CrB	Height in metres of crown clearance above adjacent ground level.					
AC	Age Class	Y – Young.	E – Early mature.	M – Mature.	O – Over-mature.	V – Veteran.
PC	Physiological Condition	G – Good	F – Fair	P – Poor	D – Dead	ADD - Ash Dieback Disease
SC	Structural Condition	G – Good	F – Fair	P – Poor	D – Dead	
BS	Category grading					
	U – Existing condition is such that any existing value would be lost within 10 years and should therefore be removed for reasons of sound arboricultural management.					
	A – High quality and value (40+ yrs).					
		1) Mainly arboricultural values	2) Mainly landscape values	3) Mainly cultural values incl. conservation.		
	B - Moderate quality and value (20+ years).					
		1) Mainly arboricultural values	2) Mainly landscape values	3) Mainly cultural values incl. conservation.		
	C – Low quality and value (10+ years).					
	Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a SD of less than 15cm should be considered for relocation.					
Rad	Root Protection Radius in metres.					
RPA	Root Protection Area in square metres.					

No	Species	Ht	SD	N E S W	CrB	AC	PC	SC	BS	RPA	Rad	Observations
T1	Sycamore	17	90*	12.5Ø	6.0	M	G	G	A	380	11.0	Off site
T2	Walnut	7.5	22	8Ø	2.0	E	G	G	C	28	3.0	
T3	Euonymus	2.8	multi	2Ø	1.0	E	G	G	C	4	1.25	Shrub pruned to a domed shape
T4	Silver birch	16.5	44	12Ø	2.0	M	G	G	B	95	5.5	Stem swept to east, small torsion crack on south side, adaptive growth on north side
T5	Holly	12	36	8Ø	1.5	M	G	G	C	64	4.5	Lean to east, 0.7m from wall, forked x 4 at 4m
T6	DEAD	9.5	28	7Ø	2.0	M	D	DP	U	-	-	Lean to east, base 0.3m from wall
T7	Yew	16	73	17Ø	4.5	M	G	G	B	225	9.0	Previous reduction to 2.2m, 1.8m from wall
-	8 x Olives	6	<10	4-5Ø ea	1.8	E	G	G	B	-	-	Two lines of 4 trees - not in construction area, previously pruned



Walnut T2



Silver birch T4



Holly T5

DEAD T6

Yew T7



Scaling accuracy is sufficient for planning purposes but this drawing should not be used for construction

This plan is drawn in colour so monochrome reproduction may be unreliable

BS 5837:2012 Tree Categories

- U Tree that should be removed
- A Tree that is highly desirable for retention
- B Tree that is desirable for retention
- C Tree of no particular merit, could be retained



