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BS5837:2005

Tree Survey

and

Implications study

on

the proposed development

at

51 Belsize Park Gdns,

London, NW3.

Ref no: AIA8909

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Accompanying drawing 001 Accompanying drawing 002 Accompanying drawing 003	Tree survey plan Tree constraints plan Tree protection plan

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1. Introduction

My name is Mark Clews and I am an arboriculturalist, trained to degree level. I have been operating as an arboricultural consultant for 16 years now, providing advice on trees and tree related issues for all manner of clients. I have recently been instructed by CoupDeVille Architects, on behalf of their client, Mr Lawrence Hannah, to provide a tree survey and implications study, for a proposed rear single storey and basement extension, at 51 Belsize Park Gardens, NW3. I agreed to provide the above with the aims and limitations for the tree survey set out below. The report also satisfies the requirements and standards for such, laid out in BS5837:2005 (Trees in relation to construction). I visited the site on Monday 24th August 2009, with these goals in mind.

Please note that this report will refer to a series of drawings, that will be accompanying it. The drawings will be a tree survey plan, a tree constraints plan & a tree protection plan. A rudimentary shade plan also accompanies this report.

These drawings should be readily available in order to easily comprehend the various parts of this report.

2. Aims of tree survey and report

- To identify all trees on the site that are 75mm diameter + at 1.5m up the trunk (DBH).
- To identify trees surrounding the site, that would potentially be affected by any proposed development of the site.
- To carry out a detailed visual inspection of all the trees on/surrounding the site and a condition assessment made, based on the inspection.
- To classify the trees on/surrounding the site with the tree classification system used and recommended under BS5837:2005 (see appendix A).
- To identify any tree-related constraints to the design and/or development on the site.
- To provide a method statement for tree protection (Arboricultural method statement), if required.
- To recommend a remedial care framework for the trees.

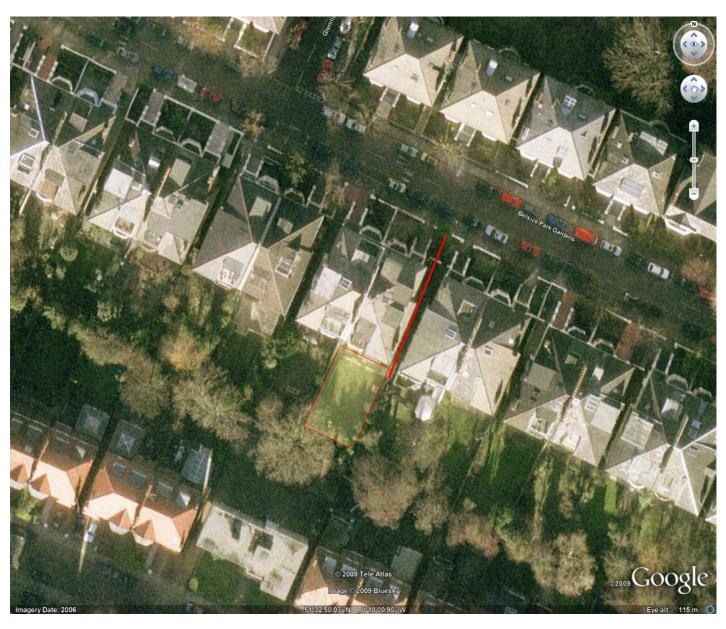
I am only an arboriculturalist, hence;

- I cannot make any comment or assessment on the existence and/or condition of any underground services.
- I cannot make any comment on the existing dynamics of the local soil hydrology.
- I cannot make any assessment of the local water table.
- Any inspection of trees on or surrounding the site, have been solely on the VTA
 method. If further inspection would be advised, then I have stated so in the report. I
 have not carried out any further inspections, unless otherwise stated and accompanied
 with the resulting evidence.
- Any assessment I have made on the condition of the trees inspected, does not hold true indefinitely. Unless otherwise stated, any assessment and recommendations can be held good for one year from the date of inspection, assuming normal climatic conditions.
- The assessment and report do not constitute a comprehensive tree hazard evaluation report. As such, it should not be used as an authoritative assessment on the structural integrity and/or risks the trees surveyed, present to their locality. Neither should it form the basis of any tree risk management systems. The author accepts no liability whatsoever, for consequences arising from the use of the assessments in this report for any such tree risk management program and/or for the evaluation of any hazards posed by the trees surveyed. The assessments of the trees surveyed and their possible risks, in this report are simply not comprehensive enough to provide the necessary information to formulate an effective and site-appropriate tree risk management strategy. There are work recommendations in the tree schedule, but these are solely in relation to the development proposal, not in response to any general risk they may present to their locality.
- This report was written solely to provide arboricultural input to aid the design and development processes and should only be used as such.
- Even if all the constraints identified in the report are mitigated, this does not guarantee
 that consent will be given to the proposed development, if any proposals are
 discussed. The report merely identifies tree-related design and construction issues and
 attempts to provide solutions where possible (and if requested), to any such treerelated issues surrounding the development of the site.
- The data contained within this document and the accompanying documents (Tree survey plan; tree constraints plan; tree protection plans; tree survey schedule) has been provided in unmodifiable form. Any third party modification of its data may render this document unfit for purpose and any third party responsible for such modifications, will be held solely liable for any implications this may cause.
- This document and it's accompanying documents have been prepared by myself in my professional capacity as an arboricultural consultant. The contents of these documents do not, in any way, purport to include any manner of legal advice or opinion.

