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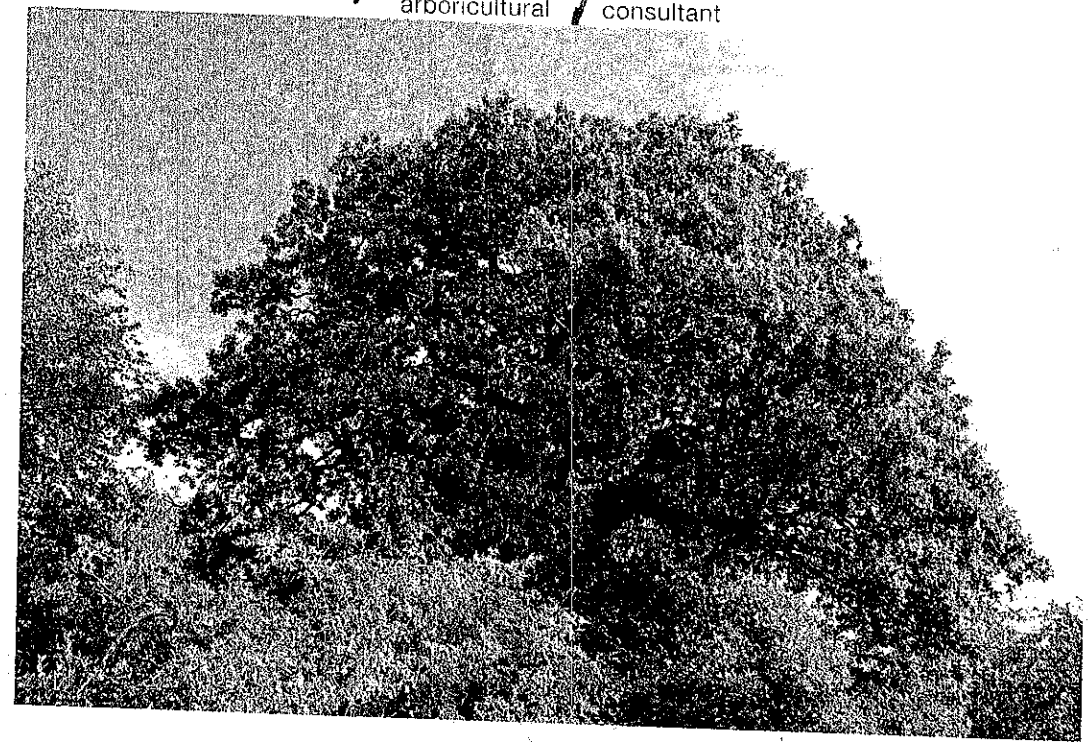

ARBORICULTURAL METHOD STATEMENT & TREE PROTECTION PLAN REPORT

for

27 Bacon Lane, Hayling Island

*- prepared on behalf of **Mr P Fox**-*

Bernie Harverson M.Arb.

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TREE WORK SPECIFICATION

Client : Perri Fox – Fox Estates

Site Location : 27 Bacon Lane, Hayling Island

The abbreviations used in the header block below are fully explained within the attached Tree Survey Notes. The assessment of remaining contribution in years and the category are made as viewed and may be subject to variation where the management strategy suggests further investigations/actions followed by re-surveying. Group details/dimensions are recorded as an average.

Attention is drawn to the fact that some mature trees could provide suitable habitat for bird nesting (ivy and cavities) and bat roosting (ivy, branch cracks and cavities) and this might at certain times of year influence and possibly restrict the form of management which can be applied. Given the legal constraints imposed by the Habitat Regulations and the Wildlife and Countryside Act this may necessitate expert ecological advice being sought before proceeding with the recommendations.

No	Species	Tree Works Recommended
1	Pedunculate Oak *Quercus robur*	• Remove major deadwood and at the same time have the crown investigated and any large open wounds checked for safety reasons – habitat value to be duly considered provided that it does not compromise safety. • IF further works are necessary then they will have to be negotiated with the LPA as this tree is TPO'd.
2	Pedunculate Oak *Quercus robur*	• Remove major deadwood and at the same time have the crown investigated and any large open wounds checked for safety reasons – habitat value to be duly considered provided that it does not compromise safety. • IF further works are necessary then they will have to be negotiated with the LPA as this tree is TPO'd.
3	Pedunculate Oak *Quercus robur*	• Remove major deadwood and at the same time have the crown investigated and any large open wounds checked for safety reasons – habitat value to be duly considered provided that it does not compromise safety. • IF further works are necessary then they will have to be negotiated with the LPA as this tree is TPO'd.
Grp 1	Hawthorns (linear belt)	• Trim back the branch overhang of the site to living growth points close to the boundary fence line.

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SITE SPECIFIC
ARBORICULTURAL METHOD STATEMENT

Client	**Mr P Fox of Fox Estates**
Site Location	**27 Bacon Lane, Hayling Island**
Project Arboricultural Consultant:	Bernie Harverson *M.Arb.,*
Date MS Prepared	June 2009

Section	Title
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2	CLIENTS BRIEF
3	DOCUMENT DISCLOSURE
4	ASSESSMENT OF TREE CONSTRAINTS
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7	AVOIDING DAMAGE TO THE TRUNKS AND BRANCHWORK
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BH1	Tree Survey Schedule (in accordance with – Table 1 of BS5837) - with Flow Diagram & Tree Survey Notes
BH2	Root Protection Schedule
BH3	Tree Survey/Constraints Plan – **BH.01/02**
BH4	Pre-Development Facilitation Tree Works Schedule
BH5	Tree Protection Plans–**BH.03** + Figure 2 & Figure 3 Diagrams from BS5837 + Warning Posters + Ground Protection Materials
BH6	BS5837 Extracts – including Table 3 and Sections 13 &14 & 15 & NJUG10 Extracts
BH7	Qualifications & Experience

1.0 INTRODUCTION

1.1 This project involves the demolition of the existing building and construction of two new detached residential dwellings on the same plot; with associated integral garages and hard standing on the frontages.

1.2 As part of this exercise the primary trees on and adjacent to the development works have been surveyed (**see at appendix BH1**) and will be referred to in this Method Statement.

1.3 I have been advised that there is a legal constraint in the form of a **Tree Preservation Order** relating to this site which protects all of the mature Oaks trees, both on and off site.

1.4 In advising my client I am duty bound to comply with 'Best Practice' industry guidelines and to follow the recommendations contained in BS5837:2005 – Tree In Relation To Construction Recommendations – adopting the sequential approach illustrated in the Figure 1 Diagram summarizing planning for trees on development sites (**see at appendix BH1**).

2.0 CLIENTS BRIEF

2.1 I am instructed in this instance by the site owners – **Fox Estates.**

2.2 I have been commissioned to prepare a Method Statement and Tree Protection Plan Report.

2.3 Providing details of phasing and any need for ground protection measures as appropriate.

3.0 DOCUMENT DISCLOSURE

3.1 The finalised layout has been made available to me in hard copy format :– **Martin Ralph Chartered Surveyors – Site Plan and Elevations – Drawing No. 08/163/JR/03 - Rev.B1 – 24/06/08 – 1:100 & 1:500.**

3.2 I rely totally on the accuracy of this drawing and have used it as the base to prepare my **Tree Protection Plans BH.03** (see at appendix BH5).

4.0 ASSESSMENT OF TREE CONSTRAINTS

4.1 Tree Losses, Retentions and Protection Measures

4.2 As part of this assessment, dimensions have been scaled from the development layout drawings provided to me and upon which I rely.

4.3 The data is presented here in tabular format:- **Key**: RSAM = Remove for sound arboricultural management reasons RTFD = To be removed to facilitate development UF of. = Under footprint of development

Tree No	Species	Cat	S or M	Stem Diam mm	BS5837:2005 Min.Radial Prot.Zone m	BS5837:2005 Min.Root Prot.Area m^2	Distance from Site Features (see key above)	Can Tree Be Retained
1	Pedunculate Oak *Quercus robur*	B1	S	1050	12.6	498.8	4.5m to new access drive 13m to new building 12.5m to new porch	**YES (1)**
2	Pedunculate Oak *Quercus robur*	C1	S	800	9.6	289.6	4.5m to existing drive 8m to new hard standing 12.8m to new building	**YES (2)**
3	Pedunculate Oak *Quercus robur*	C1	S	600	7.2	162.9	6m to existing drive 8.5m to new hard standing 13.3m to new building	**YES**
Grp 1	Hawthorns (linear belt)	C2	M	Est 200	2.0	12.6	1.5m to gravel path 3.2m to new building	**YES (3)**
4	Pedunculate Oak *Quercus robur*	B1	S	Est 600	7.2	162.9	7.5m to new patio 8.5m to new conservatory 11.7m to new building	**YES**
5	Camellia *Camellia japonica*	B1	M	200	2.0	12.6	4.7m to new patio 5.5m to new conservatory 8.7m to new building	**YES**
6	Pedunculate Oak *Quercus robur*	B1 / C1	S	Est 500	6.0	113.1	6m to new patio 7.5m to new building 8.2m to new patio	**YES**

Tree No	Species	Cat	S or M	Stem Diam mm	BS5837:2005 Min.Radial Prot. Zone m	BS5837:2005 Min.Root Prot. Area m^2	Distance from Site Features (see key above)	Can Tree Be Retained
7	Sycamore *Acer pseudoplatanus*	C1	S	200	2.4	18.1	3m to new path 3.8m to new building	YES

4.4 **YES**

T3 Oak; **T4** Oak; **T5** Camellia; **T6** Oak & **T7** Sycamore – These trees can all be retained and afforded full protection in accordance with the BS5837 recommendations.

