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ARBORICULTURAL IMPACT ASSESSMENT REPORT RELATING TO THE TREES WITHIN, AND ADJACENT TO, NUMBER 62 AVENUE ROAD, ST. JOHN'S WOOD, LONDON.

CLIENT NAME:	Mr. David Draier C/O GJP Architects Ltd 764 Finchley Road Temple Fortune London NW11 7TH **Ref:** None specified
REFERENCE:	FH-JGP-Architects-62-Avenue-Road-London-2011
DATE OF VISIT:	13th July 2011 **TIME:** 10.30am
PEOPLE PRESENT:	Dr. Frank Hope Mr. Geoffrey Prentice (JGP Architects) Mr. David Draier

1.0 FORMAL DETAILS.

1.1 My name is Dr. Frank Hope and I am currently 62 years of age. I am an independent Arboricultural Consultant based at Chestnut House, Northside, Thorney, Peterborough. The practice specialises in arboriculture, urban forestry, biological sciences and project management. I have advised many major clients during the past thirty years, for example, Sainsburys, Midland Bank, Alfred McAlpine, P&O, Ministry of Defence, Environment Agency, Local Authorities, Insurance Companies, Loss Adjusters and the Health and Safety Executive.

1.2 For five years (April 1998 to April 2003), I acted for the Office of the Deputy Prime Minister (ODPM) as an Inspecting Officer on Tree

Preservation Order Appeals. This provided me with a detailed insight into this topic.

1.3 In addition to having a doctorate and masters degree in Biological Sciences (research on woody plants), I hold the National Diploma in Arboriculture (RFS) which is the foremost practical British qualification in trees and their management. I also hold numerous general horticultural qualifications, the most notable of which is the National Diploma of Horticulture (now the Master of Horticulture (RHS).

1.4 I am a Fellow of the Arboricultural Association, and a Fellow of the Institute of Groundsmanship. I am a past member of the education committee of the Arboricultural Association, past vice Chairman of the East Anglian Branch, and am a past member of the governing council. I am also a past member of the governing body of the East of England Show.

1.5 During 1997 I was one of three people commissioned by the Arboricultural Association to develop a computerised model capable of assessing the future risk of subsidence damage to buildings when trees are growing close-by.

1.6 For further detail on my qualifications and experience see Appendix -A-.

2.0 AUTHORITY AND BRIEF.

2.1 The initial authority for this commission was provided by Mr. David Draier, in the form of an email dated the 8th of July 2011.

2.2 The objectives of this commission are to:

- inspect the trees growing within, and adjacent to, number 62 Avenue Road, St. John's Wood, London;
- discuss the implications of any legal protection of the trees;
- identify the species of trees present, describe their overall condition and age, and assess their safe life expectancy;
- quantify the quality of the trees in accordance with the category rating definitions in British Standard 5837;
- make comment on the future management of the trees;

- provide guidance on the physical protection of the trees during the development of the site.

3.0 INTRODUCTION.

3.1 Number 62 Avenue Road is a large, "L" shaped, brick-built, two and three-storey, detached house located in a generally rectangular-shaped site.

Picture showing the front of the property.

3.2 It is proposed to demolish the existing building and construct a new residence, principally on the footprint of the existing building. However, the proposal is to also construct an entrance into a subterranean car park, from the front of the property.

3.3 The front garden is relatively small and is covered mainly in asphalt. It is currently used mainly for car parking. A large shrub is located along the south-eastern boundary, with a mature Lime growing in the southern corner. A row of poor quality conifers is growing between the entrance gates of the property. There is a poor quality Whitebeam on the north-western boundary of number 60 Avenue Road, and a large, mature London Plane is growing adjacent to the southern boundary of number 64. Mature Plane trees are growing within the public pavement along the front of the property.

3.4 The rear garden of the property is small, containing a small conservatory in the northern corner, and a row of mature Limes along the rear, north-

eastern boundary. Mixed species shrubs are growing around the boundary edges. Two fully mature Whitebeams are located in the rear garden of number 60, adjacent to the north-eastern boundary wall.

Picture showing the rear of the house.

4.0 INTRODUCTION TO TREE PROTECTION (STATUTORY).

4.1 Local planning authorities look upon trees as being highly beneficial to the locality. To ensure that any important specimens, or significant groups of trees, are retained, they may place **Tree Preservation Orders (TPOs)** on them. In other situations, villages or whole districts may be classified as **Conservation Areas**. In these instances certain trees in the designated area will be protected. When trees are protected, legal procedures must be followed before any work is carried out.

4.2 When trees are protected by Preservation Orders, no work should be carried out on them without prior written consent from the Local Planning Authority. Once an application is made, the Authority personnel must inspect the trees, and make a decision within a statutory eight week period as to whether the work can go ahead. If no decision is made within the eight week period, the appellant (person making the application) can appeal to the Planning Inspectorate, for non-determination. If the Local Authority refuses the application the appellant still has the right to appeal.

4.3 The legislation for Conservation Areas is slightly different to that of Preservation Orders. Trees with trunk diameters of less than 75mm at breast height are exempt from the legislation, and no application is required to carry out any work on them. Trees with trunk diameters of

between 75mm and 100mm can be removed without permission, if their removal is to allow the further development of other trees growing close-by.

4.4 When an application is made to carry out work on a tree located within a Conservation Area, the Local Authority must make a decision within a statutory six week period (not eight as with TPOs). The Local Authority has three options, namely,

1. *Give written permission to carry out the work.*

2. *Make no written decision within the six week period. If this occurs the application is accepted by default, and the owner of the tree(s) can carry out the proposed work, but it must be completed within two years of the initial application.*

3. *Refuse consent to carry out the work. If this option is selected the Local Authority must protect the tree(s) with a Preservation Order. In this instance, the owner of the trees has the right to appeal, and* ***the Local Authority must be able to show that the tree(s) are, in fact, worthy of protection.*** (Bolding added by Dr. Hope).