No trees exist at the rear of the property, but the adjacent neighbour (no 49), has five trees that would potentially be affected by the development. The other adjacent neighbour has two substantial trees in their garden, but they are far enough from the proposed development area, to not be impacted by it. A phone to Camden borough council confirmed that these trees were covered under the Belsize Park conservation area, but that none had a TPO on them.

The proposal is a single storey rear extension, on top of a much larger basement extension. It is these extensions that I have been asked to assess the impact to nearby trees, from its construction.

Below is a Google image of the site, with the red rectangle and red line outlining the area of development and access route:



5. Observations

5.1 Site visit.

One site visit was carried out by myself in August 2009. The weather was clear and warm. I surveyed all the trees surrounding the development area, with the main purpose of classifying them into the BS5837 retention categories (**see Appendix A**). A purely visual assessment (VTA), was carried out on their structural soundness (in line with current, arboricultural good practice). No structural abnormalities were observed that warranted further investigative techniques, so no further investigative techniques were carried out.

5.2 Observations.

There were five trees surveyed, that were to be potentially affected by the proposed extension. The appended document, entitled 'Tree Survey Schedule', contains the tree details and the accompanying document, entitled 'Tree Survey Plan' (drawing no. 001), indicates the approximate tree positions.

Survey Data

The data from the tree survey can be broken down into three main categories; diversity of tree species, age distribution and tree grade classification. Breaking down the data into these categories provides for a fuller arboricultural analysis of the site. The relevance of this, is in measuring the impact any design proposal may have on the short and long term amenity, cultural and biodiversity value the site possesses and in suggesting appropriate mitigation strategies. By extension, this goes towards meeting various local development framework criteria.

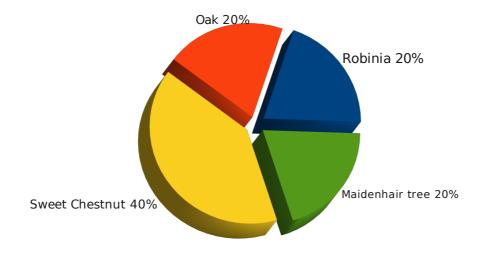
Most of this is not very relevant in this case, but it's part of my standard report.

6.1 Species diversity.

The survey data is explored below on the diversity of species surveyed. This can help us in any planting scheme, to at least redress the loss of diversity, due to the needs of the development. Please note that the below table does not include the hedges or shrubs surveyed on the site, neither does it include all the trees on the site. It only identifies trees surveyed, that stand to be potentially affected by the development.

Table of diversity

Species	Number of trees of said species	Total in percentage of said species			
Robinia	1	20			
Oak	1	20			
Sweet Chestnut	2	40			
Maidenhair tree	1	20			
Total	5	100.00%			

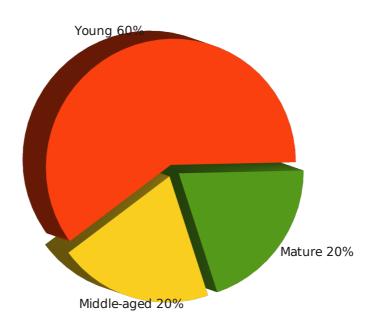


6.2 Age distribution.

The survey data is explored below on the age distribution. This can help us in any planting scheme, to attempt to mitigate the loss of age distribution, due to the needs of the development.

Table of age distribution

Age classification	Number of age classification	Percentage of classification
Juvenile	0	0.00%
Young	3	60.00%
Middle-aged	1	20.00%
Mature	1	20.00%
senescent	0	0%
dead	0	0.00%
Total	5	100%



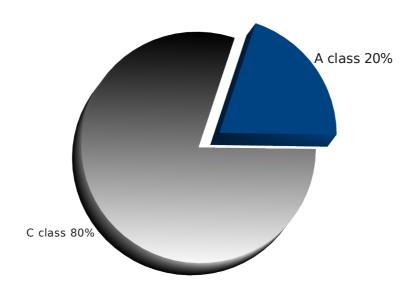
6.3 Tree grade classification.

The grading of the trees' potentially affected by the proposed development, on the site is the most important factor in the survey data. This is because any structural defects, diseases, useful life expectancy, amenity value, cultural significance, screening and site softening value and biodiversity value are assessed and classifications given, based on these factors. Below is a table of the tree class data (see **appendix A** for tree classification definitions):

Table of grading.