T3 Oak – Restricted in its rooting pattern by the Oak T2 and in any event the crown has been heavily reduced in the past and the response to this has been slow with a minimal live crown area. The root protection zone shown on plan BH.03 will therefore in my opinion be sufficient to protect this tree from development damage.

T4 Oak - This mature off site tree has been heavily topped out in the past and made a very good recovery from this with a full crown of regrowth. I suspect that this is about the optimum size for gardens of this size particularly given that this tree is due south of the neighbouring owners house and at some point I can see that they will want to once again restrict and constrain the growth habit of this tree. Nevertheless, it is of high amenity value and its root protection zone does overlap the garden at No27 so we do need to allow for this. The protective fencing line shown on plan BH.03 is in my opinion sufficient to protect this tree from development damage.

T5 Camellia – A mature tree that has been distorted by group pressures in the past but is now fully exposed as an individual specimen and I have recommended its retention to give some starting maturity to the new plot in terms of its landscaping. The crown is very one sided and will need to be pruned after flowering to give a more compact form for future growth and development. It can be fenced off as shown on plan BH.03 which will in my opinion be sufficient to protect this tree from development damage.

T6 Oak – Given the trees position atop a bank by a ditch I suspect that it falls within the ownership of No27. Regardless of this its root protection zoe overlaps the fence line into the rear garden and will need to be catered for. Equally the crown has a degree of overlap but I have advised the architects to move the conservatory to the east further away from the crown to allow for current proportions and future growth potential. The protective fencing line shown on plan BH.03 is in my opinion sufficient to protect this tree both above and below ground from development damage.

T7 Sycamore – A young sapling self sown tree of limited amenity value but nevertheless it is there and it is the intention to retain it so we must make allowance for its root protection. The protective fencing line shown on plan BH.03 is in my opinion sufficient to protect this tree both above and below ground from development damage.

4.5 **YES (1)**

T1 Oak – Whilst this is a mature tree which would normally require a larger protection zone to the west side there has until fairly recently been a complete line of mature Oak trees across the site frontage. Several of these trees have been removed and they will have had the effect of suppressing rooting to the west side under competition. It is therefore my assessment that 4m protection zone to the west side will therefore be sufficient in this specific instance. Added to which the new drive will be hand excavated and constructed of porous materials which will benefit the tree as some of the root area to the south has previously been under hard surfacing. The turning head will be constructed on 'No Dig' principals with porous materials laid over existing ground levels. What is proposed is wooden pegged board edging restraints with a porous geotextile membrane laid over the ground and then washed gravel used as the infill wearing course. Ground protection measures will be needed across the entire site frontage to initially cover the ground surface to allow scaffolding to be erected and also the storage of materials to facilitate construction and provide access to raise material to first floor and roof levels with the aid of a fork lift or similar small vehicles.

4.6 **YES (2)**

T2 Oak – A similar situation applies to this tree except that there is an existing access between the tree and those trees that were removed across the frontage. The upgrading works for the drive will take place within the specified root protection area and will therefore have to be primarily of 'NO Dig' principals except for the apron at the road edge which will have to be of tarmac or brick setts in order to prevent migration of the porous gravel infill out onto the road. Hand digging throughout will need to be enforced for works within the root protection area. The removal of existing hard surfacing to the south side and replacement with a porous wearing course and sub-base layer will be of long term benefit to the tree particularly given that the previous building was 5m closer to the tree than the proposed building for this plot. Setting out the protective fencing as shown on pan BH.03 will provide adequate above and below ground protection during the construction process. Ground protection measures will be needed across the entire site frontage to initially cover the ground surface to allow scaffolding to be erected and also the storage of materials to facilitate construction and provide access to raise material to first floor and roof levels with the aid of a fork lift or similar small vehicles.

Grp 1 Hawthorns – An off site linear grouping of very poor quality plants of limited life expectancy but nevertheless care must be exercised during the build process to avoid unnecessary damage to the root systems that might advance their decline. The turning head is outside of the specified protection zone but to protect the Oak T1 it will be on 'No Dig' principles which replaces the existing hard surfacing and garage block and can only be regarded as of benefit to the group of Hawthorns. The access path to the side can be of board edging and gravel formation. In this way the Hawthorns can be respected even though they are in poor condition and have a limited lifespan.

5.0 PHASING OF OPERATIONS

Phase 1 - Pre-Demolition/Construction Tree Works

- Undertake all approved pre-development tree work – see appendix BH4.
- The tree surgery specialist contractors are to be given clear guidelines and a remit that prohibits heavy plant (Lorries, Cranes and Work Platforms) tracking through the site within tree protection zones.

Phase 2 – Pre-Demolition/Protective Fencing Works

- Erect the protective fencing - the protective fencing barriers are to be located exactly as specified on the Tree Protection Plan BH03 – see at appendix BH5. Which is in full accordance with the recommendations contained within British Standard 5837:2005- Figure 2. A copy of the Tree Protection Plan is to be pinned up in the temporary offices/mess hut on site for all site staff to see. The area within the construction exclusion zone is to be regarded as **sacrosanct** and the fencing shall not be taken down or relocated at any time without the prior written approval of the monitoring arboriculturist or local authority tree officer, unless this has already been agreed as part of the planning application consent process and is detailed in writing and shown on a plan. The fencing shall comprise of interlocked Weldmesh (Heras) panels (or agreed alternative which meets the BS5837 standards), well braced to resist impacts and securely attached to a scaffolding framework by means of wires or scaffold clamps. It shall have top and bottom horizontal bars, with uprights set into the ground at no greater interval than 3m spacings. Angled bars shall be located behind the fencing to act as braces, these will be firmly clamped to the top rail and set into the ground braced as necessary; these shall be spaced at no less an interval than one brace per two panels.
- The following prohibitions shall apply within the area enclosed by the Tree Protection Fencing :-
    - **No** mechanical digging or scraping once the initial ground cover vegetation has been cleared and the site fenced off.
    - **No** storage of plant, equipment or materials

- **No** vehicular or plant access
- **No** fire lighting
- **No** handling, discharge or spillage of any chemical substance, including cement washings
- **No** action likely to cause localised water-logging
- **No** change in ground levels
- **No** construction of a hard surface

- Whilst the heading of this Phase refers to the Demolition works the fencing that is erected will remain in place throughout the Construction Phase as well.
- Lay Ground Protection across the entire site frontage that is outside of the protective fencing zone – this will need to be sufficiently robust to allow for the delivery and storage of materials as well as the use of forklifts to raise the materials to the first floor and roof levels as work progresses on site. For this reason it is suggested that a non – porous (to prevent the infiltration of toxic materials) membrane is laid over the ground (minimal levelling to take place only) then over this lay a cellular containment system and fill the voids with aggregate. In this way the ground is protected and the vehicle loadings are spread to avoid compaction.

Phase 3 – Demolition Works

- Machine operators are to adhere strictly to the guidelines at Section 7.0 of this report.
- On no account will protective fencing be moved to facilitate access for demolition purposes.
- Materials and debris will need to be removed as soon as possible from site as the works progress given the lack of space for long term storage of same on site.
- The existing building walls are to be **pulled in on the building footprint** and not allowed to spread beyond this to areas of open ground where there is currently no hard surfacing.

Phase 4 – Construction Works

- The main building and car parking works will take place outside of the retained trees root protection zones so they are adequately respected and protected.

- On completion of building works the temporary ground protection across the site frontage may be carefully lifted and removed from site to facilitate the construction of the new access drives and turning heads.

Phase 5 - Post Construction Landscaping Works

- General landscaping works are to be organised in accordance with the BS5837 extracts included at appendix BH6.
- On completion of all building works and immediately prior to landscaping works being undertaken and with the agreement of the LPA Tree Officer the Protective Fencing may be removed and the area within opened up for soft landscaping and final surface treatments.
- This is to be hand excavation works only with no machinery being used unless specific ground protection has been laid. Even then only lightweight mini excavators are to be permitted access.
- It is acknowledged that by the nature of the works some surface excavation is needed to prepare for tree and shrub planting or laying of lawns. This work shall be undertaken with hand forks and any exposed roots are to be cleanly severed to encourage new growth and an adequate soil medium laid around them to encourage same.

6.0 UTILITY SERVICE CONNECTIONS

6.1 At the time of writing this Method Statement the exact route of underground service connections is not confirmed but the owner has expressed a wish to link in with existing manholes and service runs and not create new ones within tree protection zones.

6.2 Unless otherwise specifically referred to by a separate conditioned Method Statement it is essential that all such service trenches are excavated outside of the Tree Protection Zones.

6.2 In the interim details of NJUG 10 Guidelines are included (at appendix BH6) as a basis for further discussion in the unlikely event that it should prove necessary to run service routes through tree protection zones.

7.0 AVOIDING DAMAGE TO TREE TRUNKS AND BRANCHWORK

7.1 Care shall be taken when planning site operations to ensure that wide or tall loads or plant with booms, jibs and counterweights and static and mobile cranes can operate without coming into contact with the retained trees. Such contact could result in serious injury which might make a trees safe retention impossible.

7.2 **ALL** machine operators are required to undergo an induction session prior to being allowed to work on site, where the Method Statement will be explained to them and a copy provided for their reference. In addition a copy of the Tree Protection Plan will be provided or pinned up in the site hut and the trees which are to be retained and protected will be pointed out to the operator and they will also be shown which trees these are on site before they start work. In this way it is hoped that unnecessary damage, by root disturbance and collision of machinery booms and operating arms with tree crowns can be avoided.

