DR. FRANK HOPE

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ARBORICULTURAL IMPACT ASSESSMENT REPORT RELATING TO THE TWO ASH TREES LOCATED ON LAND AT HOLBEACH DROVE GATE, HOLBEACH DROVE, PE12 0RX.

CLIENT NAME:	Mr Kevin Vaughan Mill House Church Lane Tydd Giles Wisbech PE13 5LA **Ref:** None specified		
REFERENCE:	FH-Vaughan-Holbeach-Drove-Gate		
DATE OF VISIT:	8th August 2018	**TIME:**	1.30pm
PEOPLE PRESENT:	Dr Frank Hope Mr Kevin Vaughan		

1.0 FORMAL DETAILS.

1.1 My name is Dr Frank Hope and 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, The Health and Safety Executive, Metropolitan Police, Local Authorities, Insurance Companies and Loss Adjusters.

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 a master's 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 retired Fellow of the Arboricultural Association, and a retired 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 report was provided by Mr Kevin Vaughan in the form of an email dated the 25th of July 2018.

2.2 The objectives of this commission are to:

- inspect the Ash trees (*Fraxinus excelsior*) located on the land at the junction of Holbeach Drove Gate, and Main Road, Holbeach Drove, Lincolnshire;
- discuss the implications of any legal protection of the trees;
- assess the overall condition of the trees, and assess their safe life expectancies;
- quantify the quality of the trees in accordance with the category rating definitions in British Standard 5837 (April 2012 edition);

- provide guidance on the possible juxtaposition of the proposed new house and the trees;

- provide guidance on the physical protection of the trees during the demolition and construction works.

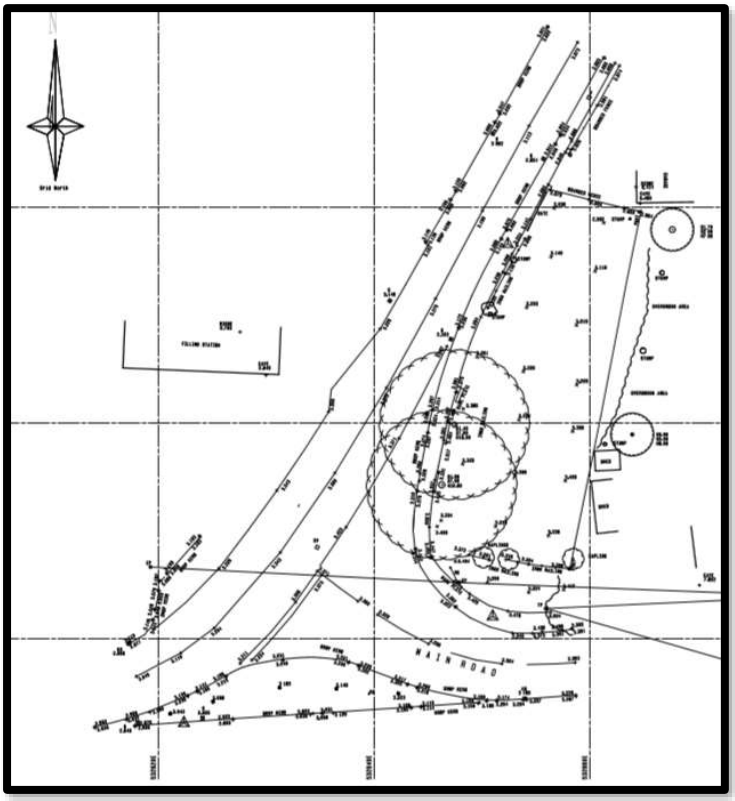
3.0 DESCRIPTION OF THE PROPERTY.

3.1 The proposed development site is a narrow, approximately rectangular plot of land, located at the south-eastern corner of the junction of Holbeach Drove Gate, and Main Road, Holbeach Drove (See the plan below).

3.2 The site is currently derelict, and generally level. It is accessed via two entrances along Holbeach Drove Gate; the historic entrance is close to the southern end of the site, between two trees, with a much newer entrance at the northern end. There are partial remains of old metal fencing along the southern and western boundaries.

3.3 There are only two poor quality, mature Ash trees located on the western side of the plot, straddling the historic entrance.

Plan provided by Ken Elener Architectural Design, showing the location of the property.



Picture looking northwards showing the existing site.

Picture showing the northern end of the site with the posts forming the most recent entrance.

Picture showing the historic entrance located between the Ash trees.

Picture showing the central area of the site (Beech "T3" to the rear).

Picture showing the very poor quality Beech in the adjacent property.

Picture showing the very poor quality Poplar (Tree "T4") in the adjacent property, to the north east of the plot.

Picture showing the remains of a tree along the north-western boundary of the site.

Picture showing the stump of a recently felled tree in the adjacent property to the east of the plot.

3.4 Some tree removal has taken place in the past from within the plot, and recent tree removal has occurred on the adjacent land to the east.

3.5 Other than the Ash trees on the western boundary there are no other trees of note within the curtilage of the site. However, there is a very poor quality Beech (*Fagus* sylvatica) and a very poor quality Poplar (*Populus nigra Cv.*) located in the adjacent property to the east (See the pictures on page 6).

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 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, 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.