Grade classificatio n	Brief description	numb er	percenta ge
Α	High quality and/or value	1	20.00%
В	Moderate quality and/or value	0	0.00%
С	Low quality and/or value	4	80.00%
R	Trees needing removal under sound arboricultural management, or present value that would be lost within the decade.	0	0.00%
Total		5	100%

From the pie chart below, it is evident that the majority of trees surveyed around the development area, fall under category C, these being of moderate quality and/or value trees.



7. Design Constraints

7. 1 Design constraints below ground

According to the current standard for developments near trees, root protection areas must be assigned to trees that justify retention. These root protection areas are areas that the development should not encroach, in order to preserve the trees root systems. Neither should the development processes encroach such root protection areas (i.e. site construction traffic, material storage etc.).

7.1.1 Root protection areas (RPA).

Under the current standard for assessing developments near trees (BS5837:2005), trees that would need to be retained, are assigned an area of ground surrounding them, that must not be altered in any way. This area of ground is known as the root protection area or zone (RPA) and would normally be part of a construction exclusion zone or area, delimited by fencing. The RPA is assigned using the following formula table:

Number of stems	Formula
Single stem tree	RPA (m²) = (stem diameter (mm) @ 1.5m x 12 / 1000)² x 3.142
Twin/multi stemmed tree	RPA (m²) = (Basal diameter (mm) x 10 / 1000)² x 3.142

The same standard also states:

"The RPA should be calculated using Table 2 (the above table), as an area equivalent to a circle with a radius 12 times the stem diameter for single stem trees and 10 times basal diameter for trees with more than one stem arising below 1.5 m above ground level."

It also goes on to state:

- "The RPA for each tree as determined in Table 2 (the above table), should.....take full account of the following factors, as assessed by an arboriculturalist, which may change its shape but not reduce its area whilst still providing adequate protection for the root system:
- a) The likely tolerance of the tree to root disturbance or damage, based on factors such as species, age and condition and presence of other trees. (For individual open grown trees only, it may be acceptable to offset the distance by up to 20% in one direction.)
- b) The morphology and disposition of the roots, when known to be influenced by past or existing site conditions (e.g. the presence of roads, structures and underground services).
- c) The soil type and structure.
- d) Topography and drainage.
- e) Where any significant part of a tree's crown overhangs the provisional position of tree protection barriers, these parts may sustain damage during the construction period. In such cases, it may be necessary to increase the extent of tree protection

barriers to contain and thereby protect the spread of the crown. Protection may also be achieved by access facilitation pruning. The need for such measures, including the precise extent of pruning, should be assessed by an arboriculturalist."

The above considerations in paragraph b have not been applied in this case.

7.1.2 Underground services

If it is imperative that the underground services be run inside any tree's RPAs and cannot be re-routed, then trenchless digging methods should be employed (such as pipe-jacking) and the services should be laid at a greater depth (ideally below 2 metres), in order to avoid the majority of the root systems of the retained trees.

In fact pipe-jacking or other trenchless methods are considered much more desirable despite the cost, as they disturb the soil structure far less and also affect the local soil hydrology far less.

If it is impractical to use pipe-jacking methods on the site, then excavating the trench using an air-spade is an alternative solution. Hand digging can also be considered, but some damage to the root systems of retained trees would be inevitable and would require amelioration measures. Machine digging of the trenches should be considered out of the question.

7.1.3 Site-specific design constraints.

The Root protection areas assigned to the trees needing retention, are shown on drawing no 002 (tree constraints plan), of the accompanying drawings. Note that the plan is to scale – the distances and or surface areas are also shown on the drawing and in the table in **Appendix B**. If it is that the root protection area has been modified in shape to account for local site conditions, then the root protection radius in **Appendix B** should be disregarded. Instead, the root protection area measurement should be observed (Also found in Appendix B).

The plans of the proposed structure indicate that the extension and basement will not encroach on the RPA of any of the trees to be retained.

I have no plans available indicating the proposal for any underground services. If underground services are to be installed, then section 7.1.2 would deal with constraints to their design and positioning.

7.2 Design constraints above ground

As part of the assessment of the implications to the trees, a study into how the proposed design requirements would impact on the trees above ground, needs to be carried out. This is also in keeping with BS5837:2005. It follows:

7.2.1 Ingress and egress of vehicles.

Consideration needs to be made for the ingress and egress of vehicles and their possible turning arcs, to ensure they don't harm, or come to harm from colliding with the retained trees (where this is applicable).

7.2.2 Proximity of built structures to retained trees.

Consideration needs to made for the distance between retained trees and new structures, in order that neither are adversely affected by each other. Such consideration would take into account the future growth potential of the trees (in order to avoid damage sustained to both, from encroaching limbs etc.), building materials used (in order to minimise changes in light reflection to retained trees, as this can adversely affect them) and shading caused by the retained trees (in order to prevent future conflict between the end-user and the retained trees).

7.2.3 Site specific constraints.

The proposed single storey extension is far enough away from the retained trees, to be largely unaffected by them, or to affect them adversely through use of inappropriate building materials. The bulk of the development will be underground in the form of the basement.