8.0 REPORTING DAMAGE TO TREES AND PROTECTIVE FENCING

8.1 Should any damage occur to trees noted for retention either by the above works or as the result of any other action, the damage must be reported to the site manager immediately. The site manager shall report up the chain of responsibility and also to the retained consultant arboriculturist or in the absence of such an appointment to an appropriately qualified arboriculturalist, to enable remedial measures to be specified and implemented as appropriate.

8.2 Should protective fencing become damaged so as to impair its function in protecting trees, all work shall cease in the vicinity of the damage until the fence has been returned to standard.

9.0 SITE MONITORING AND SUPERVISION

9.1 It is recommended in BS5837:2005 that an arboriculturist is retained to advise on all aspects of site monitoring and supervision and it is the local authority's responsibility to make this a condition of planning approval requiring agreement of a set schedule of operations and timings prior to undertaking works on site.

10.0 SOFT LANDSCAPING WORKS

10.1 Any soft landscape works within the protected areas shall be in accord with Table 3 and Sections 13 & 14 of BS5837:2005 (see copy extracts at appendix BH6).

10.2 It is strongly recommended that the plans and specifications for the landscaping of this development are drawn up by a qualified Landscape Architect.

11.0 CONTACT LIST

11.1 It is suggested that clear and concise points of contact and lines of communication are established prior to commencement of the works on site including:-

- Arboricultural Consultant ; Local Authority Tree Officer ; Local Authority Planning Officer; Site Manager and Foreman

11.2 It is advised that the Site Manager establishes his own listing of contact details at the Pre-Start site meeting and pins this up in his office for general use as necessary.

12.0 CONCLUSIONS

- This project involves the demolition of the existing detached dwelling and then the construction of two new detached dwellings with associated access and parking arrangements.
- These operations can be carried out without the loss of any trees and all retained trees (TPO'd or not) can be fully respected and protected.
- Given the south facing nature of the rear gardens I would not recommend using trees in the landscaping but rather using large shrubs – akin to the Camellia which already exists. However, to the front of the units (north facing) there is perhaps scope to plant one tree whose species/size could be negotiated with the Tree Officer.
- Given these circumstances and strict adherence to the methodology prescribed within this report I would see the new proposals as acceptable and supportable in arboricultural terms.

Bernie Harverson
arboricultural consultant

BH 1

Tree Survey Schedule
(in accordance with Table 1 of BS5837)
+ Tree Survey Notes + Flow Diagram

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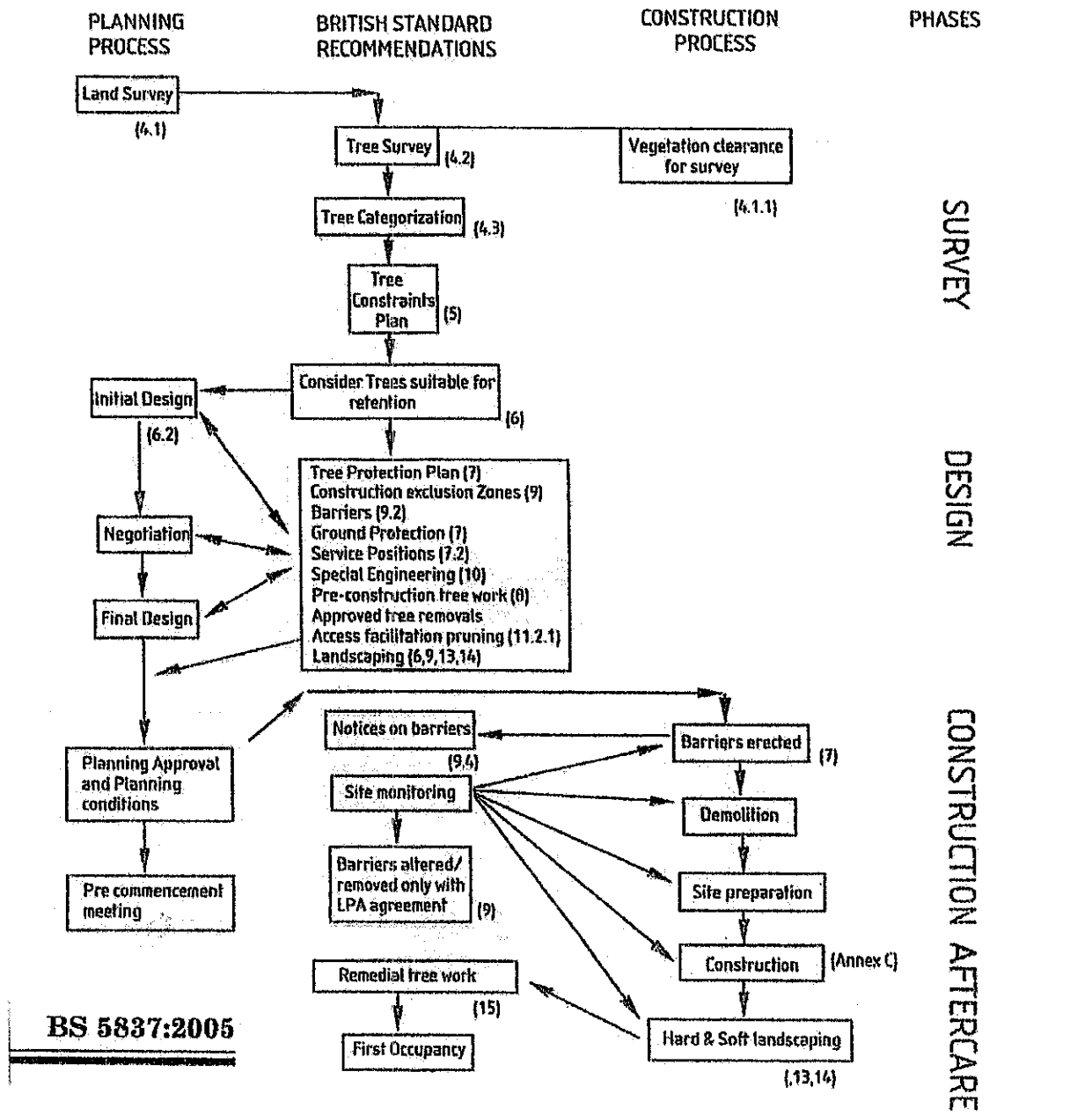

Figures in brackets refer to Clause numbers.

Figure 1 — Flow diagram, summarizing planning for trees on development sites

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TREE SURVEY NOTES

These Tree Survey Notes have been prepared in accordance with the recommendations of **British Standard 5837:2005** and define the criteria for pre – development tree surveys.

- Each tree/group has been allocated a unique number (**No.**). Where specifically commissioned small durable numbered metal tags can be applied to each tree/group surveyed.
- The tree species (**Species**) is provided in both English and Latin formats.
- Height assessments (**Ht**) are estimated in metres. This will be adequate for the majority of cases, but where accurate heights become a critical issue it may be necessary to return to site, as a separately commissioned exercise, to collect accurate measurements with the aid of optical instruments.
- Trunk/stem diameters (**Trunk Diam**)are measured in millimetres at 1.5m above ground level and denoted as **S** single stemmed trees or **M** for multi-stemmed trees which are measured immediately above the root flare.
- Radial crown spread assessments (**Brch Sprd**) are estimated in metres from the centre of the trunk/group to each of the four primary points of the compass (**N**-north; **E**-east; **S**-south and **W**-west) in order to achieve a representation of the crown shape which will be recorded on the accompanying tree survey plan. These provide a general guide as to the main bulk outline of a tree/groups crown but are not tape measured dimensions. These would only be undertaken as part of a separately commissioned exercise, where precise dimensions are critical to the project at hand.
- The average ground clearance (**Grd Cl**) is estimated and shown in metres.
- An assessment of a tree/groups age (**Age**) class is made in terms of its site specific maturity as part of the surrounding landscape, taking into account its overall shape and form in that setting, and is recorded thus :-

  Y - Young tree/group
  MA - Middle – aged tree/group
  M - Mature tree/group
  OM - Over – mature tree/group
  V - Veteran tree/group
- An assessment of a tree/groups overall physiological condition (**Fm**)is recorded as :-

  G - Good
  F - Fair
  P - Poor
  D - Dead
- Data on the structural condition (**Condition Comments**) of the tree/group is provided to give an indication of its visual appearance and any significant health and safety issues.
- Details of necessary tree works required at the time of survey is given under the heading – **Preliminary Management Recommendations**
- An estimate of a tree/groups future life expectancy (**Rem Cont**) is made and is recorded thus :-
  1-10; 10-20; 20-30; 30-40 or **>40** years.
- The category grading (**Cat**) for each tree/group is assessed according to the criteria provided within **BS5837:2005.** The assessment is made of the tree/group in its current condition and within the environment encountered bearing in mind its suitability for retention as part of any future proposed development; although the exact layout detail of any specific scheme will not be known at the time of surveying. The trees have been classified into one of four categories and colour coded as BS5837 recommends - R (dark red); A (light green); B (mid-blue) and C (grey).Please note that the numerical sub-categories which are also applied are for guidance only and do not carry any cumulative or increased value for the tree/group. This colour coding scheme will be applied to all drawings provided.