5.0 THE LEGAL STATUS OF THE ASH TREES WITHIN THE SITE.

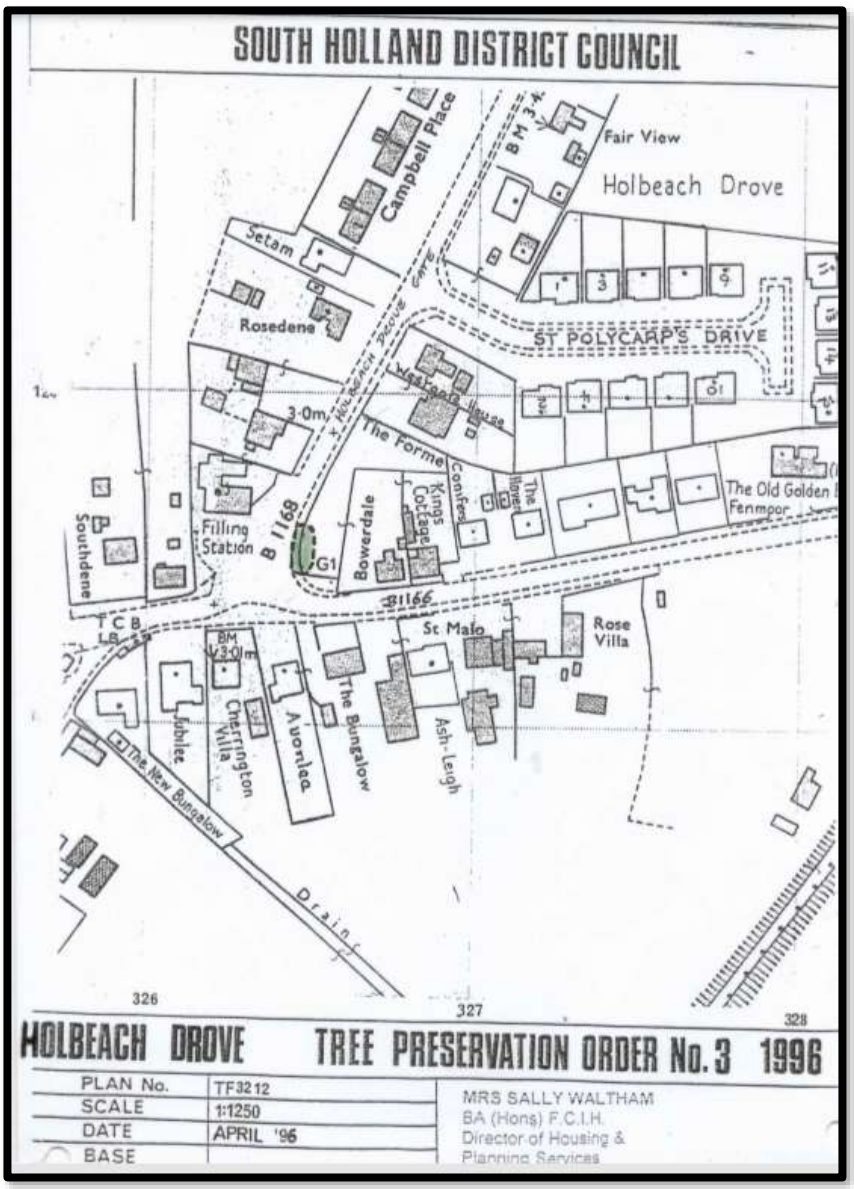
5.1 The proposed development site is not located within a Conservation Area.

5.2 The Local Planning Authority have previously protected a number of trees within the curtilage of the site by a Preservation Order. The Preservation Order is entitled "Holbeach Drove Preservation Order No. 3, 1996, and it came into force in April 1996.

5.3 The Preservation Order protected a "Group" of three Ash (*Fraxinus excelsior*) trees identified in the schedule as Group "G1".

5.4 A note to the Preservation Order stated that the TPO does not apply to the sapling chafing the fence adjacent to the middle tree (See the printout below).

Scanned copy of the plan to the Tree Preservation Order.



Scanned copy of the entry in the tree schedule.

Groups of Trees
(within a broken line on the map)

No. on Map	Description	Situation
G1	Group of 3 Ash (Fraxinus excelsior) (Note: The Tree Preservation Order does not apply to the sapling chafing the fence adjacent to the middle tree)	On the north eastern side of the B1166/ Holbeach Drove Gate junction extending from grid reference TF 32650 12360 in a southerly direction for approximately 15 metres.

5.5 There does appear to be some ambiguity within the Preservation Order, as at the time of my site visit Mr Vaughan informed me that an Ash tree had previously been removed following an accident with a HGV vehicle. It is interesting to note that during the conversation Mr Vaughan informed me that following the incident the Local Planning Authority Tree Officer told him that she considered that the trees were some of the worst to have a TPO placed on them. It appears that the tree that was removed following the incident was considered to have been the best tree in the group.

5.6 As the Ash trees are legally protected no work should be carried out on them without prior consultation and written consent from the Local Planning Authority.

6.0 INTRODUCTION TO BRITISH STANDARD 5837.

6.1 British Standard 5837 is the industry standard, and nationally accepted document, for providing recommendations in relation to the juxtaposition of trees and buildings. Although not a statutory document, the British Standard now forms the basis for almost all arboricultural impact assessments relating to development sites. It was revised and updated in April 2012.