Consideration would need to made regarding the amount of available light to the basement. Tree 2 sits to the south-west of the proposal and would cast shade over this proposal (see drawing no 005), all year round. Tree 2 is not yet at it's mature height potential, so the shade it would cause in future years will only increase.

Use of adequately sized light wells, skylights etc.. should be incorporated into the design, to mitigate this.

8. Implications of the Development to the site trees

8.1 Loss of amenity.

The proposal requires no tree removals. It does require the removal of various shrubs in the garden of the proposal. However there would be no loss to the amenity of the site and carrying this out.

8.2 Loss of wildlife habitat.

There would be no loss to wildlife habitat.

8.3 Loss of species diversity.

As no trees are scheduled for removal, there would be no loss to diversity of species.

8.4 Site exposure.

The single storey extension could be partially viewed by neighbours at the rear, therefore the proposal may create a small level of exposure.

8.5 Site amelioration.

As there may be a small amount of exposure from and to the proposed extension, a small planting scheme at the foot of the garden should be considered.

9.1 Preliminary tree and soil maintenance.

Work to the trees, shrubs, any other vegetation and soil prior to development are as follows:

- **9.1.1** A removal of the necessary shrubs in the garden of number 51.
- **9.1.2** Penotrometer readings (a basic penotrometer, such as a John Dickey penotrometer, would be preferable, as it tests compaction below the ground surface), should be taken within the RPA of T2. The readings within the RPA for this tree will help in the implementation of any amelioration plan.
- **9.1.3** Inoculations of tree 2 with Paclobutrazol, via soil injection should be carried out. The injections should be carried out radially, within 300mm of the root collar of the trees and be of a dosage rate of 1.6g per cm of stem diameter.

9.2 Preliminary vegetation control.

None needed

9.3 Preliminary tree protection methods.

Prior to development, the following measures need to be carried out:

- **9.3.1** All / any preliminary tree maintenance must be carried out.
- **9.3.2** If protective fencing is specified, then protective fencing of the kind specified in **Appendix D** should be placed in the position shown in the tree protection plan, at the distances shown in the 'tree protection plan'. **Note that this plan is to scale and can be scaled off.** The fencing should be permanently fixed to the ground as shown in **Appendix D**. Weatherproof signs should be attached to the fencing, stating their purpose and that they should not be moved. The protective fencing should delimit a construction exclusion zone and should be considered immovable.
- **9.3.3** Ground protection in the form described in **Appendix E**, should be placed if and where ground protection is specified in the Tree Protection Plan. It should be placed with the distances shown in the tree protection plan. The ground protection should immediately follow from the protective fencing, to the area of development. The compressible layer can comprise of either sheet polystyrene to 100mm or bark chip or compressible expanded clay boards (e.g. Claymaster, Claylite etc.), to the same depth. The clay boards are preferred, as they can be laid completely over the RPA and holes cut into them, where footings need to be placed. Please note that this ground protection is for **foot traffic and light plant equipment only**. If heavy plant or other machinery is to be moved over the area, then ground protection in the form of a temporary roadway, as described in **Appendix C**, should be used.
- **9.3.4** Any temporary roadway needed, that is to be the construction traffic access route should be constructed. The temporary roadway should be constructed by using a 3 dimensional cellular confinement system (see appendix C), to minimise destruction of the soil structure, where it encroaches any RPA or any future planting site. When laying the roadway using machinery, the machinery should be working ahead of itself (i.e. on top of the temporary roadway).

9.3.5 A materials / waste storage area should be identified and designated outside any RPAs, prior to any demolition, excavation and construction activities commencing.

9.4 Methods and restrictions during site work.

The following measures should be adopted throughout excavation and construction:

- **9.4.1** The fencing comprising the construction exclusion zone should not be moved.
- **9.4.2** No materials and/or plant can be stored within the designated root protection area of any of the trees. Any liquid materials to be stored on site, must be located where, in any event of spillage, will allow for natural run-off to be away from the designated root protection area.
- **9.4.3** Any demolition of buildings and their footings within the root protection areas, should be done by hand and care should be taken not to damage any exposed roots.
- **9.4.4** The mixing of concrete and mortar must be carried out outside the root protection area, in such an area where in the event of any spills, any liquid will drain away from the root protection area.
- **9.4.5** Within the RPA, if hollows are needed to be filled in, in order to level the subsoil before laying any sub-base, then they should only be back-filled with sharp sand that is NaCl free and not compacted.