Table 1 – Cascade chart for tree quality assessment

Category and definition	Criteria			Colour on plan
TREES FOR REMOVAL				
Category R Those in such a condition that any existing value would be lost within 10 years and which should, in current context, be removed for reasons of sound arboricultural management.	• 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 **R** category trees (i.e. 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 (e.g. Dutch Elm Disease), or very low quality trees suppressing adjacent trees of better quality			Dark Red
TREES TO BE CONSIDERED FOR RETENTION				
	Criteria – Subcategories			
	1	**2**	**3**	
Category A – Those of high quality and value: in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested)	Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particularly visual importance (e.g. avenues or other arboricultural features assessed as groups)	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	Light Green
Category B – Those of moderate quality and value: in such a condition as to make a significant contribution (a minimum of 20 years is suggested)	Trees that might be included in the high category, but are downgraded because of impaired condition(e.g. presence of remediable defects including unsympathetic past management and minor storm damage)	Trees present in numbers, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating 3than they might as individuals but which are not, individually, essential components of formal or semi-formal arboricultural features (e.g. trees of moderate quality within an avenue that includes better, A category specimens), or trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality	Trees with clearly identifiable conservation or other cultural benefits	Mid Blue
Category C – Those of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested), or young trees with a stem diameter below 150mm	Trees not qualifying in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit	Trees with very limited conservation or other cultural benefits	Grey

Note: Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150mm should be considered for relocation

Bernie Harverson
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TREE SURVEY SCHEDULE

Client : **Perri Fox – Fox Estates**

Site Location : **27 Bacon Lane, Hayling Island**

Surveyor : Bernie Harverson *M.Arb.* **Date Surveyed :** 27th March 2009

No	Species	Ht m	S or M	Trunk Diam mm	Brch Sprd m	G Cl m	Age	F	Condition Comments	Preliminary Management Recommendations	Rem Cont yrs	Ca
1	Pedunculate Oak *Quercus robur*	18	S	1050	N8 E8 S8 W4	5	M	F	Major deadwood and stubs-suppressed to the west side and stunted form due to pruning works-cavities in old pruning wounds-previously crown lifted to 6m and wounds failing to occlude-previously heavily topped out-lightening strike scar from top to bottom of tree on west side-no depth to decay and callus tissue is growing in from either side	Remove major deadwood over road	>40	B1
2	Pedunculate Oak *Quercus robur*	15	S	800	N5 E6 S4 W1.5	6	M	P	Ivy on main trunk and smothering up into crown-crown shape dictated by group pressures-merged crown-low crown density-major deadwood and stubs and minor deadwood and dieback throughout-suppressed to the west side-previously heavily topped out and laterals reduced and reshaped and centre thinned out-cavities in old pruning points-ripped and torn wounds throughout- poor quality tree	Remove major deadwood and tidy stubs-plus check out the decay in the old pruning points	>40	C1
3	Pedunculate Oak *Quercus robur*	14	S	600	N4 E1 S8 W5	6	M	P	Ivy on main trunk and smothering up into crown-crown shape dictated by group pressures-merged crown-low crown density-major deadwood and stubs and minor deadwood and dieback throughout-suppressed to the east side-previously heavily topped out and laterals reduced and reshaped and centre thinned out-cavities in old pruning points-ripped and torn wounds throughout	Remove major deadwood and tidy stubs-plus check out the decay in the old pruning points	>40	C1

Grp 1	Hawthorns (linear belt)	6	M	Est 200	N0.5 E2 S0.5 W2	1.5	MA	P	Unable to access base of trees as they are off site-linear group with crown shapes dictated by group pressures-merged crowns-low crown density-minor deadwood throughout-cavities in old pruning wounds-previously topped as a hedgerow	No works required at the time of survey	30-40	C2
4	Pedunculate Oak *Quercus robur*	14	S	Est 600	N5 E5 S5 W5	5	M	F	Unable to access base of tree as it is off site-previously heavily topped out and laterals shortened back	No works required at the time of survey	>40	B1
5	Camellia *Camellia japonica*	3.5	M	200	N4 E1 S0 W1	0	M	F	Multi-stemmed at ground level- tight forks with included bark-crown weighted to the north	Reduce and reshape to redress the imbalance	20-30	B1
6	Pedunculate Oak *Quercus robur*	12	S	Est 500	N5 E5 S3 W7	4	M	F	Unable to access base of tree as it is off site-Ivy on main trunk-suppressed on south side-previously crown lifted to 6m-previously heavily topped out and thinned- evergreen shrubs crowd out lower crown	No works required at the time of survey	>40	B1 / C1
7	Sycamore *Acer pseudoplatanus*	10	S	200	N2 E3 S3 W4	2	Y	F	Basal suckering-squirrel browsing damage – branches engulfing lamp column	No works required at the time of survey	>40	C1

Bernie Harverson
arboricultural consultant

BJH.0331

BH 2

Tree Root Protection Area Schedule
(in accordance with Table 2 of BS5837)

Bernie Harverson
arboricultural consultant

ROOT PROTECTION ZONE/AREA SCHEDULE

BJH.0331

Client : Perri Fox – Fox Estates
Site Location : 27 Bacon Lane, Hayling Island

Tree No.	Tree Species	Grade	Single or Multi Stem	Diam. mm	BS5837:2005 Table2 Radial Protect. Zone m	BS5837:2005 Table2 Root Protect. Area m^2	Is An Offset Required To Cater For Existing Rooting Pattern Restrictions
1	Pedunculate Oak *Quercus robur*	B1	S	1050	12.6	498.8	**YES** – competition with other Oaks which have now been removed will have restricted the rooting potential to the west side
2	Pedunculate Oak *Quercus robur*	C1	S	800	9.6	289.6	**YES**- competes with its adjacent partner for rooting space which will constrain the rooting pattern
3	Pedunculate Oak *Quercus robur*	C1	S	600	7.2	162.9	**YES**- competes with its adjacent partner for rooting space which will constrain the rooting pattern
Grp 1	Hawthorns (linear belt)	C2	M	Est 200	2.0	12.6	NO- hard surfacing all around and competition from other trees all cancel each other out
4	Pedunculate Oak *Quercus robur*	B1	S	Est 600	7.2	162.9	NO – relatively free rooting
5	Camellia *Camellia japonica*	B1	M	200	2.0	12.6	NO – relatively free rooting
6	Pedunculate Oak *Quercus robur*	B1 / C1	S	Est 500	6.0	113.1	**YES**- constrained by ditch and road to west side
7	Sycamore *Acer pseudoplatanus*	C1	S	200	2.4	18.1	**YES**- constrained by ditch and road to west side

Bernie Harverson
arboricultural consultant

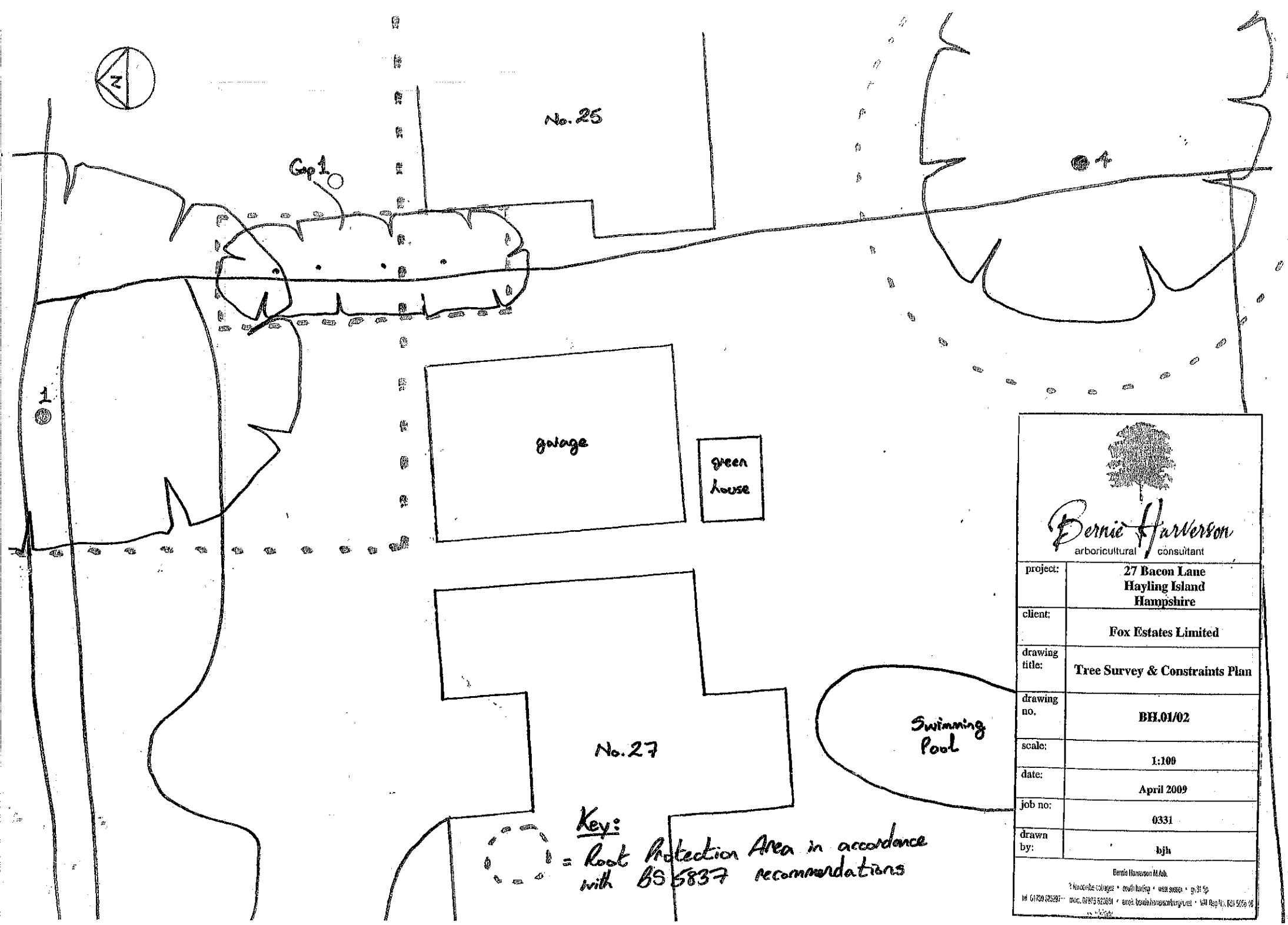
BH 3

Tree Survey& Constraints Plan -BH01/02

Bernie Harverson
arboricultural consultant

BH 4

Pre-Development Facilitation
Tree Works Schedule



Bernie Harverson
arboricultural consultant

project:	27 Bacon Lane Hayling Island Hampshire
client:	Fox Estates Limited
drawing title:	Tree Survey & Constraints Plan
drawing no.	BH.01/02
scale:	1:100
date:	April 2009
job no:	0331
drawn by:	bjh