Appendix B

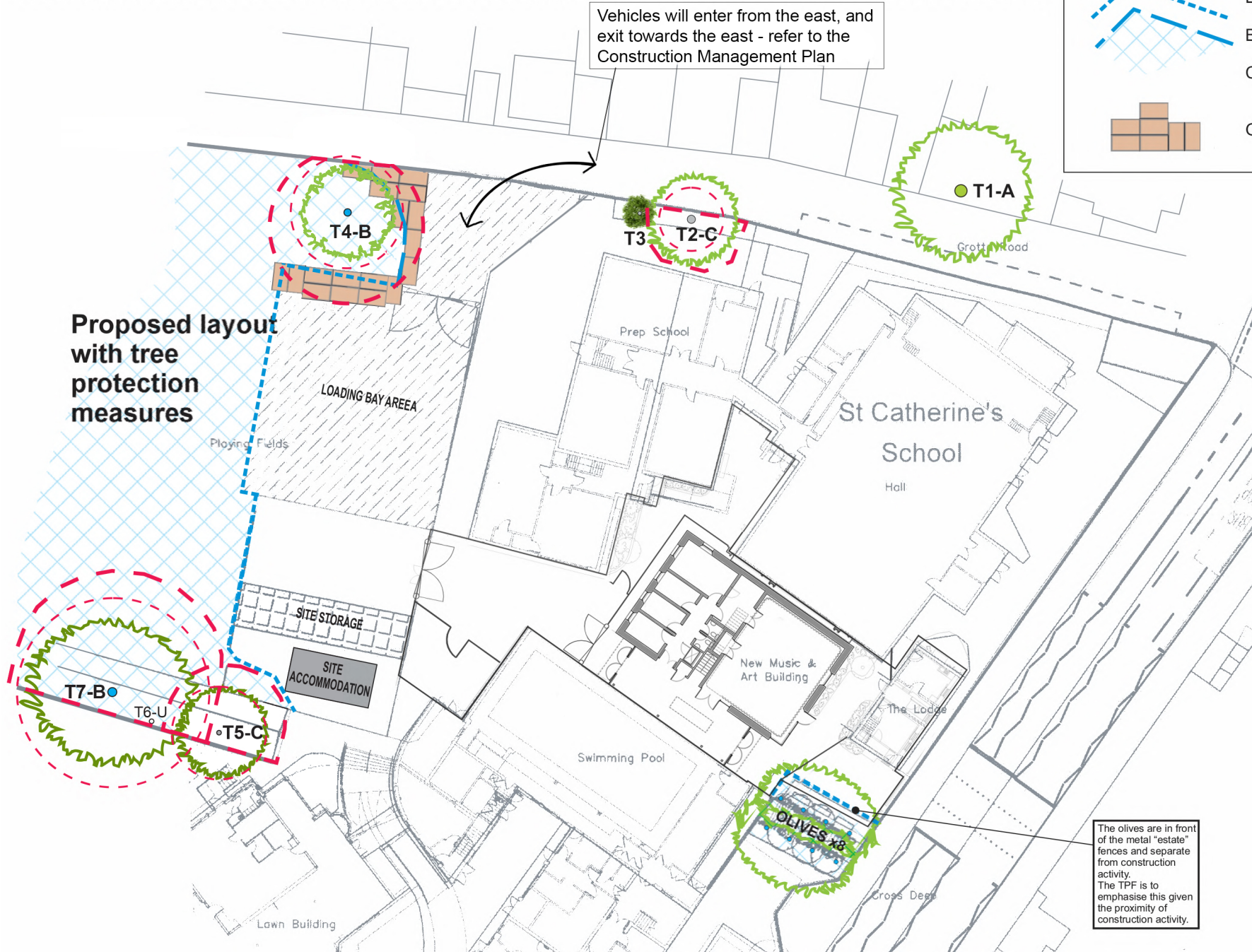
Existing layout with subject trees



●	Retained Tree
●	Removed Tree
	Root Protection Area Indicative Circular Adjusted Actual
	Tree Protection Fence BS5837 spec Appendix E
	BS5837 spec Appendix D Construction Exclusion Zone
	Ground Protection Appendix F

Vehicles will enter from the east, and exit towards the east - refer to the Construction Management Plan

Proposed layout with tree protection measures



The olives are in front of the metal "estate" fences and separate from construction activity. The TPF is to emphasise this given the proximity of construction activity.