4.5 If a tree protected by a Preservation Order, or is located in a Conservation Area, is either killed, or wilfully destroyed, the owners of the tree, and the contractor who did the work, can both be prosecuted. The fines for killing, or wilfully destroying a tree can be high, i.e. the current maximum is £20,000 per tree, and there is an automatic requirement to re-plant. The current maximum for minor unlawful infringements, such as pruning, is £2,500.

4.6 Trees which are dead, dying or dangerous are exempt from the legislation (both Preservation Orders and Conservation Areas), although if such trees are removed, the onus of proving that they fell into one of these categories lies with the tree owner. Whenever possible it is strongly recommended that the Local Authority be given at least five days notice before any work on such trees is carried out.

4.7 No specific detail has currently been provided to confirm the legal status of the trees growing within, and adjacent to, the property. However, Mr. Prentice has verbally confirmed that the property is located within a Conservation Area. This means that no work should be carried out on the trees without prior consultation with the Local Planning Authority.

5.0 INTRODUCTION TO BRITISH STANDARD 5837.

5.1 British Standard 5837 is the industry standard, and nationally accepted document, for providing recommendations in relation to the juxtaposition of trees and buildings. The British Standard now forms the basis for all arboricultural impact assessments relating to development sites. It was revised and updated in September 2005.

5.2 In an attempt to identify which trees are worthy of retention, the British Standard suggests a category rating for all trees growing on proposed development sites.

5.3 Four broad categories have been identified within the Cascade Chart (see the chart on the following page for reference).

5.4 The category ratings in the current edition of the British Standard have been modified from those of the previous, 1991 edition. Category "D" is replaced with category "R", and categories "A", "B" and "C", contain sub-categories relating to arboricultural, landscape and cultural values.

5.5 One of the most fundamental changes in the new category rating system has been the recognition that trees with a safe life expectancy in the region of ten years or less, would be category "R" rated, and that trees with life expectancies of between 10 and 20 years (i.e. between category "R" and category "B"), should be classified as category "C".

5.6 Trees which are classified as having a British Standard 5837 category rating of "R", are of such poor quality, or have such a short safe life expectancy, that they should be removed from a site.

5.7 It is acknowledged at the bottom of the Cascade chart (see the chart above for reference) that category "C" trees should not normally be retained where they would pose a significant constraint on the development of a site. Such trees could be retained in the short-term, if considered worthwhile, and where they do not pose a constraint.

5.8 **The retention, or removal, of category "C" trees can sometimes be contentious, as Local Authorities invariably wish to retain as many trees on a site as possible. However, although the retention of category "C" trees is laudable, there are many circumstances, even if legally protected, where their removal is both sensible, and reasonable, due to their health, or other site related factors.**

TREES FOR REMOVAL

Category and Definition	Criteria	Identification on plan
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	• 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 NOTE Habitat reinstatement may be appropriate (e.g. R category tree used as a bat roost: installation of bat box in nearby tree).	DARK RED

TREES TO BE CONSIDERED FOR RETENTION

Category and Definition	Criteria - Subcategories			Identification on plan
	1 Mainly arboricultural Values	2 Mainly landscape values	3 Mainly cultural values, including conservation	
Category A **Those of high quality and value: in such 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 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-pastures)	LIGHT 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 distinct landscape features, thereby attracting a higher collective rating than 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.			

5.9 The current edition of the British Standard contains a new system of assessing the safe distance between trees and buildings. The assessment is based on tree trunk diameter, and is the basis of calculating a theoretical "Root Protection Area".

5.10 In addition to the concept of a "Root Protection Area", the British Standard provides increased guidance and recommendations on the physical protection of trees, prior to, and during, the development of a site.

6.0 INTRODUCTION TO THE INVESTIGATIONS.

6.1 The site was visited by Dr. Frank Hope on the morning of the 13th of July 2011. The morning was cloudy, and overcast. During the visit, a visual above ground assessment was made relating to the trees growing within, and adjacent to, the property.

6.2 Under normal circumstances it is standard arboricultural practice to number each of the trees within a proposed area of development using small metal, or plastic tags. However, in this instance, some of the trees were located in adjacent properties, and it was inappropriate to attach tags to them.

6.3 A scale plan (Constraints Plan) showing the position of the trees, and their theoretical Root Protection Areas, will be provided by JGP Architects, as part of the planning application.