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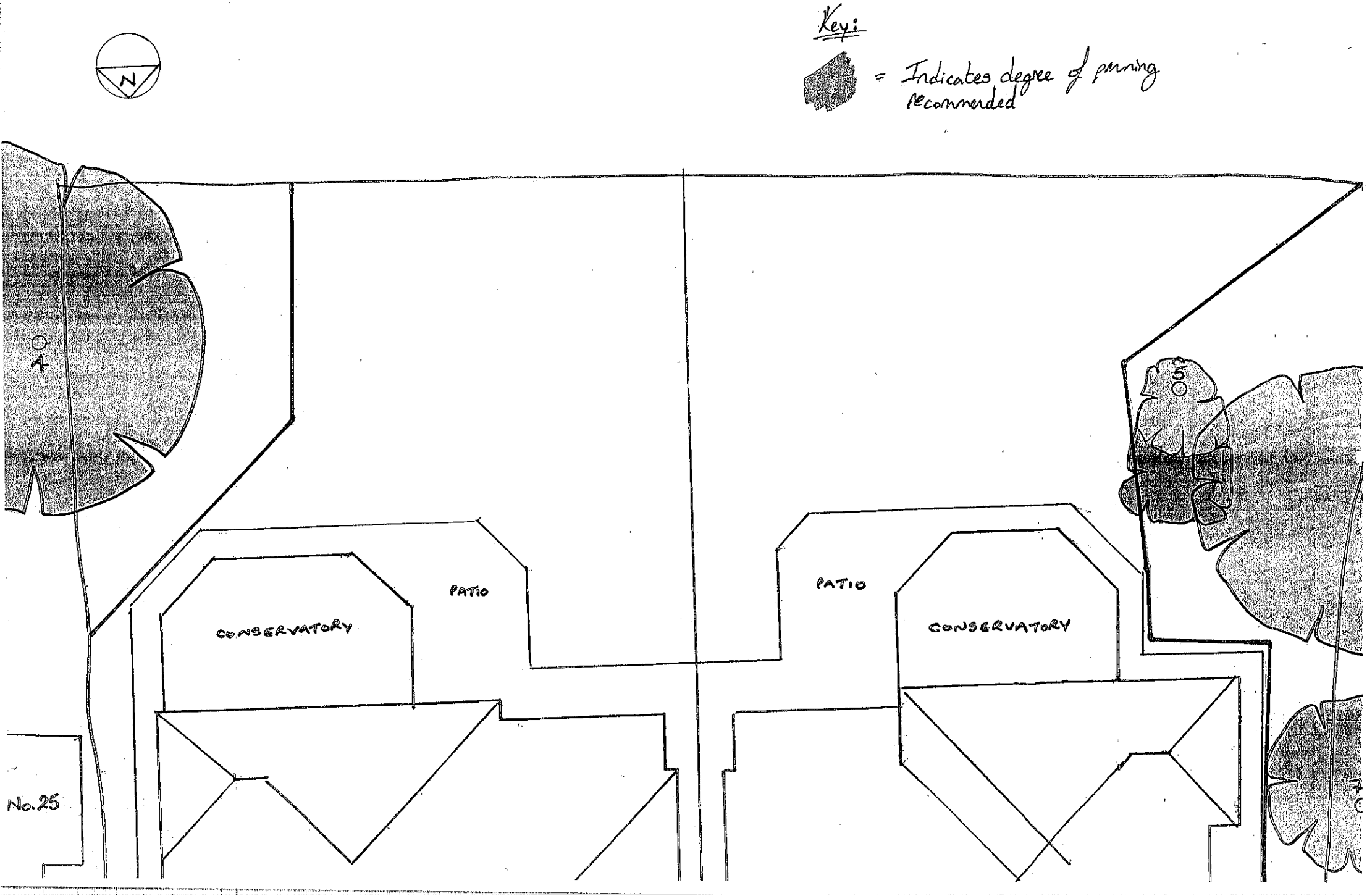
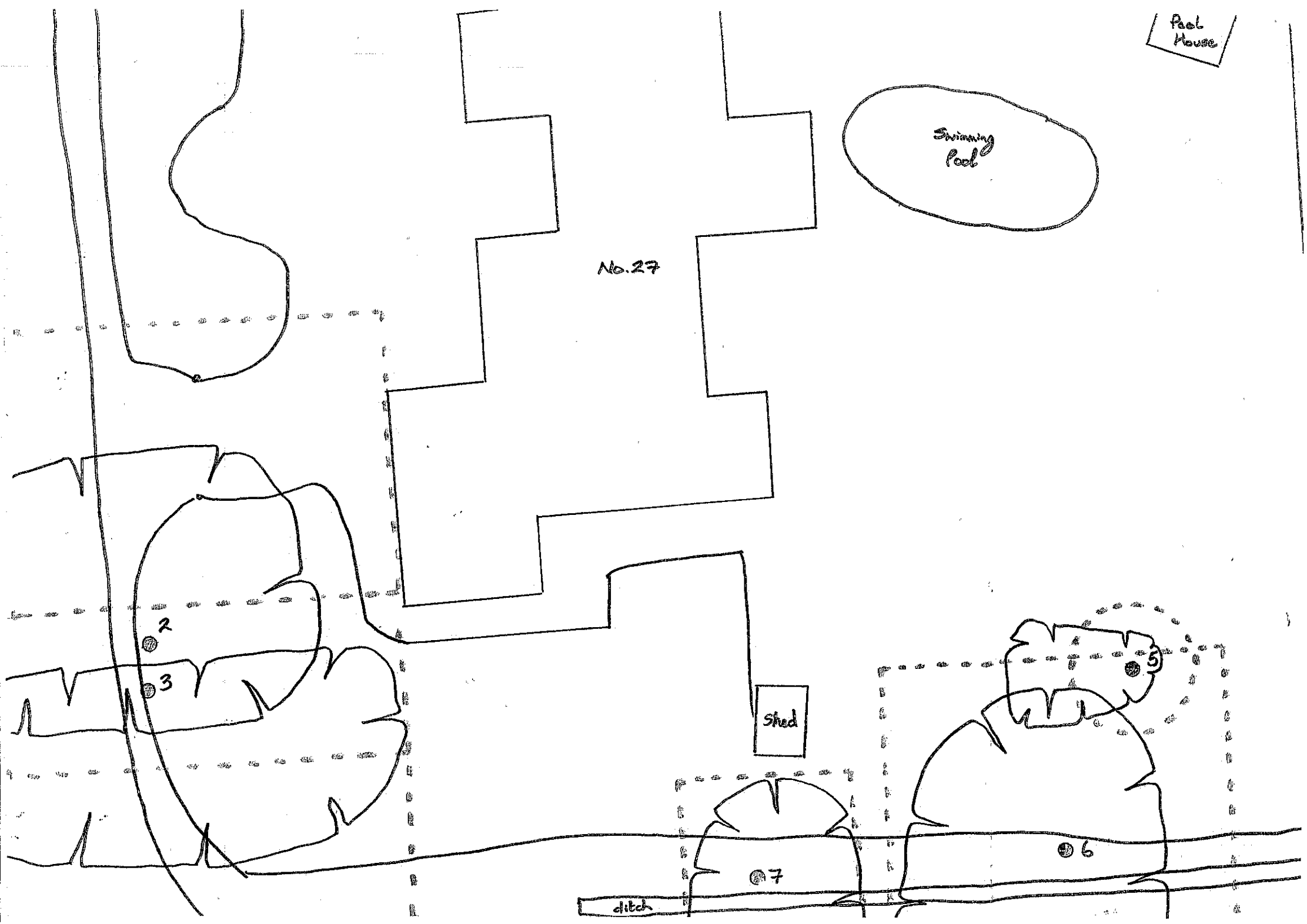
4	Pedunculate Oak *Quercus robur*	• NO works envisaged as this is an off -site tree
5	Camellia *Camellia japonica*	• Reduce and reshape the crown to the north side to give a more compact form for future growth • All works to be undertaken between the months of June to October to avoid damaging flowering potential.
6	Pedunculate Oak *Quercus robur*	• NO works envisaged at this time
7	Sycamore *Acer pseudoplatanus*	• NO works envisaged at this time


Key:
= Indicates degree of pruning recommended
N
No. 25
CONSERVATORY
PATIO
PATIO
CONSERVATORY