Excavation:

- **9.4.6** If and when creating any pad holes / pile holes / screw-piling, the machinery / operators should be moved over and placed over the specified ground protection, where piles need to be created within the RPAs. The ground protection should only be lifted when excavation needs to be carried out. Any pile creating machinery should be positioned where possible, outside of the RPA of retained trees.
- **9.4.7** No levelling, grading or compacting of any sort should be carried out within the RPAs.
- **9.4.8** When pouring concrete into any foundations, contact with the soil and especially bare roots by the wet concrete, must be avoided by the use of membranes.
- **9.4.9** The excavations for any underground services should be routed outside any RPAs. If it is unavoidable that underground services be run inside RPAs, then trenchless techniques should be utilised where possible. If manual excavation is needed, then the trenches should be dug by air-spade where they encroach the RPAs of retained trees. Any roots that span the trench during digging should not be cut, but should have damp Hessian sacking placed around them. Damaged roots of up to 2cm diam should, where possible, be cut cleanly and covered. Any substantial roots (larger than 25mm diam), that become damaged or need to be removed, advice should <u>first be sought from an arboriculturalist</u> prior to any work being carried out on them.
- **9.4.10** If and when installing infrastructure for underground services, they should be done by hand within any RPA and care should be taken not to damage the exposed roots. Back-fill should not be compacted.
- **9.4.11** If and when any sub-bases are to be installed for car-parks and/or permanent

roadways, where they encroach any RPAs, they should be constructed in the manner described in **Appendix C** of this report. When laying these using machinery, the machinery should be working ahead of itself (i.e. on top of the newly laid base). The base should not be compacted, neither should the soil below it.

- **9.4.12** The use and movement of any cranes/heavy lifting arms and booms of delivery vehicles should be carried out without damage to the retained trees (a safe working distance should be established, in order to avoid collisions with the retained trees).
- **9.4.13** If any temporary roadways are to be dismantled, care should be taken to ensure that no damage to the ground underneath occurs (i.e. no scraping it up with a digger). They should be removed by hand. The same applies to any temporary ground protection.
- **9.4.14** Regular (fortnightly) site visits throughout the development, should be carried out by an arboriculturalist, to ensure the protective fencing and ground protection is intact and the RPA is still being protected.
- **9.4.15** All ground protection and protective fencing should be dismantled and removed by hand once the construction work is complete, or in the case of ground protection covering the building footprint, once the building base is installed.
- **9.4.16** Once demolition and construction activities have been completed, a post-development tree inspection should be carried out, in order to help formulate a tree care plan.

9.5 Post-development tree care

The following should comprise the post development tree care:

- **9.5.1** A detailed visual inspection of all the retained trees on/surrounding the development site, to check for signs of development damage. Appropriate remedial tree work should then be recommended by an arboriculturalist.*
- **9.5.2** Any damaged branches to be removed or pruned cleanly in line with current arboricultural practice and any specific arboricultural advice.
- **9.5.3** Penotrometer readings should again be taken in the RPA of the retained trees and in any future planting areas, in order to identify failed ground protection. If soil is found to be compacted, then de-compaction measures should be adopted. An amelioration plan should draw up and state the type of amelioration methods depending on the type and level of compaction encountered. If severe compaction is found within the RPAs of the retained trees, then radial trenches, where specified in an amelioration plan, should be excavated and backfilled with 1:2 ratio of topsoil:composted mulch. The excavations should be carried out with an air-spade and subsequent backfilling be carried out by hand. The amelioration plan should be drawn up prior to commencement of amelioration work and should stipulate position, size & depth of trenches, as well as methods to be used and materials needed, along with quantities involved. It may also identify and recommend planting areas, as part of an amelioration strategy.
- **9.5.3** Any recommended planting schemes to then be undertaken.

^{*}In an ideal world, tree condition inspections should be carried out for several years after the

development has been completed. A programme of inspections and necessary work for the treatment of symptoms of development damage, as they develop, should be drawn up. The programme should also provide recommendations for frequency of inspections and/or beneficial tree work and should take the form of an arboricultural management plan.

A small budget should be set aside for any amelioration work needed on the trees.

10.1 Planting Scheme Strategies.

There are a number of documents, laying out strategic goals for planting schemes on development sites:

- 1. BS5837:2005 recommends planting strategies be incorporated into the design proposals, especially as a mitigation strategy for initial tree loss (section 6.2.3).
- 2. BS5837:2005 also suggests areas where suitable tree planting can ameliorate negative site features (section 13.1.2). Planting strategies should incorporate these suggestions, where they are considered relevant.

There are also Government policies that focus on development sites and the requirement of them to benefit their local environment. They usually include the retention and planting of trees, among other things. These policies are to be implemented by local authorities through their local development frameworks, which means that these policies can and often do become obligatory, in order to have consent to develop granted. For example:

- 1. Planning Policy Statement 9 (supercedent to PPG9) recommends particular strategies for improving native habitats and biodiversity and that these strategies be incorporated within local unitary development frameworks. Paragraphs 6 14 of the document cover the range of sites to be considered, while paragraphs 2 & 3 lay out the strategic goals.
 - Where this policy is applicable to the site, any recommended planting should incorporate these strategies.
- 2. Planning Policy Statement 1, under the section termed "Protection and enhancement of the environment" lays out goals for developments to meet environmental needs. It also lays out aims to improve the health and well-being of occupants/users of developments, through environmental improvements (among other things). Where this policy is applicable to the site, any recommended planting should incorporate these strategies.
- **3.** Planning Policy Statement 1, under the section termed "Design", lays out the goals for improving the 'quality and character' of developments, part of which being strategic planting schemes.
- 3. Planning Policy Statement 3, frequently refers to 'efficient use of land' for such factors as 'environmental sustainability' and 'the health and well-being of occupants', among many other factors. This would necessitate suitable planting schemes, as part of a mitigation strategy for the environmental and social impact of developments. Where this policy is applicable to the site, any recommended planting should incorporate these strategies.