6.2 In an attempt to identify which trees are worthy of retention, the British Standard suggests a category rating for all trees growing on, or adjacent to, proposed development sites (See the chart on the following page).

6.3 The chart on the following page identifies four broad category ratings of trees. The ratings have been modified slightly from those of the previous, 2005 edition. Category "R" is replaced with category "U", whilst categories "A", "B" and "C", retain the same three sub-categories relating to arboricultural, landscape and cultural values. All three of the sub-categories carry the same weight when assessing trees.

6.4 One of the most fundamental changes in the new category rating system has been the recognition that trees that cannot be realistically retained as living trees in the context of the current land use for longer than 10 years are given the rating of "U".

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

TABLE 1 – Cascade Chart for tree quality assessment.

Category and Definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby or very low quality trees suppressing adjacent trees of better quality NOTE Category U trees can have an existing or potential conservation value which might be desirable to preserve; see 4.5.7			See Table 2
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
Category A **Tree of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual, or those that are essential components of groups, or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remedial defects, including unsympathetic past management and storm damage), such that they unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Table 2 Identification of tree categories.

Category from Table 1	Colour A)	RGB code A)
U	Dark red	127-000-000
A	Light green	000-255-000
B	Mid blue	000-000-255
C	Grey	091-091-091
A) Colours verified against http://safecolours.ridgenage.com/palettefiles.html#files [viewed 2012-03-26]		

An acceptable alternative to the use of a colour coding scheme on the plans is to suffix the tree category rating adjacent to the tree identification number, for example 217-A, 218-C etc.

6.6 Item 4.5.8 of the British Standard acknowledges that when categorising a tree, the presence of any serious disease, or tree-related hazards should be taken into account.

6.7 The definition of category "C" in the British Standard has been modified compared to the previous 2005 edition. The current edition still recognises that category "C" includes low quality trees, with estimated safe life expectancies of between 10 years and 20 years, but it now incorporates young trees with stem diameters of below 150mm.

6.8 It is of importance to note that the British Standard accepts that whilst the presence of young trees of good form and vitality is generally desirable, they need not necessarily be a constraint on a site's potential.

6.9 **The retention, or removal, of any of the four categories of 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 trees is laudable, there are many circumstances, even if legally protected, where their removal is both sensible, and reasonable, due to other site related factors.**

6.10 The British Standard recommends that where trees are removed "Mitigation" planting should be considered where appropriate.

6.11 The current edition of the British Standard maintains the previous methodology of assessing the safe distance between trees and buildings, i.e. the assessment is based on tree trunk diameter, and is the basis of calculating a theoretical "Root Protection Area". However, the measurement of multi-stemmed trees has been modified somewhat.

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

7.0 INTRODUCTION TO THE INVESTIGATIONS.

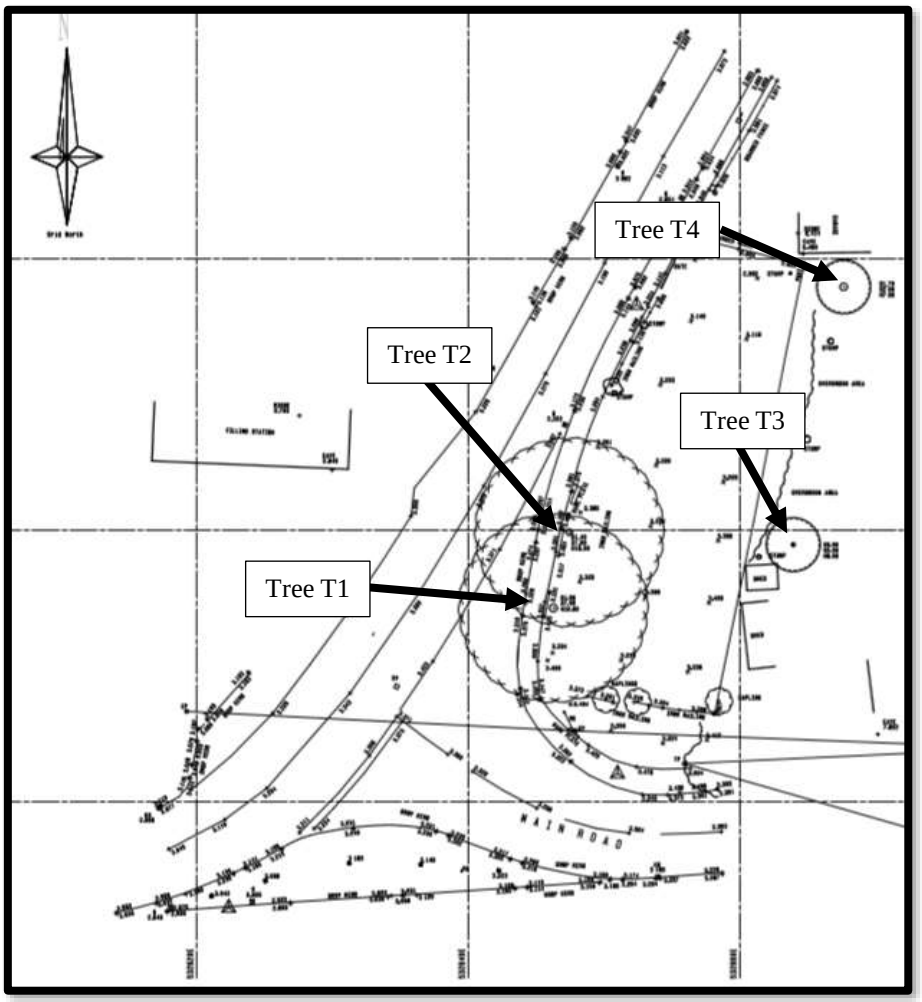
7.1 I visited the site on the afternoon of the 8th of August 2018. The afternoon was clear and bright. During the visit, I carried out a visual above ground assessment of the Ash trees growing within the curtilage of the property, and where possible, the trees in the adjacent properties. No climbed or invasive internal inspections of the trees were carried out.