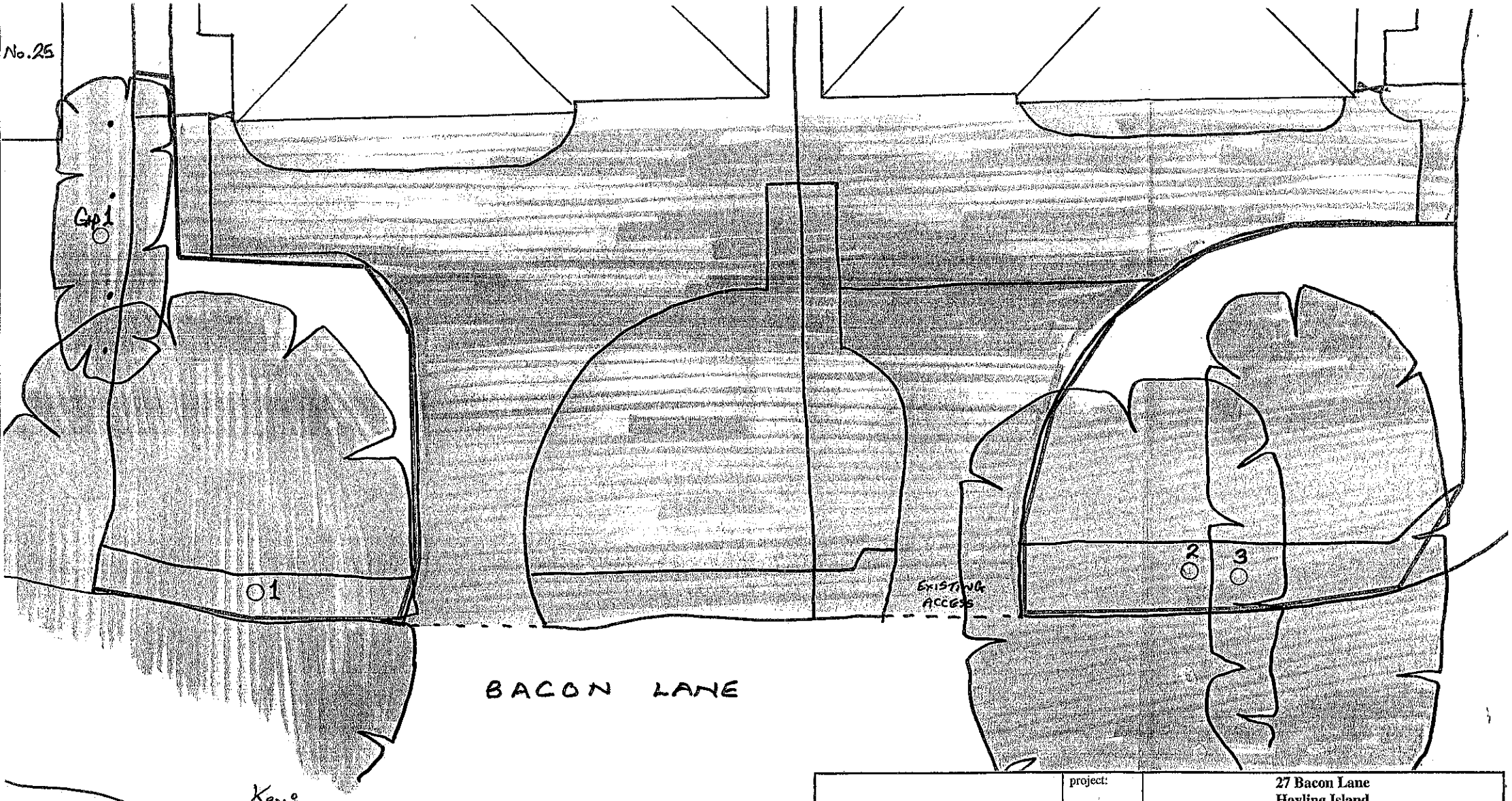

Pool House
Swimming Pool
No. 27
2
3
Shed
5
6
7
ditch

Bernie Harverson
arboricultural consultant

BH 5

Tree Protection Plan BH03

No.25



Key:

N

= Trees to be retained

= Setting out positions for the Protective Fencing

= Ground protection measures for the Demolition and majority of Construction Phases of work

Bernie Harverson arboricultural consultant

project:	27 Bacon Lane Hayling Island Hampshire			
client:	Fox Estates Limited			
drawing title:	Tree Protection Plan			
drawing no: BH 03	scale: 1:100	job no: 0331	date: June 2009	drawn by: bjh

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Bernie Harverson
arboricultural consultant

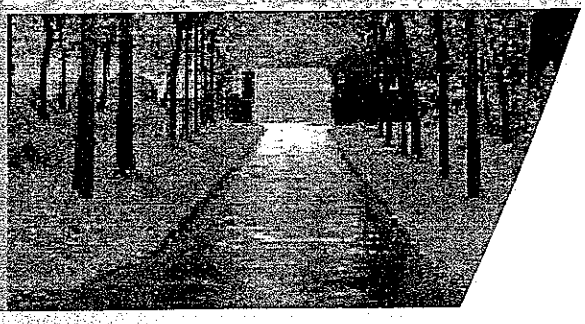
BH 6

BS 5837:2005 Extracts
Table 3 - Sections 13, 14 and 15
& NJUG 10 Extracts

CI/SfB

Common Arrangement R12

Uniclass
L81208/L81210



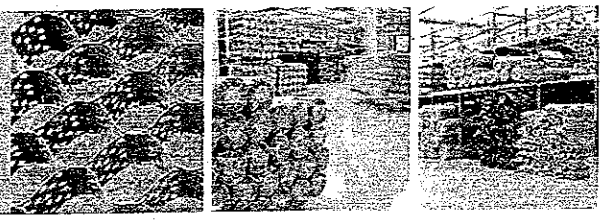
CellWeb

Tree Root Protection System

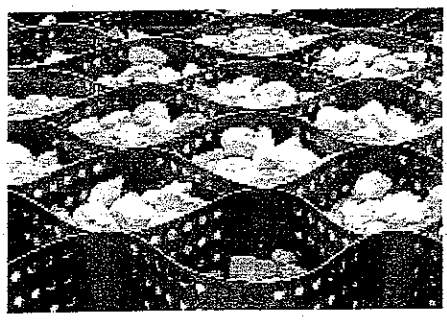
Geosynthetics

CellWeb

Tree Root Protection System



CellWeb Tree Root Protection System provides a flexible and permeable solution for protecting tree roots while creating a strong stable surface for traffic.



With increased urbanisation and more redevelopments of existing properties, the need to be mindful of the impact on the surrounding environment is more important than ever.

The demand for building site access, driveways and parking around existing trees can have a potentially fatal impact on the tree if carried out incorrectly. Tree preservation orders (TPO's) ensure that trees are not wilfully damaged. However the need for vehicle access over and around tree roots can still cause the following problems:

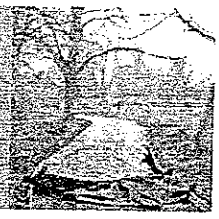


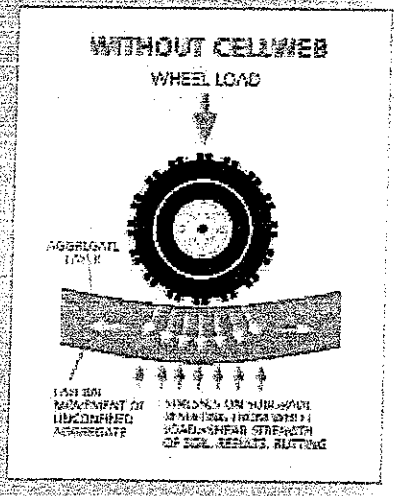
Problems:

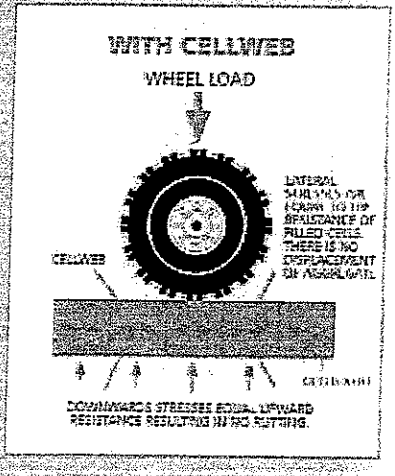
- Compaction of subsoils (especially by construction traffic) causing oxygen and nutrient depletion
- Creating an impermeable surface that prevents water reaching the roots
- Changes in ground level and water table
- Damage caused during excavation
- Contamination of the subsoil

By using CellWeb Tree Root Protection System you can avoid these problems and ensure the tree's long-term future. BS 5837:1991 (revised 2005) and APN 1 provide information for the protection of trees during the construction process, and CellWeb is a well-established solution that conforms to these guidelines.

Product features



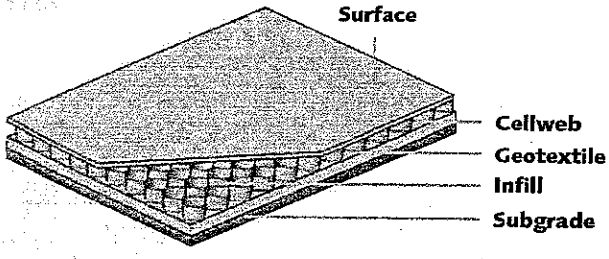




Cellweb's patented design with its unique cellular structure and perforated cell walls reduces the vertical load pressure on tree roots and prevents damage. With clean granular materials as infill, air and moisture can reach the roots to encourage healthy growth.

With no-dig solutions being the preferred option of most Arboricultural Consultants and Tree Officers, CellWeb is ideal as only the surface vegetation need be removed. As well as avoiding disruption to the roots this reduces installation time and saves money.

What's more CellWeb also cuts down the depth required for the sub base – in most cases by 50% for further cost savings. CellWeb also significantly reduces surface rutting, increasing the long-term performance of the finished surface.