6.4 Specific tree dimensions were measured using a metric tape and a Laser Technology "Criterion RD1000" laser.

6.5 Two trial pits were excavated in the rear garden of the property to ascertain the extent of any root development.

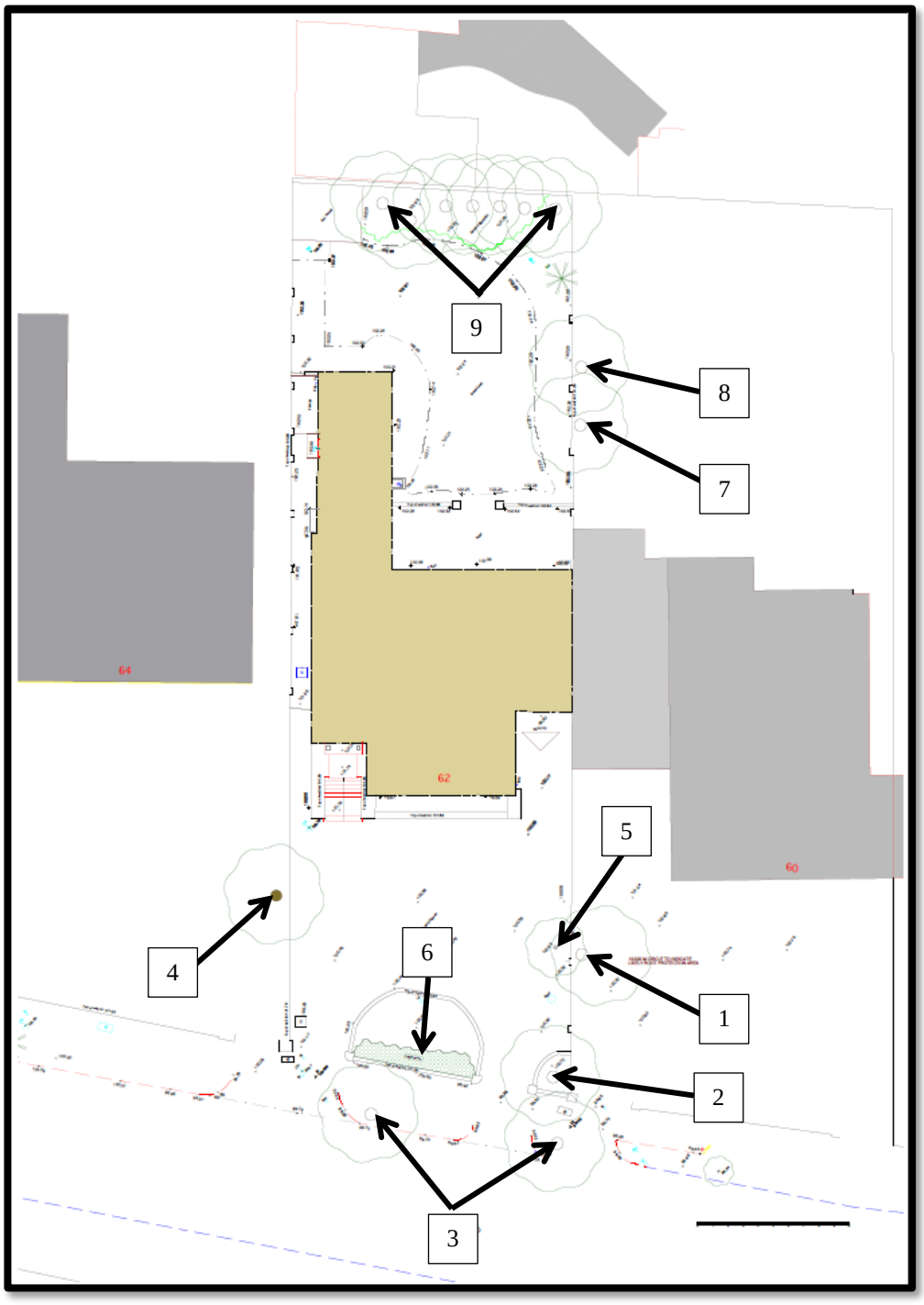
6.6 In order to obtain a detailed climatic assessment, data for the area were obtained from the publication entitled "The Agricultural Climate of England & Wales", and from Meteorological Office data in the form of MORECS sheets. **The climate is not a constraint on the proposed development.**

7.0 DESCRIPTION OF THE TREES.

7.1 The plan on the following page indicates the position of the existing house, and the location of the trees. The Field Notes provide detail on the

individual trees, and are correlated with the numbers on the plan.

Plan showing the location of the trees.



Field Notes:

Tree 1: An extremely poor quality Whitebeam (*Sorbus aria*) growing in the front garden of number 60 Avenue Road, approximately 1.0 metre from the south-eastern boundary wall of number 62. It is currently approximately 9.0 metres tall, with an average crown

spread in the region of 7.0 metres. It leans significantly away from number 62 Avenue Road, i.e. into the garden of number 60, and it has a trunk diameter of approximately 350mm. At the time of the inspection on the 13th of July, 2011, the tree had a very sparse crown. It has a British Standard 5837 category rating of "C1/R".

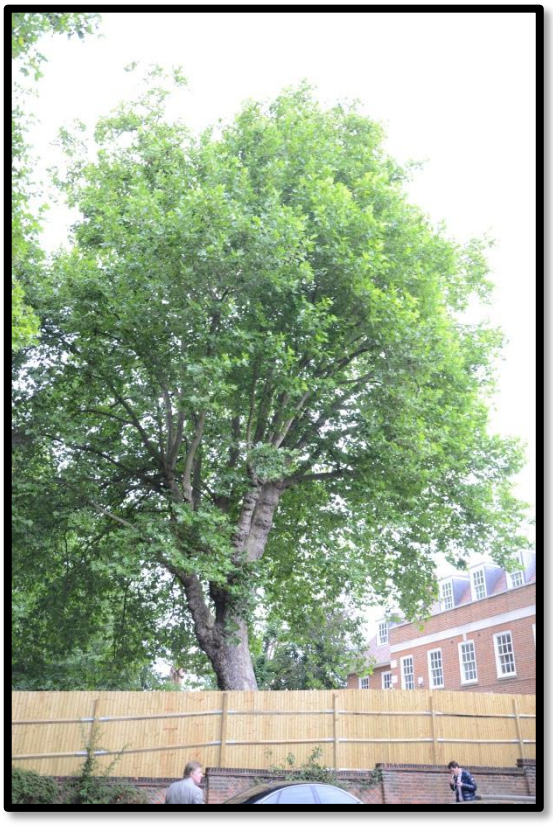
Picture showing tree 1 in the adjacent garden.

Tree 2: A poor quality Lime (*Tilia x europaea*), growing on a 1.0 metre high raised area, in the front, southern corner of the property, and beneath the canopy of one of the London Planes growing in the pavement. It is currently approximately 12.0 metres tall, with an average crown spread of 5.0 metres, and a trunk diameter of 318mm. It is being suppressed on the roadside by the growth of the adjacent Plane. The main branches emanate approximately 7.5 metres above ground level, where it has been pollarded in the past. It has a British Standard 5837 category rating of "C1".

Tree 3: Two large, mature London Planes (*Platanus x hispanica*) growing in the public pavement at the front of the property. They will not be affected in any way by the proposed development, although it will be prudent to physically protect their trunks during the development works.

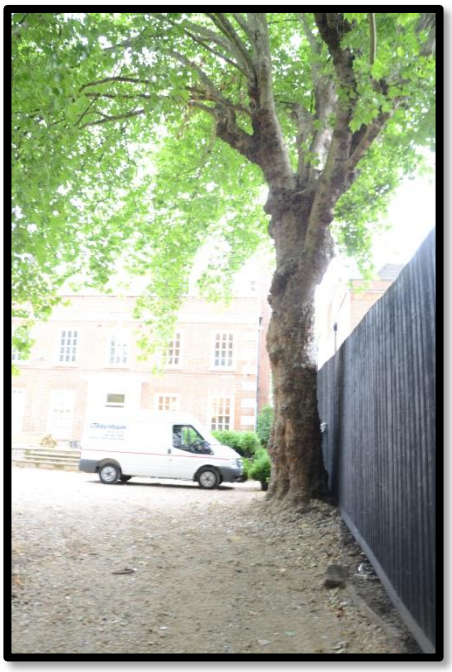
Picture showing the Lime tree 2, in the front, left-hand corner.