7.2 When carrying out tree surveys, or inspections, for development purposes, it is standard arboricultural practice to number each tree, or groups of trees, shown on the topographic survey, with numeric tags so as to make future identification straightforward. If required, the numbers of the trees can then be combined with the tree category ratings, and added to the development plan.

7.3 As there are only two trees located within the property, it was considered unnecessary to attach identification tags to their trunks. Within this report the trees have, therefore, been identified with the arbitrary references of "T1" and "T2". No identification tags could be attached to the trees in the adjacent property.

7.4 The plan below provides an accurate representation of the site at the time of my site visit. A scale copy of the plan will be provided as part of the planning application.

<u>Plan showing the location of the property.</u>



8.0 DESCRIPTION OF THE TREES - FIELD NOTES.

Tree T1: This is a very poor quality, multi-stemmed Ash tree (*Fraxinus excelsior*) located on the south-western side of the site, adjacent to the historic entrance. It actually appears to consist of two maturing trees growing right up against each other, forming one contiguous canopy.

Picture looking along Holbeach Drove Gate showing the Ash (T1) with the second Ash (T2) behind it.

As the main stems are so close together they will be described as a solitary tree within this report. The tree is up to 15.0 metres in height, with a crown spread to the north of only 3.0 metres (towards tree T2), to the south 8.0 metres, to the east (over the site) 7.5 metres and to the west 7.0 metres. The crown of the tree is sparse and contains extensive dead branches and branch stubs, for example at a height of 1.0 metre above ground level. Some branches have snapped off. The tree is showing signs of significant overall deterioration. The main branches emanate above 2.0 metres of ground level. Some roots close to the main trunk have been damaged in the past, and some decay has occurred in at least one of the surface roots. The basal trunk of the tree has engulfed a section of the old metal fencing along the boundary of the site, and a large piece of metal has also been engulfed close to ground level on the eastern side. There is a potentially very weak union approximately 500mm above ground level.

Picture showing the very poorly-shaped Ash tree (T1) to the right of tree "T2".

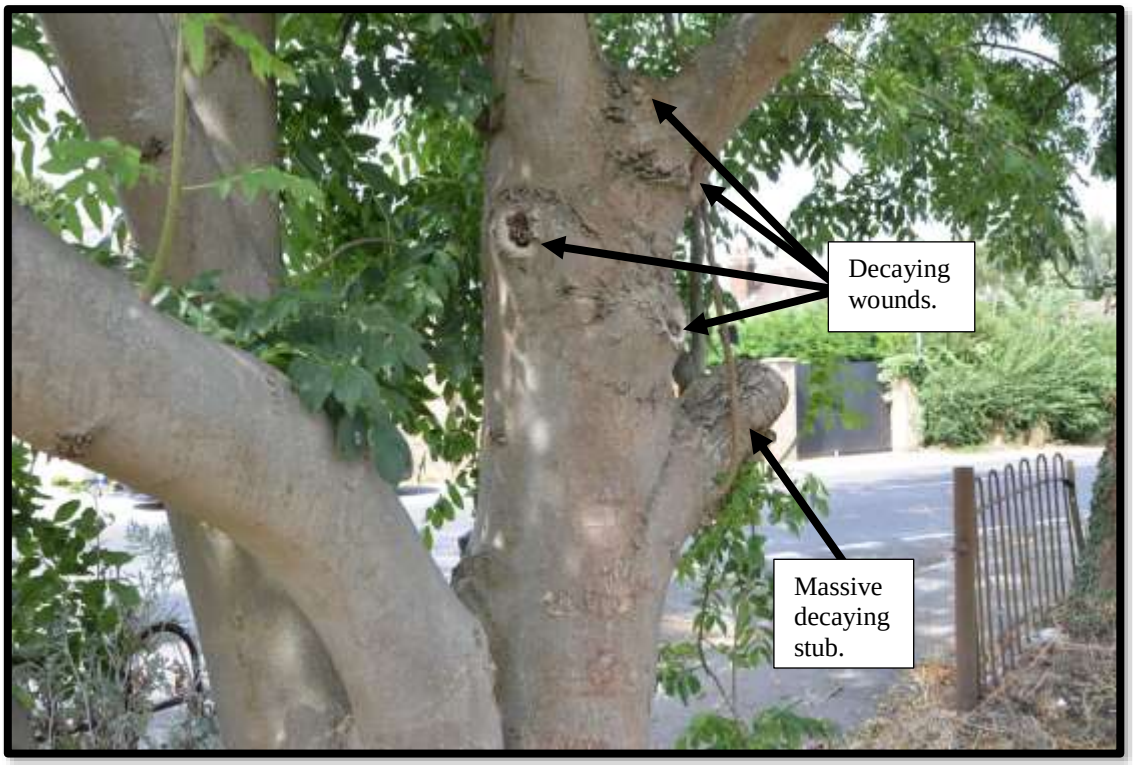
Picture showing the weak trunk union of tree "T1".