Using CellWeb for tree root protection gives you these benefits:

- Reduced depth of excavation required
- Preventing the compaction of subsoils
- Preventing oxygen and nutrient depletion
- Environmentally sound
- Quick, easy and cost-effective installation
- Free technical support available

CellWeb gives you the cost-effectiveness you need at the same time as helping to preserve trees.

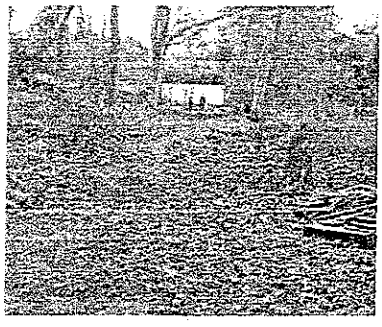
Geosynthetics Ltd is a leading di

Please call
01455 617 139
or email sales@geosyn.co.uk
for further information.

Wide product range

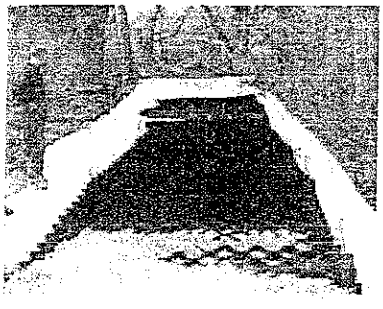
Large stock holding

Next day delivery

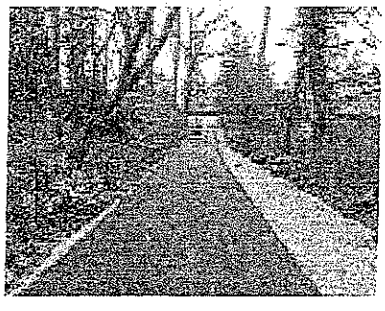


Access road for the National Lake District Parks Authority.

Site before construction pictured above.



CellWeb during installation.



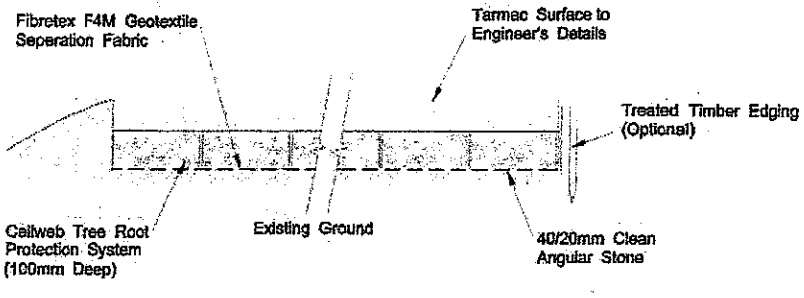
Final surfacing.

Final surfacing

The CellWeb Tree Root Protection is totally confined within the clean stone sub base, therefore you can choose whichever surface materials are most appropriate for your installation. Some materials are more suitable than others and serious consideration should be given to the porosity of the surface for continued healthy growth of the tree. An ideal surfacing are DuoBlocks: a grass reinforcement and gravel retention system. Geosynthetics can supply these systems for a visually attractive surface that also has the advantage of being fully porous.

Loose or bonded gravels can be used as an alternative hard landscaping and CellWeb can also be used with block paviors whose porous joints will permit moisture and air transfer to the roots. Where planning allows, porous asphalt is yet another possible surfacing treatment.

Call our sales office on 01455 617 139 for more information.



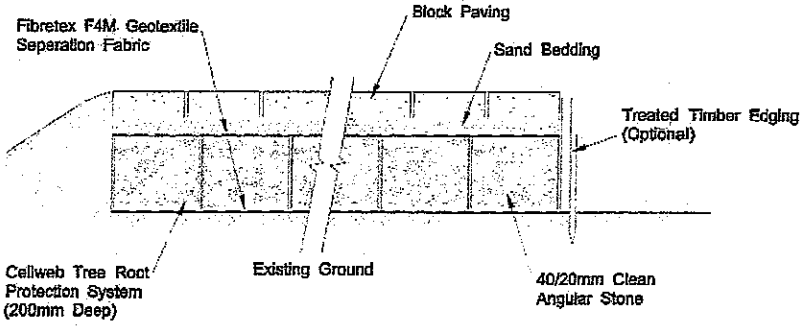


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Table 3 – Minimum distance (m) between young trees or new planting and structures to avoid direct damage to a structure from future growth.

Type of Structure	Diameter of stem at 1.5m above ground level at maturity		
	<30cm	(30-60) cm	>60cm
Buildings and heavily loaded structures	-	0.5	1.2
Lightly loaded structures such as garages and porches	-	0.7	1.5
Drains and underground services:			
<1m deep	0.5	1.5	3.0
>1m deep	-	1.0	2.0
Masonry boundary walls[a]	-	0.5	1.0
	-	(1.0)	(2.0)
In situ concrete paths and drives[a]	-	0.5	1.5
	(0.5)	(1.0)	(2.5)
Paths and drives with flexible surfaces or paving slabs[a]	-	0.5	1.0
	(0.7)	(1.5)	(3.0)

[a] **These distances assume that some movement and minor damage might occur. Guidance on distances which will generally avoid all damage is given in brackets.**

Extract taken from BS5837:2005

13 Design considerations for new planting

13.1 General

13.1.1 The purpose of proposed new planting should be understood from the start of the design process so that appropriate choices of structure, location and species can be made. Advice on detailed design should be sought from a landscape architect or other competent person experienced in landscape design.

13.1.2 Trees may perform a variety of roles, both aesthetic and functional:

- shelter planting to benefit buildings, people, crops or stock;
- screen planting to hide the unsightly or create privacy;
- planting to define or divide spaces, or to define or direct routes or views;
- specimens or groups can be used for architectural effect to complement buildings;
- for their inherent aesthetic qualities;
- providing character or sense of place;
- softer, natural elements to counter the artificial lines of the built environment;
- for their contribution to nature conservation, biodiversity and biomass;
- reducing air pollution; providing shade and controlling erosion.

13.1.3 All new tree planting proposals should take into consideration the future use, layout and design of a development site, constraints of soil and climate, the local landscape character and the contextual surroundings. As trees generally form the dominant elements of the long-term landscape structure of a site, careful consideration should be given to their ultimate height and spread, form, habit and colour, density of foliage and maintenance implications.

13.2 Planting adjacent to buildings

13.2.1 On all soils, it is inadvisable to plant trees at distances closer to a structure than those shown in Table 3 unless special precautions have been taken. Paths, patios and driveways, where they are not constructed to appropriate standards (see **10.3 and [14]**) can be vulnerable to damage by trees with surface rooting characteristics. In addition, on shrinkable soils account should be taken of the foundation construction of existing and proposed nearby structures; planting should not compromise the structural performance of the foundation.

13.2.2 The effect of shade created by new trees and the likely extent and density of the tree crown when fully grown should be taken into consideration before new planting adjacent to buildings. Careful design and species selection should allow residents to enjoy reasonable light and the trees to develop into mature specimens. Special care should be exercised when considering planting large and/or fast growing evergreen trees as screens or hedging as these can be particularly oppressive, obstructing light all year round and requiring frequent maintenance to restrict their growth.

NOTE For information on planting adjacent to boundaries see Annex A and [6], [12] and [13].

13.3 Planting adjacent to roads

Roadside trees can make a significant contribution to the character of new developments. Their siting and species selection should be carefully co-ordinated at an early stage with other highway design considerations and, in the case of adopted roads, with the agreement of the relevant highway authority.

Sight line requirements, lighting schemes, CCTV, underground and overhead service routes and avoidance of physical obstruction or damage should all be taken into account with due consideration for future growth and periodic maintenance requirements.

13.4 Planting in the vicinity of services

Trees should not be planted where they might obstruct overhead power lines or cables. In new developments, underground services should be ducted or otherwise protected at the time of construction to enable trees to be planted nearby without conflict (see utilities guidance documents [17]). Root barriers should be constructed, where considered necessary, under expert advice to reduce the risk of tree root intrusion into service runs.

14 Ground works and preparation for new planting

NOTE BS 4428 contains recommendations and guidance on general landscape operations with sections on preliminary investigation, drainage, grading and cultivation, tree planting and woodland planting.

14.1 Drainage

New development may have an effect on the existing drainage pattern and ground water levels of a site, due to increased areas of hard surface and consequential drainage requirements. Existing trees may suffer due to an alteration in the supply of groundwater, whilst younger specimens and new plantings may be more likely to adapt to the changed conditions. Expert advice on both drainage and trees should be taken where ground water conditions are liable to such change.

14.2 Soil conditions

Before any of the landscape operations listed in BS4428 are undertaken and where contamination is apparent, soils in areas to be planted should be analysed for structure and content by a specialist laboratory and expert advice taken on remediation measures for new planting if this is required. If contaminants (e.g. oil or diesel fuel, toxic materials, heavy metals, etc.) are present, soils should either be removed to the full depth for planting and new soil imported or expert advice obtained on remediation measures, which may include limiting the choice of species for planting. Where the structure of the soil is in an unsuitable condition to encourage growth, a number of remediation measures may be required including physical decompaction by mechanical plant or compressed air injection, the incorporation of bulky additive materials and new drainage systems. The advice of an arboriculturist should be sought for all works in the root protection area.

14.3 Surfaces around newly planted trees

NOTE BS4428 provides recommendations for the treatment of soft surfaces, but excludes hard surfaces.