BS5837:2012 (Paragraph 4.6.1)
Root Protection Area radii in ½ metre graduations



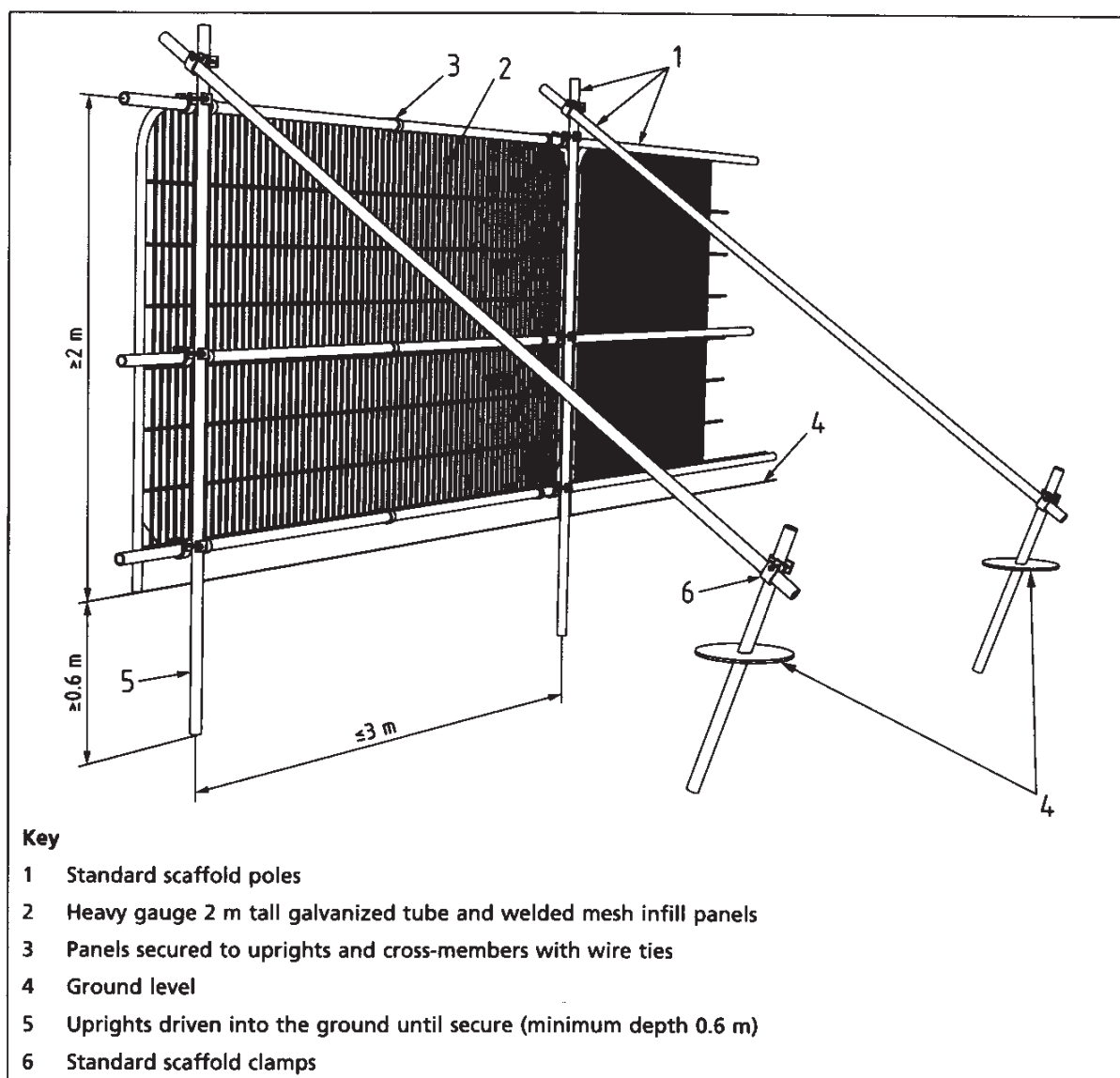
The ½ metre graduations of RPA radii have been calculated back to produce diameter dimensions, which in turn have been rounded down to the nearest centimetre. If the BS5837 multiplier factor is plotted on a graph it produces a straight gradient and if the ½ metre steps are plotted they are all above that line, thus ensuring that the RPA radii err on the generous side.

<i>Single Stem up to diameter (mm)</i>	<i>RPA Radius (m)</i>	<i>RPA (m²)</i>
1250	15.0	707
1210	14.5	660
1170	14.0	616
1120	13.5	573
1080	13.0	531
1040	12.5	491
1000	12.0	452
960	11.5	416
920	11.0	380
870	10.5	346
830	10.0	314
790	9.5	284
750	9.0	255
710	8.5	227
670	8.0	201
620	7.5	177
580	7.0	154
540	6.5	133
500	6.0	113
460	5.5	95
420	5.0	79
370	4.5	64
330	4.0	50
290	3.5	38
250	3.0	28
210	2.5	20
160	2.0	13

Extract from British Standard 5837: 2012
Trees in relation to design, demolition and construction
- Recommendations

Figure 2. Default specification for Tree Protection Barrier

Indicated framework support as the usual method of support for steel mesh panels ('Heras'). Some variation can be employed if appropriate, such as support by wooden posts (75mm x 75mm x 2.75m) dug or concreted into the ground (dry mix concrete contained within a plastic bag), or if there is no pressure of access a lighter form of netting on driven stakes.