Picture showing the weak union between two upright upright-growing structural stems.
Note the engulfed metal bar, and decay of one of the stems.

Picture showing a large decaying stub on a main stem, 1.0 metre above ground level. Note also the partially occluded wound.

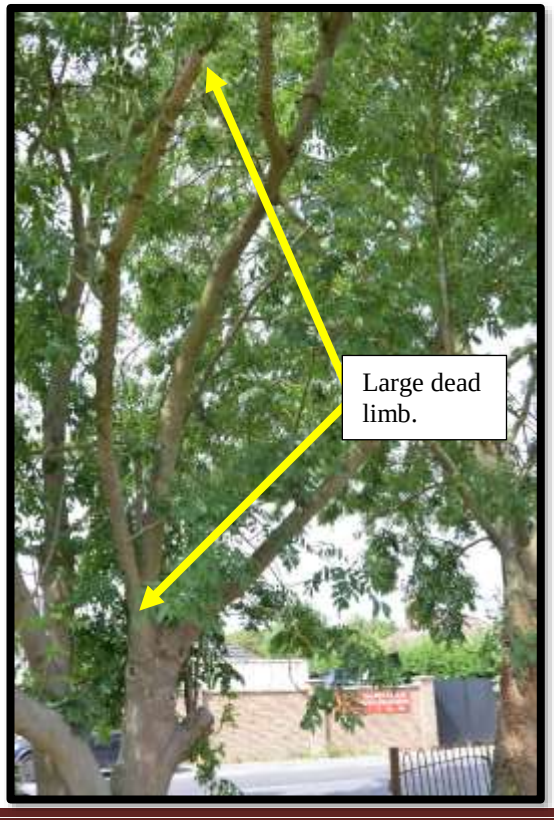
Picture showing additional partially occluded wounds close to the base of the tree (T1).

Picture showing extensive decay up to a height of 2.0 metres in tree "T1".



Close-up picture showing the extensive decay at the crotch point of the tree (T1).

Picture showing one of the large dead and decaying large limbs on tree "T1".



Picture showing large dead limbs in the Ash "T1".

Picture showing the large decaying area of dysfunctional wood in the southern-most trunk of tree "T1", against the railing

Close-up picture of the railings and damage/decay of the trunk.

Tree T1
Cont… The structural stems of the main trunk have diameters of 350mm, 255mm, 320mm, 190mm, and that of the southern-most trunk is 350mm. Extensive dead wood is present within the canopy of the tree. There is a large section of dysfunctional bark, and almost certainly internal decay on the southern-most tree, i.e. from ground level up to a height of approximately 1.0 metre. A section of old metal fencing is present, and there is a high probability that the railings will have initiated the damage. There is a partially occluded wound on the main central stem 1.2 metres above ground level, and other open, decaying wounds are present 2.2 metres above ground level. Although the tree has a useful visual amenity to the locality, it is deteriorating significantly, and has a British Standard 5837 category rating of "U", i.e. less than ten years of safe life expectancy. It should not be used to adversely affect the development of the site.

Tree T2: This is a maturing Ash tree (*Fraxinus excelsior*) located to the north of tree "T1", i.e. on the opposite side of the historic entrance into the site (See the picture below).

Picture showing the Ash (Tree T2) looking southwards along Holbeach Drove Gate.

Picture showing the trunk of the Ash (T2) from within the site.