Picture showing the Plane tree 4 in the adjacent property.



Tree 4: A large, fully mature Plane tree (*Platanus x hispanica*) growing in the front garden of number 64 Avenue Road. It is currently 27.0 metres tall, with a crown spread to the north of 12.0 metres, to the south (over 62) 8.5 metres, to the east 9.0 metres, and towards the west 9.0 metres. It has a trunk diameter of 1123mm, and the main branches emanate approximately 8.0 metres above ground level. The boundary wall is 1.6 metres high. The tree has been pruned in the past, but has a large, spreading canopy. Number 64 Avenue Road is currently being renovated/redeveloped, but no tree protection measures have been installed, and signs of soil movement are visible around the basal trunk. The tree has a British Standard 5837 category rating of "A1".

Picture showing the base of the Plane, tree 4, close to the boundary, and with no physical protection of its roots or trunk.



Tree 5: This is a large, poor-quality, multi-stemmed evergreen shrub located within the front garden of the property, adjacent to the right-hand (south-eastern) boundary wall (See the picture on the following page). It is currently only 4.0 metres tall, with an average crown spread of 5.5 metres. No British Standard 5837 rating has been given, and it should not be used to affect the proposed development.

Tree 6: A row of poor quality Leyland Cypress (*xCupressocyparis leylandii*) hedging running along the front of the property, between

the two entrance gates (See the picture on page 3 of this report). The hedge has a British Standard 5837 category rating of "C2".

Picture showing the shrub, tree 5, growing adjacent to the boundary wall.

Tree 7: This is a fully mature Whitebeam (*Sorbus aria*) growing in the rear garden of number 60 Avenue Road, within 500mm of the northern boundary wall. It is currently 14.0 metres tall, with a crown spread over to the north (over 62) of 1.0 metre, towards the south 4.0 metres, towards the north-east 2.0 metres, and to the east 4.0 metres. It has a trunk diameter of approximately 320mm. The main branches emanate 4.5 metres above ground level, but the tree has been severely pruned (Pollarded) in the past at that height. It has also been topped at a height of between 6.5 metres and 7.0 metres. The tree has a British Standard 5837 category rating of "C1", and should not be used to adversely affect the development of the site.

Tree 8: A second Whitebeam growing in the rear garden of number 60 Avenue Road; adjacent to tree 7, and within 500mm of the boundary wall. It is currently 15.0 metres tall, with a crown spread to the north (over 62) of approximately 1.0 metre, towards the south-east 2.0 metres, and towards the west 4.0 metres. It has a trunk diameter in the region of 350mm, and the main branches emanate 4.5 metres above ground level. The tree has been severely pruned (Pollarded) in the past similar to tree number 7. It is

currently covered with Ivy. The tree has a British Standard 5837 category rating of "C1", and should not be used to adversely affect the development of the site.

Picture showing the two Whitebeams, trees 7 & 8, in the rear garden of the adjacent property.

Picture showing the row of Lime trees, tree 9, along the rear boundary of the property.

Tree 9: This is a row of 7 Limes (*Tilia x europaea*) six of which are growing within 1.5 metres of the rear boundary wall of the garden. The second tree from the left is located 2.5 metres from the wall. The trees are up to 22.0 metres tall, with average crown spreads over the garden of 7.0 metres. The main branches emanate 6.0 metres above ground level, and the trees have been severely pruned (Pollarded) on a number of occasions. Epicormic growths are present on the main trunks. The largest trunk diameter is 423mm (the second from the left is 382mm). Other than the second tree from the right, which is effectively dying and has a British Standard 5837 category rating of "R", the remainder have British Standard 5837 category ratings of "C2".

8.0 TREE SURVEY SUMMARY.

8.1 The following tree survey schedule, provides detail on all of the trees within, and adjacent to, the site.

8.2 The survey summary is based on the Field Notes, and provides an estimate on the safe life expectancy of the trees.

TREE SURVEY SUMMARY

Tree No.	Species	Height (m)	Branch spread Av. m	Stem Dia Mm	Age class	Height of crown clearance m	Physiological condition	Structural Condition	Prelim. Recomms..	Remaining contri-bution in years	BS: Cat.
1	Whitebeam	9.0	N 3.5 S 3.5 E 3.5 W 3.5	350	M	3.5	Very poor	Extremely poor	Retain in short term	<20	C1/R
2	Lime	12.0	N 2.5 S 2.5 E 2.5 W 2.5	318	M	7.5	Poor	Poor	Retain	<20	C1
3	London Planes	19.0 appr.	N 5.0 S 5.0 E 5.0 W 5.0	-	M	5.0	Average	Average	Retain	>40	B1
4	London Plane	27.0	N 12.0 S 8.5 E 9.0 W 9.0	1123	M	8.0	Average	Average	Retain	>40	A1
5	Shrub	4.0	N 2.5 S 2.5 E 2.5 W 2.5	-	M	1.5	Poor	Poor	Ideally remove	<20	---
6	Leyland Cypress	-	N - S - E - W -	-	-	-	-	-	Retain	<20	C2

7	Whitebeam	14.0	N 1.0 S 4.0 E 4.0 W 4.0	320	M	4.5	Poor	Poor	Retain	<20	C1
8	Whitebeam	15.0	N 1.0 S 2.0 E 2.0 W 4.0	350	M	4.5	Poor	Poor	Retain	<20	C1
9	Limes	Up to 22.0	N 4.0 SE 7.0 E 4.0 W 5.0	Up to 423. T2 = 382.	M	6.0	Poor	Poor	Retain	<20	C2

9.0 THE TREE CONSTRAINTS PLAN - BELOW GROUND CONSTRAINTS.

9.1 Item 5.1 of British Standard 5837 states that the influence that trees on, and adjacent to the site, will have on the layout of a development should be plotted on a plan called the **"Tree Constraints Plan"**. This is a design tool which should show the below ground constraints, represented by the theoretical Root Protection Area (RPA), and the above ground constraints the trees pose by virtue of their size and position.