**Extract from British Standard 5837: 2012
Trees in relation to design, demolition and construction
- Recommendations**

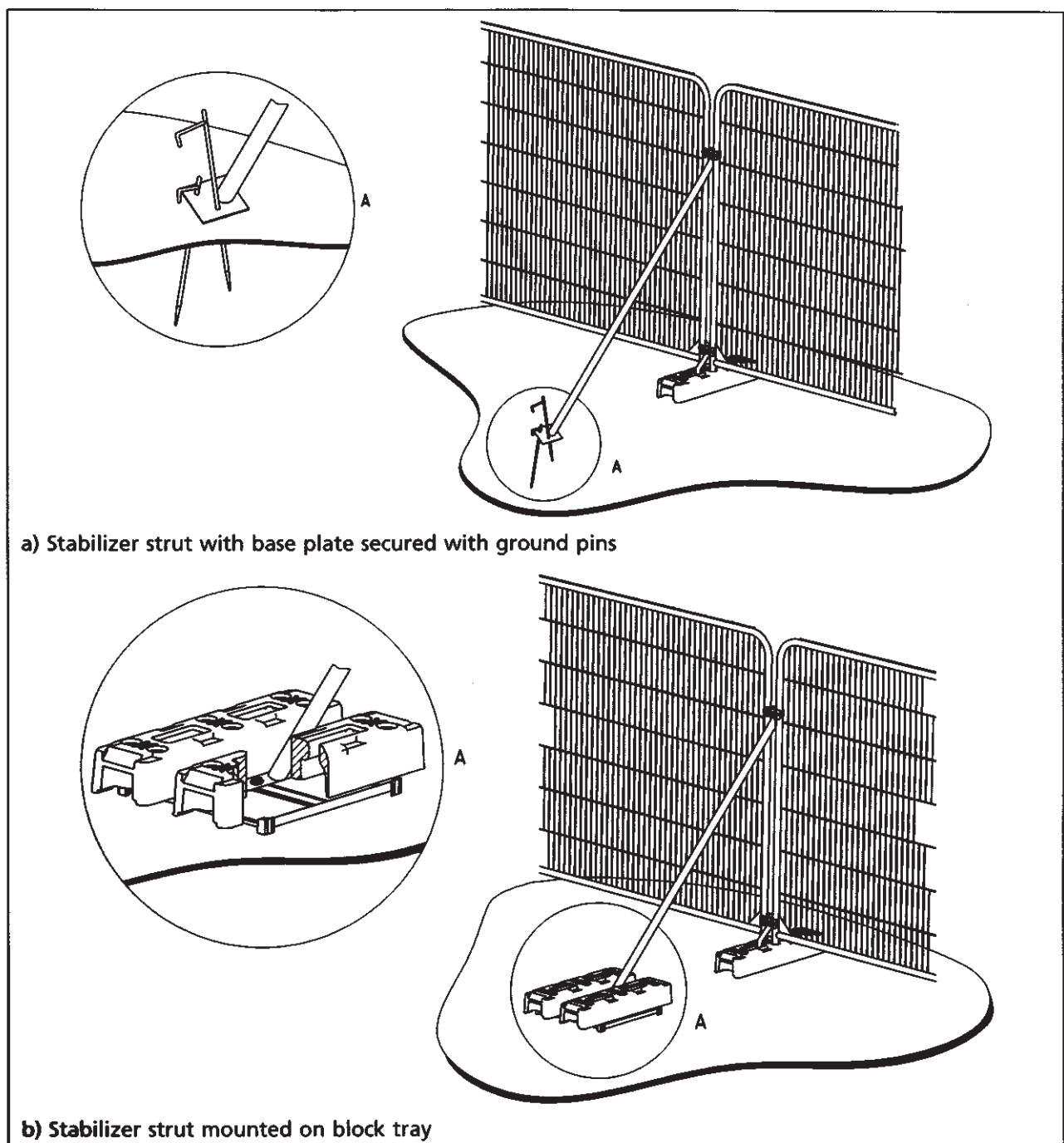
Figure 3. **Lighter support specification for Tree Protection Barrier**
This can be used where the fence is not under site work pressure but the RPA needs protection from other access.

BRITISH STANDARD

BS 5837:2012

Tree Protection Fencing

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

Temporary Ground Protection Mats

These can be doubled (or even trebled up) for very heavy vehicles

2.4m x 1.2m



Steel



GRP Composite





Arboricultural Site Management Report Form QW - smrf

Quaife Woodlands

2 Squerries Farm Cottages, Westerham, Kent, TN16 1SL
 Telephone: 01959 563878 Facsimile: 01959 564854
 E-mail: jq@quaife-woodlands.co.uk

Appendix G

Date of Form		Form Number	1
---------------------	--	--------------------	---

Site:	QW Ref:	AR/
	LPA Ref:	

Please record any changes to personnel

Local Planning Authority			
Arboricultural Officer	phone		e-mail

Date/Time	Tree Protection Measure	Status/Action	Completed?

Tree Protection Alterations
none

EXAMPLE

Site Agent		signature	
phone		e-mail	

Attached photographs / plans / diagrams / notes
YES