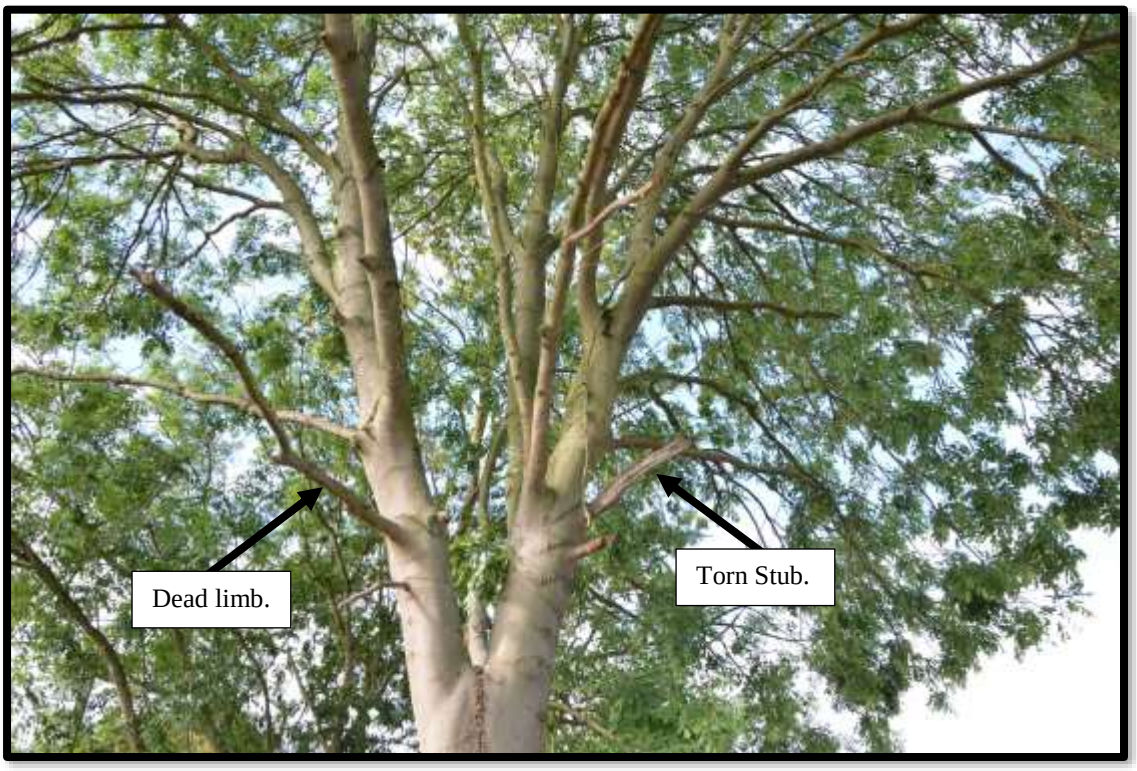
Picture showing the soil and the engulfed railing at the base of tree "T2".

Close-up picture showing the large, partially occluded wound in tree "T2".

Picture showing the extent of the dead wood and die-back in tree "T2".

Close-up picture of the dead wood in tree "T2".

Picture showing the remains of a large torn branch that previously overhung the pavement and road.



Close-up picture of the torn stub, with a smaller one beneath it.

Tree T2

Contd.. The tree is currently in the region of 16.0 metres tall, with an average crown spread of 8.0 metres to the north, 3.5 metres to the south, 8.0 metres to the east (over the site), and to the west 6.0 metres. The soil around the base of the trunk has been moved at some point in the near past, and a section of old, metal railings has become engulfed within the basal trunk. The railings lean over the pavement, and pose a potential safety hazard to users of the pavement. The tree has a trunk diameter of 500mm, and its main branches emanate from a height of 3.0 metres above ground level. A large partially occluded wound is present within the trunk, approximately 1.0 metre below the crotch point, and there will inevitably be a large, decaying wound present behind the callus tissues. The canopy of the tree merges with that of the adjacent Ash Tree "T1", and together they form a contiguous crown. The upper canopy contains extensive dead wood, and numerous decaying stubs and dead branches are present from a height of approximately 3.5 metres. The canopy is actually becoming sparse, and the tree appears to be deteriorating. It appears to have been pruned in the distance past, but no work has been carried out recently. Although the tree does have a useful visual amenity to the locality ay the present time, its condition is such that it has an effective British Standard 5837 category rating of "C1", bordering on category "U".

9.0 TREES IN ADJACENT PROPERTIES.

9.1 To comply with British Standard 5837 it should be noted that there are two, poor quality trees within the curtilage of the adjacent property (See pictures 5 & 6 above), both of which have been severely pruned in the recent past. The tree closest to the centre of the plot is a Beech, whereas that at the northern end is a Poplar. No measurements of the trees were taken. They have British Standard 5837 category ratings of "U", and should not be used to affect the proposed development.

9.2 Some tree removal from within, and adjacent to the site has been carried out in the past. The remains of an Ash are present on the western side of the plot, adjacent to the railings, and a self-set Elderberry (*Sambucus nigra*) is growing on the western boundary, close to the south of the Ash (See the picture below).

9.3 Two trees have been removed from the adjacent property to the east, and their trunks remain in situ (See an example on page 7 above).

Picture showing the felled Ash and the Elderberry.

10.0 TREE SURVEY SUMMARY.

The following tree survey schedule provides detail on the Ash trees, as identified in the Field notes.