14.3.1 Where surfaces are paved, the settlement of the soil in tree pits which occurs gradually after planting may cause movement of the paved areas. This may involve the partial collapse or instability of paving or disruption of flexible surfaces, where these are laid over prepared pits. The unpaved area around new plantings should, therefore, be of an adequate size to enable surrounding paving to be retained by a conventional edging and foundation (e.g. brick, concrete, stone or treated timber) set at a distance where it is unlikely to be affected by settlement. It may be appropriate for the outer edges of the backfilled area to be treated as a transition zone using interlocking surface reinforcement grids backfilled with a surface dressing of a permeable, granular material (e.g. gravels, shingles and other aggregates) which can be topped up if required. Due allowance should be made for future growth of stem and roots of a tree when considering the finished dimensions and the design of edge or kerb treatments of tree pits and planted areas.

Where load-bearing paving is to be laid over pits, it should either:

a) be laid when the soil has settled and the level made good; or:

b) be laid on a supported foundation that spans the tree pit; or:

NOTE Such foundation may be constructed from reinforced concrete, or comprise bearers made from steel or concrete.

c) incorporate a tree grille with appropriate support around the edges.

d) utilise structural soil.

14.3.2 Where there is any risk of a tree pit receiving surface water run off that may be contaminated, for example by rock salt, fuel spillage or other materials that may be toxic or harmful to plants, paving should be designed and laid to fall away from the pit.

Extract taken from BS5837:2005

15 Post development management

15.1 Existing trees

15.1.1 Trees growing on a site before development takes place may, if adversely affected, be in decline over a period of several years before they die. This varies greatly depending on the age, species and condition of the tree, the soil conditions, climate and the extent of damage incurred during development. A programme of inspections and necessary work for the treatment of symptoms as they develop should be drawn up in conjunction with an arboriculturist. This programme may include recommendations for frequency of inspection and/or beneficial tree work and should take the form of an arboricultural management plan.

15.1.2 Where the trees in question are protected by planning controls, the planning authority should be informed and any necessary agreements obtained prior to such work.

15.1.3 Prior to handover, following completion of development, the arboriculturist should look for signs of intolerance to change in conditions and the effect of the development and any accidental damage to identify the need for further tree works in addition to those originally specified at the beginning of the development process.

15.1.4 An arboriculturist, should consider appropriate cultural operations. These may include irrigation, or measures to enhance the soil structure and organic nitrogen levels in the soil.

15.1.5 Where the development design incorporates the need for active management intervention following the completion of construction works, a tree or landscape management plan should be prepared and a copy supplied to all parties who may have an interest in the future management of the site or parts of it.

15.2 New plantings

Maintenance of newly planted trees is of particular importance during the critical establishment period, of at least two years and may, where required by planning conditions, be five years or more following planting. A detailed maintenance schedule covering the establishment period should be prepared in conjunction with the landscape design proposals and appropriate arrangements made for its implementation.

-EXTRACTS TAKEN FROM-

NJUG 10

NATIONAL JOINT UTILITIES GROUP

GUIDELINES FOR THE PLANNING, INSTALLATION AND MAINTENANCE OF UTILITY SERVICES IN PROXIMITY TO TREES

GAS - ELECTRICITY - TELECOMMUNICATIONS - WATER

UNDERGROUND SERVICES

2. HOW ROOTS ARE DAMAGED

2.1 Contrary to popular belief, the root system of a tree is not a mirror image of the branches, nor is there usually a 'tap root'. The majority of the root system of any tree is in the surface 600mm of soil, extending radially in any direction for distances frequently in excess of the tree's height. Excavation or other works within this area are liable to damage roots.

The root system

2.2 The base of the trunk typically flares out in buttresses, with these extending into the main lateral structural roots. These rapidly subdivide into the mass of smaller roots which serve to anchor the tree into the soil, and to conduct water and nutrients. Even a short distance (3m) from a large mature tree, most roots will be less than 10mm in diameter, but these may extend to well beyond the branch spread of the tree. A mass of fine roots, less than 1mm diameter, develop off all parts of this root system. These fine roots absorb the water and nutrients which are essential for the growth of the tree.

2.3 The main structural roots (close to the trunk) develop as the tree grows in response to the need for the tree to have physical stability. Beyond these major roots, root growth is influenced by the availability in the soil of water, air and nutrients. The cultivation of soil provides ideal conditions for root growth. Services are often cooler than surrounding soil, encouraging moisture within the soil to condense on the surface, thereby encouraging roots to grow close to the service. For all these reasons, root growth is often most prolific within the backfilled trench and in the soil around the services. The variability of soil conditions and the presence of obstacles to root growth results in a very variable and unpredictable distribution of the roots within the general guidance in para 2.1.

email: bernie.harverson@virgin.net

Types of damage

2.4 Root systems can be damaged by:-

- The severance of a root, for example by trenching, which will destroy all parts of the root beyond that point. Even roots less than 10mm diameter may be serving the fine roots over a wide area. The larger the root severed, the greater the impact on the tree.
- Damage to the bark on the root. The bark protects the root from decay, and is also essential for further root growth. It is loosely attached and easily damaged. If damage to the bark extends around the whole circumference, the root beyond that point will be killed.
- Compaction of the soil. Compaction which is avoidable may occur from storage of material or passage of heavy equipment over the roots. This can restrict or even prevent gaseous diffusion through the soil, and thereby asphyxiate the roots. The roots must have oxygen for survival, growth and effective functioning.
- Alterations in soil level. Lowering the level will strip out the mass of roots near the surface. Raising levels will have the same effect as soil compaction.
- Incorrect application of herbicide.
- Spillage of oils or other harmful materials.

2.5 If roots are damaged:-

1. close to the trunk, the anchorage and stability of the tree can be adversely affected.
2. anywhere along their length, all of the fine roots which they serve will be destroyed.

Damage to the fine roots by severance of a main root, or by compaction or alteration in levels, will prevent these fine roots from absorbing the water and nutrients which are essential for the well-being and growth of the tree. The effects of damage from different causes, for instance by successive excavations for different services, or by excavation in one part and compaction in another part of the system, will be cumulative.

2.6 If the root system is damaged, new roots must develop to sustain the tree. These may develop from damaged root or by increased growth of other parts of the system. It may take years to replace all the lost roots. Vigorous young trees are the most likely to be capable of rapid root regeneration, but mature tress find it very difficult to recover from major root damage, if at all. While roots may regenerate, they will not necessarily provide their original anchorage.

2.7 Trees with damage may not show any immediate symptoms. If the root system is capable of rapid regeneration the tree may recover without any noticeable ill-effects, but usually the symptoms will take several years to develop. Such symptoms may range from only minor branch dieback to deterioration and ultimate death of the tree, dependant on the severity of damage and the ability of the roots to regenerate.

2.8 There is frequently a need for operational land (e.g. substations) to be kept clear of weed growth for safety and as a fire precaution. Herbicides provide an efficient method of killing both herbaceous and woody weeds. There are several types of herbicide with different modes of action and persistence. The most attractive chemicals are those that can be applied to the ground, usually as a granule, and which remain active in the soil for long periods. The wide-ranging root system of a tree may extend into the operational land from adjoining properties, and may absorb some types of herbicides which have been applied to the ground. Material absorbed in one part of the root system can kill the whole tree.

2.9 Other materials which can leach into the soil can also damage the root system. For instance, oil spilled into the soil is broken down by soil bacteria which deplete the soil of oxygen and so asphyxiate the roots. Other materials may have a direct toxic effect on roots.

4 HOW TO AVOID DAMAGE TO TREES

4.1 This section gives general guidance on methods of work to minimise damage top trees which should be adopted by utilities. The local authority (or for privately owned trees, the owner or his advisor), should be informed about planned work at an early stage prior to commencement.

4.2 Wherever trees are present, precautions should be taken to minimise damage to the root system. As the shape of the root system is unpredictable, there should be careful control and supervision of any excavation, particularly if this involves digging through the surface 600mm where the majority of roots develop.

4.3 The precautions advocated in this section are applicable to any excavations or other works occurring within a distance from the tree equal to 4 times the circumference of the trunk (circumference measured around the trunk at a height of 1.5m above ground level; distance measured from the centre of trunk to nearest part of any excavation or other work). This area around the trunk is referred to as "the precautionary area" hereafter.

4.4 Although, ideally, services should be diverted or re-aligned outside the precautionary area, it is recognised that this will not always be practicable. Where works are required for the laying or maintenance of any service within the precautionary area, there are various techniques to minimise the damage. The appropriate method of laying will depend on the circumstances, such as:

- scope of the works (one off repair, or part of an extensive operation)
- degree of urgency (for restoration of supplies)
- soil conditions
- amenity value of tree
- cost

Acceptable techniques in order of preference are:-

1. **Trenchless**
2. Broken trench – hand dug
3. Continuous trench – hand dug

Excavation of open trenches by machine is totally unacceptable within the precautionary area.

4.5 Trenchless

4.5.1 Wherever possible trenchless techniques should be used. The pit excavations for starting and receiving the machinery should be located outside the precautionary area.

4.5.2 IN order to avoid damage to roots by the **mole**, it is recommended that the depth of run should be below 600mm. Techniques involving external lubrication of the mole with materials other than water (e.g. oil, bentonite)
should be avoided, unless precautions are taken to ensure that there is no contamination of the soil within 600mm of the surface within the precautionary area.

4.6 Broken Trench

4.6.1 This technique combines hand dug trench sections with trenchless techniques. If excavation is unavoidable, it should be limited to practical access and installation around/below the roots. The trench is excavated by hand with precautions taken as for continuous trench below. Open sections of the trench should only belong enough to allow access for linking to the next section. The length of sections will be determined by local conditions, especially soil texture and cohesiveness, as well as the practical needs for access. In all cases the open sections should be kept as short as possible.