9.2 In order to avoid damage to the roots or rooting environment of retained trees, the RPAs should be plotted around each of the category A, B and C trees. This is a minimum area (for conventional foundations) in m^2, which should be left undisturbed around each retained tree.

9.3 The theoretical RPA should be calculated using Table 2 of the British Standard (see the method of calculation below) as an area **"equivalent"** to a circle with a radius 12 times the stem diameter measured at 1.5 metres above ground level, for single stem trees, and 10 times basal diameter for trees with more than one stem arising below 1.5m above ground level.

9.4 **It should be noted, and appreciated, that although the theoretical RPAs of category "C" trees should be plotted, they should not normally be used as a constraint to the development of a site (See the entry at the base of the Cascade Chart on page 7 of this report).**

9.5 The bolding of part of the last sentence in the following table was added by Dr. Hope for emphasis, i.e. confirming that the use of square root protection areas is acceptable.

BS: 5837 Table 2 - Calculating the RPA

Number of Stems	Calculation
Single stem tree.	$\text{RPA } (m^2) = \frac{\left(\text{stem diameter (mm) at 1.5m x 12}\right)^2 \times 3.142}{1000}$
Tree with more than one stem arising below 1.5 metres above ground level.	$\text{RPA } (m^2) = \frac{\left(\text{Basal diameter (measured immediately above root flare) at 1.5m x 10}\right)^2 \times 3.142}{1000}$
NOTE: The 12x multiplier is based on NJUG 10(9) and published work of Matheny and Clark (10). The calculated RPA should be capped at 707 m², e.g. which is equivalent to a circle with a radius of **15m or a square with approximately 26m sides.**	

9.6 British Standard 5837 recommends that the theoretical Root Protection Area for each tree, as determined in Table 2, should be plotted on the Tree Constraints Plan taking 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). (See Note 1 of 11.3.5 of the BS.)."

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" (see 11.2.1 of the BS). The need for such measures, including the precise extent of pruning, should be assessed by an arboriculturist."

THE LIKELY TOLERANCE OF THE TREES TO ROOT DISTURBANCE.

9.7 Healthy trees produce a balance between their root systems and their branch/leaf structure. The balance of growth is known as the root:shoot ratio, and it ensures that the tree has enough roots to provide adequate moisture and nutrients to support the branches and leaves. If the root:shoot ratio is altered to any extent, the tree will rapidly produce new growth to reinstate the balance.

9.8 It is important to appreciate that the pruning of a tree's root system does not necessarily mean that it will cause any lasting harm to the tree, and there is no evidence available to indicate that pruning the **non-structural roots** of a tree at a distance of say 3.0 metres from its trunk, will lead to any greater risk of disease ingress, or reduction in life expectancy, compared to pruning the same roots at a distance of say 4.0 metres, or greater. The critical points in relation to distance from the trunk are that of maintaining tree stability, and adequate amounts of roots for moisture and nutrient absorption.

9.9 **There is no available evidence to indicate that minor root disturbance, or damage, would adversely affect the safe life expectancy of the trees growing within, or adjacent to, the site.**

THE MORPHOLOGY AND DISPOSITION OF TREE ROOTS.

9.10 The vast majority of the roots of trees will be within the top 1.0 metre of the soil surface, and the spatial development of the roots will be affected by obstructions within the soil, which can act as partial root barriers.

9.11 The root system of the very poor quality Whitebeam growing in the front garden of number 60 Avenue Road will have been affected by the foundations of the boundary wall separating the two properties. The wall has cracked, and the only practical way to repair it in its present position would be to remove the tree. In my opinion, there will be few, if any, significant sized roots from the tree encroaching onto the property. The theoretical Root Protection Area of this tree will skewed by the presence of the boundary wall.

9.12 The only significant tree within the front garden of the property is the Lime tree (T2) growing on the elevated position to the right of the southern-most entrance to the site. The retaining wall around the base of the tree will have acted as a root barrier preventing root development beneath the asphalt.

9.13 Both of the London Planes (T3) at the front of the property will have had their root development restricted to some extent by the boundary walls. However, the proposed development is nowhere near the theoretical Root Protection Areas of the trees.

9.14 The large London Plane (T4) growing in the front garden of number 64 Avenue Road will have had its root development affected by the presence of the boundary wall between it, and the front garden of number 62 Avenue Road. The presence of the boundary wall indicates that few roots will have encroached into the garden of number 62.

9.15 The shrub growing within the front garden of number 62 Avenue Road will have had its root development affected by the foundations of the boundary wall. However, the plant has no special attributes, and should not affect the development of the site. The dead stump next to the shrub should be removed.

9.16 The Leyland Cypress will have had their root development affected to some degree by the boundary wall. However, they will not be affected by the proposed development, and can be left in situ if required.

9.17 Two Whitebeams (T7 & T8) are growing within the rear garden of number 60 Avenue Road, adjacent to the boundary wall. Their root development will have been significantly affected by the foundations of the boundary wall.