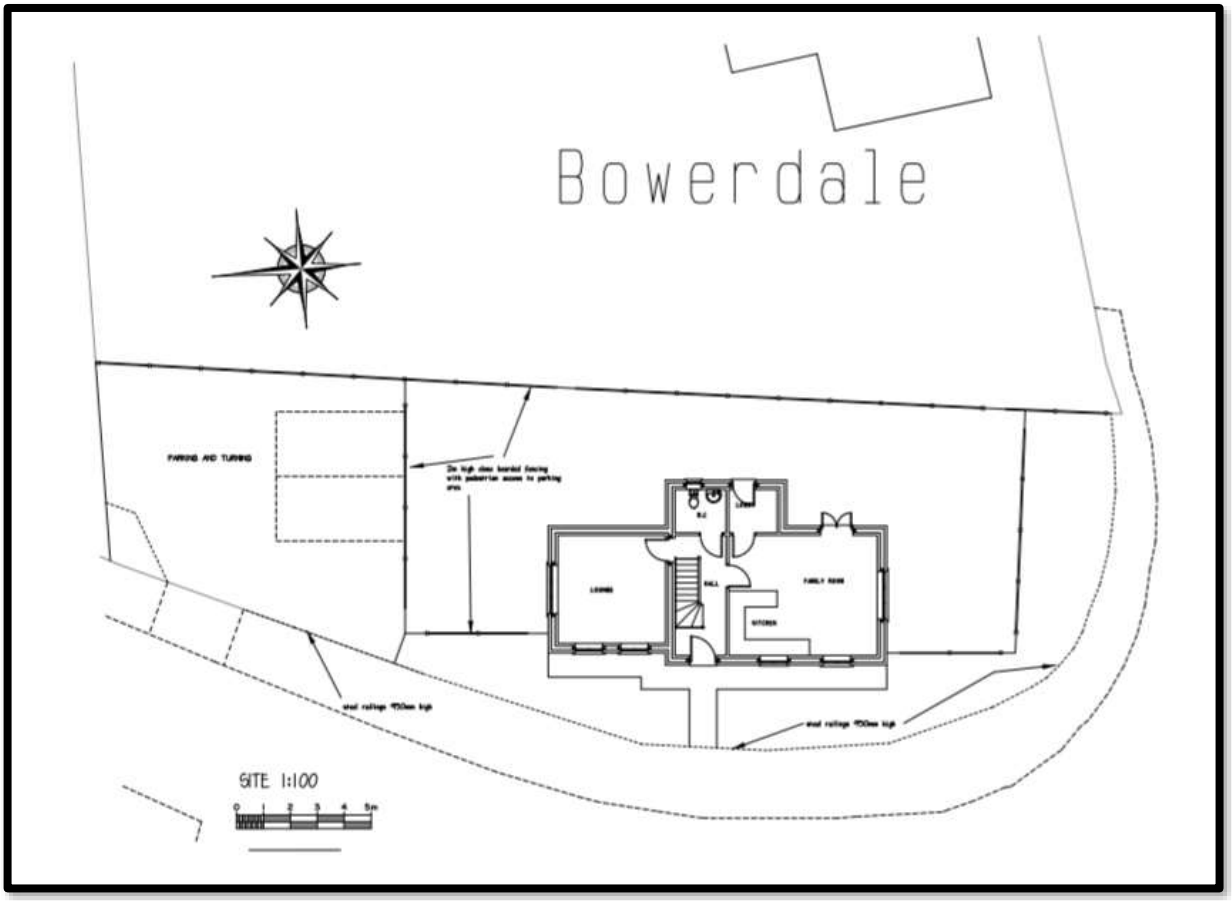
TREE SURVEY SUMMARY											
Tree No	Species	Height (m)	Branch spread Av. M	Stem Dia mm	Age class	Height of crown clearance m	Physiological condition	Structural Condition	Prelim. Recomms..	Remaining contri-bution in years	BS: Cat.
T1	Ash	16.0	N 3.0 S 8.0 E 7.5 W 7.0	350 190 350 255 320	M	2.0	Very poor	Very poor	Ideally remove	<10	U
T2	Ash	16.0	N 8.0 S 3.5 E 8.0 W 6.0	500	M	3.0	Poor	Poor	Ideally remove to allow develop-ment.	<20	C1

11.0 THE PROPOSED DEVELOPMENT.

11.1 The current proposal is to construct a new, brick-built, three bedroom, detached residence on the site (See the draft proposal below). The final siting of the building will be confirmed following discussions with the Local Planning Authority.

11.2 There will be adequate space within the site to carry out suitable mitigation planting. The species, sizes and locations will be agreed with the Local Planning Authority at an appropriate time.

Plan produced by Ken Elener – Architectural Design.



12.0 THE DEVELOPMENT OF TREE ROOT SYSTEMS.

12.1 There is a general misconception that tree roots grow to great depths within a soil, and often have large "Tap-Root" systems (See Figure 1 below). However, in reality, the root systems of trees are typically shallow, and spread out for considerable distances (See Figure 2 below).

Scanned copies of Figures 1 & 2 of AAIS – APN12.

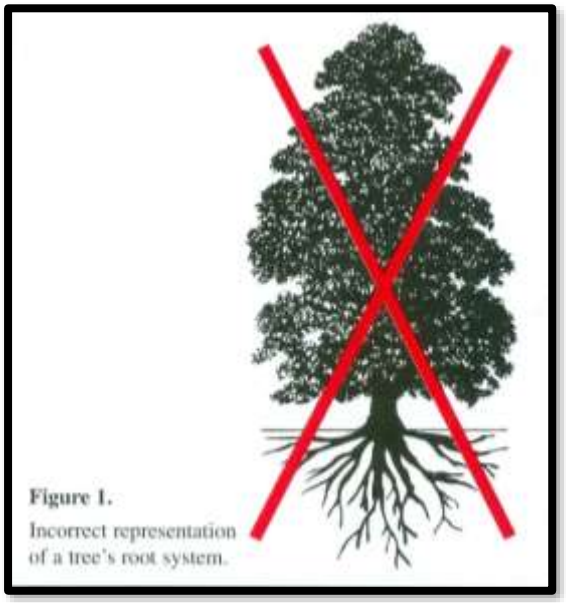


Figure 1.
Incorrect representation of a tree's root system.