10.2 Site specific planting strategies

Where planting schemes are required or considered desirable under the previous section, they should follow a site-specific amelioration strategy.

The aims of such a strategy should be to:

- to identify areas that would benefit from planting schemes
- to identify and provide areas of screening and privacy for the end-users of the site and adjacent neighbours
- to provide softer, natural elements to counter any artificial lines of the developed environment
- to provide an area that is seasonally aesthetically pleasing
- to provide habitat for native wildlife
- to be in keeping with local native vegetation
- to provide a suitable level of biodiversity

All the above would be a site-specific implementation of the previous section (12.1).

10.3 Planting Scheme Design.

The design should incorporate, as much as possible the identified site specific strategies. Other factors should be taken into consideration, such as;

1. Distances from built structures. BS5837:2005 provides a guidance table, stipulating recommended distances between new plantings and structures to avoid direct damage from future tree growth:

Type of structure	Diam. Of stem @ 1.5m above ground level a maturity					
	<30cm	(30-60)cm	>60cm			
Buildings and heavily loaded structures		0.5	1.2			
Lightly loaded structures (porches, garages etc.)		0.7	1.5			
Drains and underground services < 1m deep > 1m deep	0.5	1.5 1.0	3.0 2.0			
Masonry boundary walls*		0.5 (1.0)	1.0 (2.0)			
In situ concrete paths and drives*	(0.5)	0.5 (1.0)	1.5 (2.5)			
Paths and drives with flexible surfaces or paving slabs*	(0.7)	0.5 (1.5)	1.0 (3.0)			

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

NHBC Chapter 4.2 also provides a huge guidance table on recommended distances between new plantings and structures to avoid indirect damage from future tree growth. This could also be referred to if it is felt necessary.

- **2.** The effect of shade (present and future) caused by new plantings.
- 3. Distances from new plantings and any roads (areas of unobstructed visibility)
- **4.** Planting in the vicinity of services (overhead and underground).
- **5.** Site suitability (local provenance, size and character)
- 6. Maintenance requirements and cost
- **7.** Ground preparation requirements (drainage, water availability, compaction, nutrient availability etc.)
- **8.** Possible ground preparation and planting constraints (e.g. planting schemes within an RPA).
- Availability of desired trees
- **10.** Competition from established site vegetation.
- **11.** Loss of planting stock arising from wildlife browsing (rabbits, deer etc. where applicable)
- **12.** To meet the aims set out in the planting strategy.

10.4 Site specific planting schemes

I have not been instructed to provide a planting scheme.

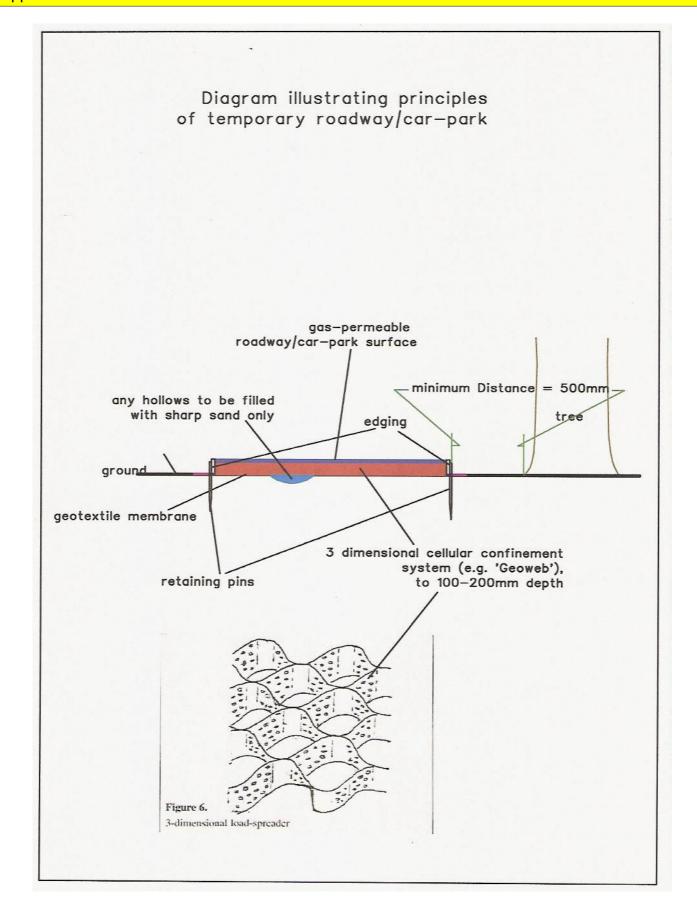
I did recommend the drawing up of a small planting scheme to mitigate any excessive site exposure caused by the development in section 8.4, so if it is felt prudent to draw up a planting scheme, then consideration needs to made for the mature height potential of any plants/shrubs selected, as they will be situated mainly south of the development and will contribute to the shade being cast over it.