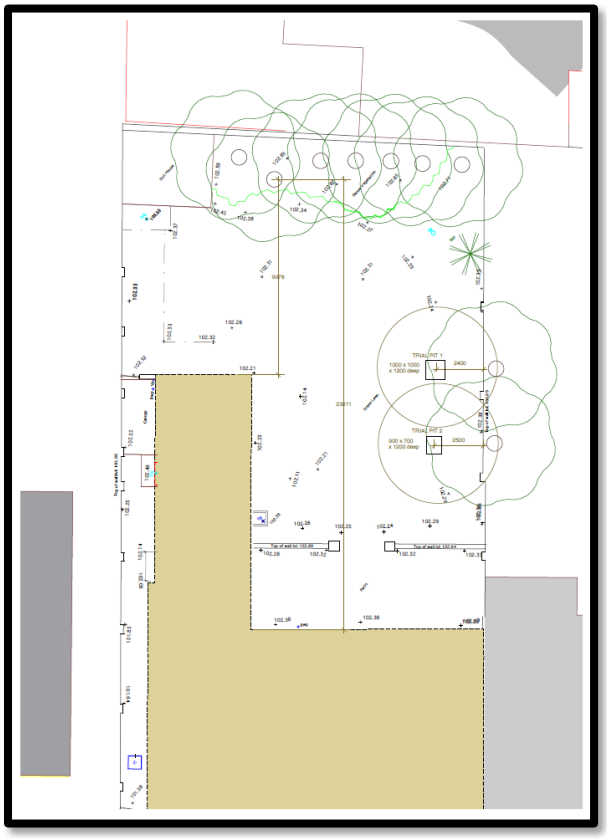
As the current proposal is to extend the new house into the existing rear garden, it was considered worthwhile to carry out some site investigations to ascertain if any significant numbers of the roots from the Whitebeams have grown beneath the boundary wall, and into the rear garden of the property.

Two trial pits were excavated by hand in the rear garden, between 2.4 and 2.5 metres away from the boundary wall (See the plan on the following page for detail). Trial pit 1 measured 1000mm long by 1000mm wide, and was excavated to a depth of 1200mm. Trial pit 2 measured 900mm long by 700mm wide, and was also dug down to a depth of 1200mm.

The specification for the excavations was that the pits should be dug by hand-held equipment (not mechanical diggers), and should go down to a depth of at least 300mm below the level of the foundations. If any roots with a diameter of 25mm or greater were encountered during the

excavations, the works were stopped. The directive was that no roots of over 25mm should be severed.

Plan produced by GJP Architects showing the location of the trial pits.



Picture showing the sides and base of trial pit 1.

Close-up picture of Trial Pit 1 showing no significant root growth.

Picture showing the bottom and sides of Trial Pit 2.
(Note no significant roots in the profile).

Picture showing Trial Pit 2, containing 2 roots of approximately 25mm to 30mm diameter, within 300mm of the soil surface. These roots will not have emanated from the Whitebeams.

9.18 The site investigations indicate that there are no significant roots of the Whitebeams in the rear garden of the property.

9.19 The row of Limes along the rear boundary will have had their roots affected by the foundations of the adjacent wall. The majority of their roots would be expected to be within the rear garden of the property.

THE SOIL TYPE AND STRUCTURE.

9.20 Detailed textural analysis of the soil would provide a greater insight into the conditions on the site. However, the visual inspection of the soil, coupled with the age and condition of the trees, indicate that the soil would not be a below ground constraint in the future growth of trees on the site.

TOPOGRAPHY AND DRAINAGE.

9.21 The site is generally level, and there are no signs to indicate that the topography, or drainage, will be a limiting factor in the future growth of trees on the site.

SIGNIFICANT PART OF A TREE'S CROWN OVERHANGING THE POSITION OF TREE PROTECTION BARRIERS.

9.22 British Standard 5837 recognises that in certain instances, some pruning of trees will have to take place on development sites. The British Standard accepts that "Access Facilitation Pruning" is a recognised method of reducing tree canopies.

9.23 The current proposal is to rebuild within the existing footprint of the house, and all of the trees worthy of retention have their crowns at height, which will not be adversely affected by the development.

9.24 There should be no requirement for any low branches to overhang any areas of the proposed development.

10.0 CALCULATION OF THE ROOT PROTECTION AREAS.

10.1 The overall Root Protection Area in m², for each of the trees worthy of retention on a site, is calculated using a theoretical circle. However, in many cases it is not expedient, or practical, to use a circular Root Protection Area. Item 5.2.4 of British Standard 5837 recognises this, and allows the shape of the Root Protection Area to be changed, but not reduced in size. Item 5.2.4 states the following:

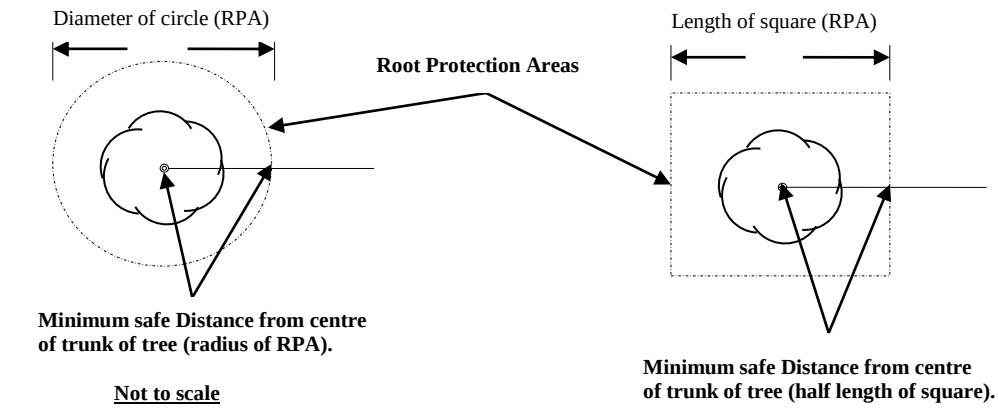
"The RPA, for each tree as determined in Table 2, should be plotted on the TCP (Tree Protection Plan) taking full account of the following factors, as assessed by an arboriculturist, ***which may change its shape but not reduce its area whilst still providing adequate protection for the root system****."* (Bolding added by Dr. Hope).

10.2 Item 5.2.3 of British Standard 5837 confirms that it is acceptable to modify the shape of the Root Protection Areas, for example, it states the following:

"The calculated RPA should be capped at 707m², e.g. which is equivalent to a circle with a radius of 15m or ***a square*** *with approximately 26m sides."* (Bolding added by Dr. Hope).

10.3 As all of the trees within, and adjacent to, the site are close to the boundary edges, the most appropriate method of calculating the theoretical Root Protection Areas, will be a square.

Diagram showing the minimum safe distances between trees and construction (conventional foundations).



10.4 Item 5.2.4(a) of British Standard 5837 indicates that for individual open grown trees only, it is possible to offset up to 20% of the Root Protection Area in one direction. In the case of the trees within, and adjacent to, the grounds of the property, I consider the use of the 20% reduction would be inappropriate.

10.5 The overall theoretical Root Protection Areas for the trees based on Table 2 of the current British Standard 5837, are shown below. The Whitebeam (T1) and shrub (T5) have been included for completeness only. Two figures have been provided for the Limes (T9), the first is for the largest trunk diameter, the second related to the 2nd tree from the left, as it is growing further away from the wall than the rest.

Calculation of the theoretical Root Protection Areas.

$$RPA\ (m^2) = \left(\frac{\text{stem diameter (mm) at 1.5m x 12}}{1000}\right)^2 \times 3.142$$

No.	Location	Tree species	Trunk Dia.	RPA (m^2)
1	Front No. 60	Whitebeam	350mm	55.4
2	Southern corner	Lime	318mm	45.8
3	Roadside	Planes	-	-
4	Front No. 64	Plane	1123mm	571.0
5	Front garden	Shrub	-	-
6	Front boundary	Leylandii hedge	-	-
7	Rear No. 60.	Whitebeam	320mm	46.3
8	Rear No. 60	Whitebeam	350mm	55.4
9	Rear boundary	Limes	423/382mm	81.0/66.0

(The RPA figures have been rounded to 1 decimal point.)

10.6 The table below indicates the dimensions of the sides of the theoretical square Root Protection Areas for each of the trees, without a 20% reduction in area. The trees would be located centrally within each of the squares.

RECOMMENDED ROOT PROTECTION AREAS - SQUARES.

No.	Location	Tree species	RPA(m^2)	Length(m)/Width(m)
1	Front No. 60	Whitebeam	55.4	7.4
2	Southern corner	Lime	45.8	6.7
3	Roadside	Planes	-	-
4	Front No. 64	Plane	571.0	23.9
5	Front garden	Shrub	-	-
6	Front boundary	Leylandii hedge	-	-
7	Rear No. 60.	Whitebeam	46.3	6.8
8	Rear No. 60	Whitebeam	55.4	7.4
9	Rear boundary	Limes	81.0/66.0	9.0/8.1

(The figures for the length of the side have been rounded to 1 decimal point.)

10.7 As the trees would be located centrally within the squares, the actual distances between the trees and the nearest point of excavation will be half the figures of the length/width measurement (see the table below).

RECOMMENDED MINIMUM DISTANCES TO CONSTRUCTION (CONVENTIONAL FOUNDATIONS/EXCAVATIONS).

NO.	Tree species	Dist. from tree (m)
1	Whitebeam	3.6
2	Lime	3.4
3	Planes	-
4	Plane	12.0
5	Shrub	-
6	Leylandii hedge	-
7	Whitebeam	3.4
8	Whitebeam	3.7
9	Limes	4.5/4.1

(The distance figures have been rounded to 1 decimal point.)

10.8 The theoretical squares do not need to be in a north/south direction when plotted on the design plan. They can be swivelled around to accommodate

the buildings. In addition, there is no disadvantage if any of the RPAs overlap each other.

10.9 It is critical to note that the theoretical Root Protection Areas do not take into account the influence of the boundary walls on the trees. In reality, the extent of the roots within the property will almost certainly be considerably smaller than the Root Protection figures.

10.10 As the row of Limes (T9) is located close to the rear boundary of the site, it is recommended that their theoretical Root Protection Areas be increased by 2.0 metres on the garden side, i.e. to provide a greater protection area.

10.11 The Tree Constraints Plan, which will form part of the planning submission, will indicate the position and size of the theoretical Root Protection Areas for the trees in relation to the position of the building.

11.0 TREE CONSTRAINTS - ABOVE GROUND CONSTRAINTS.

11.1 In relation to "Above Ground Constraints", items 5.3.1 & 5.3.2 of British Standard 5837 state the following:

"The current and ultimate height of category A, B and C trees should be annotated on the tree constraints plan (TCP) ***where this would cause unreasonable obstruction of sunlight or daylight to the development****. In practice this could be represented by a segment with a radius from the centre of the stem equal to the height of the tree drawn from due North West to due East indicating the shadow pattern through the main part of the day."* Bolding added by Dr. Hope.

The current and ultimate height and spread of a tree is also a constraint due to its size, dominance and movement in strong winds. For this reason, as well as in relation to shading, the existing spread of branches and the future branch growth should be taken into consideration as a constraint in the design phase."

11.2 There should be no above ground tree constraints.

12.0 BARRIERS AROUND THE TREES.

12.1 Section 9 of British Standard 5837 provides guidance and recommendations relating to the protection of the construction exclusion

zone. Abbreviated notes from the British Standard, which are relevant to the protection of the trees on the site are identified below.

Barriers:

"Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s). On all sites, special attention should be paid to ensuring that barriers remain rigid and complete.

In most cases, barriers should consist of a scaffold framework in accordance with Figure 2 comprising a vertical and horizontal framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3 m. Onto this, weldmesh panels should be securely fixed with wire or scaffold clamps. ***Weldmesh panels on rubber or concrete feet are not resistant to impact and should not be used."*** (Bolding added by Dr. Hope).

12.2 The majority of damage to trees on development sites occurs within a few hours of machinery first entering the site. The damage can occur in numerous ways. It can be direct, i.e. where the trees are physically hit by moving plant, or indirect, where the soil structure or levels, are changed to such an extent that the moisture regimes are altered. It should also be appreciated that other agencies, such as spilt fuel, or fires can cause significant damage.

12.3 It is essential that tree protection measures are put in place before any construction traffic is allowed on the sensitive sections of a site.