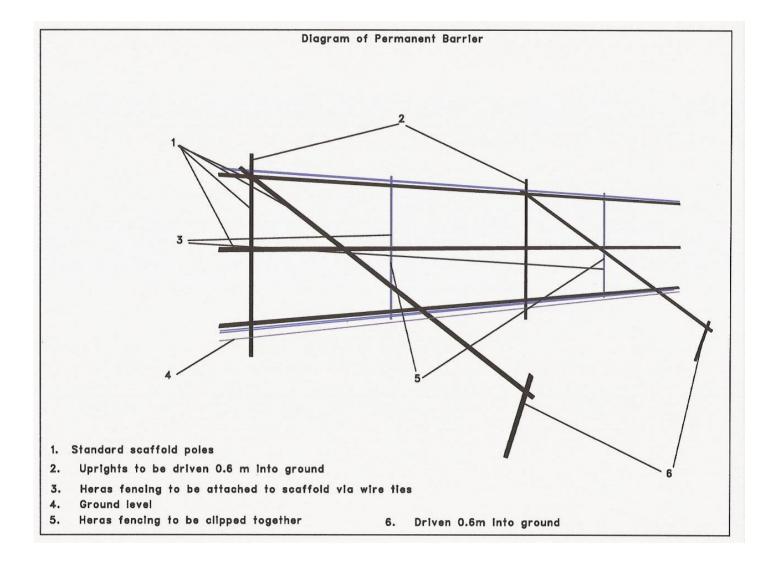
This concludes the report.
If there are any queries, please feel free to contact me.
Regards,
Mark Clews.

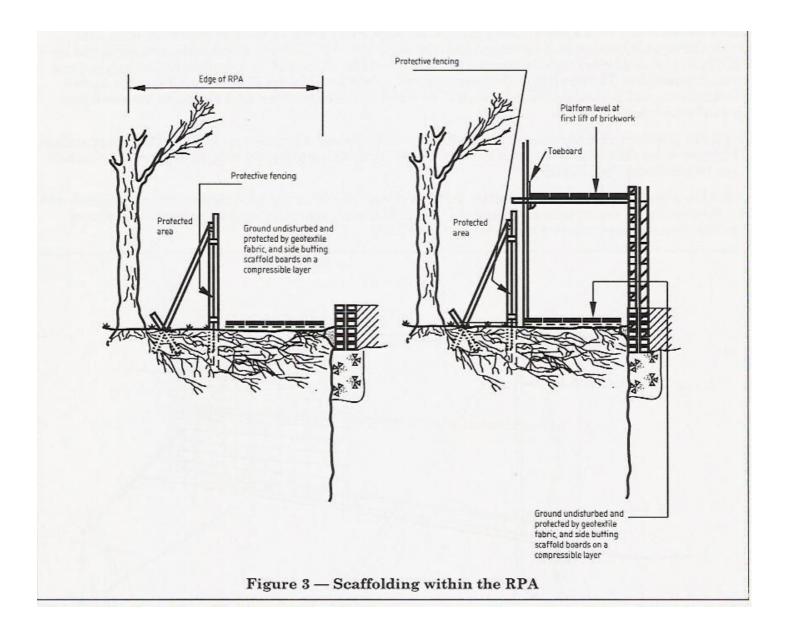
Appendix A - Casca	ide Chart For Tree Qu	uality Assessment						
TREES FOR REMOVAL								
Category & definition		Criteria						
Category R Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed for reasons of sound arboricultural management.	is expected due including those (i.e. where, for witigated by pruse that are do irreversible over Trees infected with nearby (e.g. Duttrees of better que NOTE Habitat reins	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 TO BE	CONSIDERED FOR RE	ETENTION					
Category and definition		Criteria - subcategories		Identification on plan				
	Mainly arboricultural values	2. Mainly landscape values	3. Mainly cultural values, including conservation					
Category A Those of high quality and value: in such a condition as 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 particular 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).	GREEN				
Category B Those of moderate quality and value: those 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 distinctive landscape features, thereby attracting a higher collective rating than they might as individuals but which are not, individually, essential components of formal or semiformal 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.					
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 in groups or woodlands, but without this conferring on them significantly greater landscape value and/or trees offering low or only temporary screening benefit.		GREY				

Appendix B – RPA distances

Tree protection areas assigned by BS5837:2005								
TREE	Root protection area (to nearest m²)	equivalent radius (in m)	Retention class					
T1	69	4.68	C2					
T2	269	9.24	A2					
T3	13	2.04	C2					
T4	15	2.16	C2					
T5	11	1.8	C2					