13.0 METHODS OF PROTECTING THE TREES ON THE SITE.

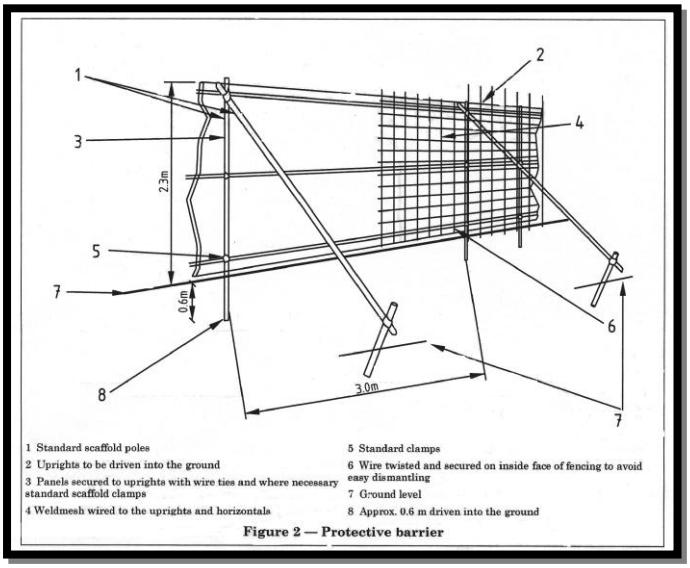
13.1 The majority of the trees are growing within the adjacent properties, and are separated from the site by boundary walls. There should be no requirement to provide addition protection to these trees.

13.2 The row of Limes (T9) will require protection prior to, and during, the construction works. It is recommended that these trees should be protected using the guidelines in Figure 2 of British Standard 5837 (see the diagram on the following page).

13.2 Once the protective fencing has been erected the protected area should be sacrosanct, and under no circumstances should any personnel or

equipment be allowed to enter the protected area. All subsequent work should be carried out from the construction side of the fencing.

FIGURE 2 OF BRITISH STANDARD 5837



1 Standard scaffold poles
2 Uprights to be driven into the ground
3 Panels secured to uprights with wire ties and where necessary standard scaffold clamps
4 Weldmesh wired to the uprights and horizontals
5 Standard clamps
6 Wire twisted and secured on inside face of fencing to avoid easy dismantling
7 Ground level
8 Approx. 0.6 m driven into the ground

Figure 2 — Protective barrier

13.3 No materials, such as bricks, petrol, gravel or cement should be stored beneath the crowns of the trees, and any site huts and latrines should be sited well away from the protected area. No fires should be allowed within 20.0 metres of the crowns of the trees.

13.4 No protective fencing should be removed until all of the construction works are completed.

14.0 THE POSITIONING OF THE CAR PARK ENTRANCE.

14.1 The current proposal is to construct a subterranean car park beneath the new house, with its entrance within the current area of asphalt. This will entail the excavation of some of the front garden.

14.2 The introduction of a car park entrance at the front of the property should not harm any of the trees, as long as the excavations are outside the Root Protection Areas of the trees.

15.0 SITE INVESTIGATIONS.

15.1 If the siting of the car park entrance, is within the theoretical Root Protection Areas, it is recommended that a series of excavations be carried out, similar to those in the rear garden, adjacent to the boundary

walls to ascertain if any significant numbers of roots from the trees have encroached into the property.

15.2 If the Local Authority request site investigations to assess the numbers of roots present, or if the owner of the site considers it appropriate to carry them out prior to making a planning application, it is recommend that the following procedure be followed:

i. position the pits/trenches against the boundary walls, as close as possible to the centre of the trunks of the trees;

ii. the size of the pits/trenches should ideally be between 1.0 metre and 1.5 metres long, by 1.0 metre wide;

iii. the excavations should be carried out by hand held equipment (not mechanical diggers), and should go down to a depth of at least 300mm below the level of the foundations;

iv. If any roots with a diameter of 25mm are encountered during the excavations, the works should be stopped. No roots of over 25mm should be severed;

v. if roots with diameters of 25mm are encountered, they should be inspected by an arboriculturalist so as to assess their possible influence on the life expectancy of the trees;

vi. if the Local Authority personnel are not present during the investigations, adequate JPEG photographs should be taken for future reference;

vii. Once the excavations are completed the trial pits/trenches should be back-filled using hand-held equipment to prevent any roots from drying out.

16.0 CONCLUSIONS AND RECOMMENDATIONS.

16.1 It is proposed to redevelop number 62 Avenue Road by demolishing the existing house and constructing a new residential property, mainly on the existing footprint. It is also proposed to incorporate a car park entrance at the front of the property.

16.2 No detail has been provided in relation to the legal status of the trees, but it is believed that the property is within a Conservation Area. It is

recommended that no work should be carried out on the trees without prior consultation with the Local Authority.

16.3 The majority of the trees are in a poor condition, and have been severely pruned throughout their lives. The dead stump and shrub in the front garden should ideally be removed.

16.4 Most of the trees have British Standard 5837 category ratings of "C". Other than the solitary Lime in the front garden, and the row of Limes in the rear garden, the trees are located in adjacent properties, separated by brick-built boundary walls.

16.5 The following table contains the trees growing within, and adjacent to, the property. The table identifies the minimum safe distance between the trees and any conventional excavations. However, it should be appreciated that the figures do not take into consideration the influence the foundations of the boundary walls will have had on the possible encroachment of the tree roots. In reality, other than the size of the Root Protection Area for the Limes (T9) in the rear garden, there is a high probability that no significant encroachment will have taken place, and the Root Protection Areas will be in excess of that required.

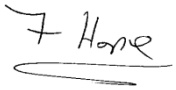
RECOMMENDED MINIMUM DISTANCES TO CONSTRUCTION (CONVENTIONAL FOUNDATIONS/EXCAVATIONS).

NO.	Tree species	Dist. from tree (m)
1	Whitebeam	3.6
2	Lime	3.4
3	Planes	-
4	Plane	12.0
5	Shrub	-
6	Leylandii hedge	-
7	Whitebeam	3.4
8	Whitebeam	3.7
9	Limes	4.5/4.1

16.6 It is recommended that the Root Protection Area of the row of Limes in the rear garden be extended by 2.0 metres to provide an increased buffer zone from any excavations.

16.7 If any excavations will be within the theoretical Root Protection Areas of the trees, it is recommended that site investigations are carried out to assess the actual encroachment of roots from the adjacent properties.

16.8 Any works to the trees should be as per the recommendations in British Standard 3998 "Tree Work", 2011.



8th August 2011