1. Protected Species

- 1.1 **Bats:** All British bat species are fully protected under schedule 5 of the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000. All British bats are also included on schedule 2 of the Conservation (Natural Habitats etc.) Regulations 1994 as European protected species.
- 1.2 Taken together, these pieces of legislation make it an offence to:
 - Intentionally or recklessly kill, injure or capture bats,
 - Deliberately or recklessly disturb bats (whether in roosts or not)
 - Damage, destroy or obstruct access to bat roosts
- 1.3 A roost is defined as any structure or place which a bat uses for shelter or protection. As bats tend to re-use the same roosts; legal opinion is that a roost is protected whether or not bats are present at the time of survey.
- 1.4 Maternity roosts are formed by pregnant females from the end of April to the end of August inclusively whilst hibernation roosts are formed from the end of October to mid March depending on weather. Any proposed work should be undertaken outside of these periods.

2. Nesting birds:

The main bird nesting season is between March and August inclusive. Contractors have a legal responsibility to comply with current legislation relating to breeding birds. Under the Wildlife and Countryside Act 1981 and the Countryside and Rights of Way Act 2000 all birds, their nests and eggs are protected and it is an offence to:

- Take, damage or destroy the nest of any wild bird while it is in use or being built.
- Take or destroy the egg of any wild bird.
- Disturb any wild bird listed on Schedule 1 while it is nest building, or at a nest containing young, or disturb the dependant young of such a bird.

Appendix G – further reading

BS4043:1989 – Recommendations for transplanting root-balled trees.

BS4428:1989 – Code of practice for general landscaping operations (excluding hard surfaces).

National Joint Utilities Group Guidance note 4 (NJUG4 – supercedent to NJUG 10) - Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees .

Tree Roots and Foundations – Biddle P.G (1998) Arboriculture Research and Information Note 142/98/EXT. Arboriculture Advisory and Information Service, Farnham, UK.

Tree Root Damage to Buildings – causes, diagnosis and remedy (vol. 1); Patterns of Soil Drying in Proximity to Trees in Clay Soils (vol. 2) – Biddle P.G. Willowmead Publishing Ltd, 1998.

Tree Root Systems – Dobson M.C. (1995) Arboriculture Research and Information Note 130/95/ARB. Arboriculture Advisory and Information Service, Farnham, UK.

Subsidence of Low-Rise Buildings. 2nd edition (2000). Institution Of Structural Engineers.

Town and Country Planning (Trees) Regulations 1999.

Town and Country Planning Act 1990.

The Wildlife and Countryside Act 1981.

The Countryside and Rights of Way Act 2000.

The Conservation (Design and management) Regulations 1994.

The Environment Act 1994.

Wind-Blown Tree Survey: analysis of results – Cutler D.F., Gasson P.E., Farmer M.C. Arboricultural journal 14 (3) pp265-286. Arboricultural Association.

APN12 – Through the trees to development (supercedent to APN1). Arboriculture Advisory and Information Service, Farnham, UK.

NHBC Standards Chapter 4.2 – Building foundation depth in proximity to trees.

Tree roots in the built environment – Research for amenity trees No. 8 (Department for Communities and Local Government).

BRE Report 209 – Site Layout Planning for Daylight And Sunlight: a guide to good practice. Building Research Establishment.

Planning Policy Statement 1 (PPS1) – Delivering Sustainable Development. ODPM.

Planning Policy Statement 3 (PPS3) - Housing. ODPM.

Planning Policy Statement 9 – Biodiversity and Geological Control. ODPM.

Planning Policy Statement 7 – Sustainable development in rural areas. ODPM.

Sheet1

Tree survey schedule for 51 Belsize Park Gardens development proposal

	The curvey concerns to December 1 and Carachic activity proposal											
Tree no.	Species	Height (in M)	Stem diameter (in cm)	Crown size , N S E W	Crown starts at (in m)	Age class	Physical condition	Structural condition	Preliminary management recommended	Useful life expectancy	Tree quality class	Protected wildlife habitat
1	Robinia pseudoacacia (robinia)	15	39	4, 5, 5, 1	4	Middle- aged	moderate/poor vigour. Excess deadwood – parts of upper crown dead	decay strip in stem – bark necrosis extends into scaffolds of crown	none	>10yrs	C2	no
2	Quercus petraea (Sessile Oak)	23	77	9, 9, 7, 7	4	mature	good vigour, good colour small amount of deadwood in lower crown	stem covered in ivy, otherwise no defects observed	none	>40yrs	A2	no
3	Castanea sativa (Sweet Chestnut)	6	17	2, 1, 2, 2	3	young	good vigour despite suppression	no defects observed	none	>20yrs	C2	no
4	Castanea sativa (Sweet Chestnut)	4	18	3, 1, 4, 4	2	young	good vigour despite suppression	no defects observed	none	>20yrs	C2	no
5	Ginkgo biloba (Maidenhair tree)	5	15	1 0.5, 0.5, 0.5	4	young	no defects observed	no defects observed	none	>20yrs	C2	no