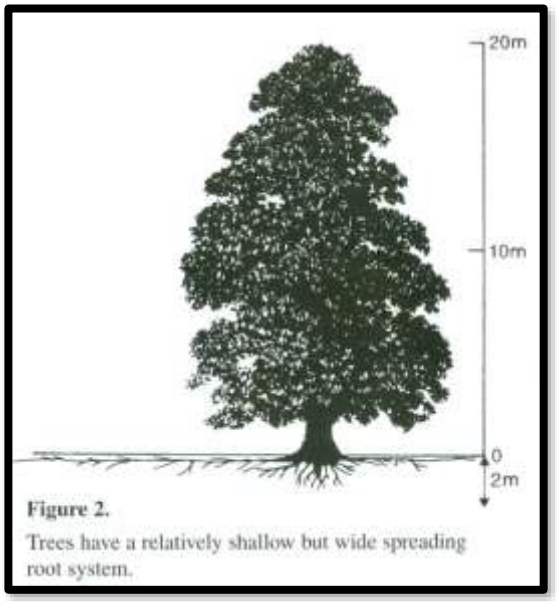


Figure 2.
Trees have a relatively shallow but wide spreading root system.

12.2 Tree roots typically grow parallel with the soil surface, rather than vertically, and on level sites the majority of their roots are within a depth of between 600mm and 1.0 metre below ground level.

12.3 Roots can be up to 30cm or more in diameter at the base of the trunk of a tree, but sub-divide and taper rapidly as they extend from the trunk. In the vast majority of cases the roots are only 2-3cm in diameter, or much less, at a distance of 3.0 metres to 4.0 metres from the trunk.

13.0 CAN TREE ROOTS BE SEVERED WITHOUT CAUSING HARM TO TREES?

13.1 As with the general misconception with the depth of tree root systems, there is also a general misconception that the pruning of roots will necessarily lead to damage to trees. However, as with pruning of branches, this is not the case.

13.2 It is generally accepted within the Arboricultural industry (See item 2 of the current British Standard 5837) that some roots can be severed without causing damage to trees. This is confirmed in The National Joint Utility Group publication entitled "NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees – volume 4, Issue 2, 2007", where it accepts that roots of up to 25mm diameter can be severed without specialist arboricultural input, and that roots with diameters greater than 25mm diameter may also be severed in certain circumstances following advice from a qualified arboriculturalist. It is

important to note that although roots of less than 25mm may be severed, special care must be taken where clumps of roots of this diameter are present.

14.0 THE TREE CONSTRAINTS PLAN - BELOW GROUND CONSTRAINTS.

14.1 British Standard 5837 recommends that the influence that trees on, and adjacent to the site, will have on the layout of a development should normally be plotted on a plan called the "Tree Constraints Plan". In the majority of situations, a theoretical **Root Protection Area** (RPA) is used as a design tool indicating the minimum area around a tree identified as containing sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure should be treated as a priority.

14.2 In order to avoid damage to the roots or rooting environment of retained trees, the RPAs should normally 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. However, the British Standard does accept that it is possible to encroach within the Root Protection Areas in some instances, with typically industry accepted incursions of between 10% and 20%.

14.3 Although the theoretical RPAs of category "C" trees should be plotted, they are of such poor quality that they should not normally be used as a constraint to the development of a site.

14.4 There is no requirement to plot trees that have British Standard 5837 category ratings of "U".

14.5 For single-stemmed trees the theoretical Root Protection Area should normally be calculated as being equivalent to a "**circle**" with a radius 12 times the effective trunk diameter.

14.6 For trees with more than one main stem, one of two calculation methods should be used. Annex "C" of the current British Standard 5837 describes the methodology of measuring the effective trunk diameters of trees.

14.7 The effective (combined) trunk diameter of trees with two to five stems should be calculated using the following equation:

$$\sqrt{(\text{Stem diameter 1})^2 + (\text{Stem diameter 2})^2 \ldots\ldots + (\text{Stem diameter 5})^2}$$

14.8 The effective (combined) trunk diameter of trees with more than 5 stems should be calculated using the following equation:

$$\sqrt{(\text{Mean stem Diameter})^2 \text{ x number of stems}}$$

14.9 Once the effective (combined) trunk diameter is calculated (for both single-stemmed and multi-stemmed trees), the **radius of the nominal RPA circle** can be ascertained, and the theoretical Root Protection Area can be calculated.

14.10 Where circular RPAs are used, the minimum safe distance between the trees and any soil excavations will be the radius of the nominal circle. For example, if a tree has a single stem (trunk), or combined stem diameter, of 200mm, the radius of the nominal circle will be 2.4 metres (200mm x 12), and the safe minimum distance between the centre of the trunk of the tree and any excavations (without any factors affecting root development) will therefore be 2.4 metres. The RPA would be calculated using the following equation:

Calculating the RPA

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

Simplistically the calculation for a 200mm diameter trunk would be as follows:

$$2.4 \text{ x } 2.4 \text{ x } 3.142 = 18.09 \ (18m^2).$$

14.11 Annex "D" of the current British Standard 5837 provides a table with pre-calculated Root Protection Areas.

15.0 THE RELEVANCE OF USING A CALCULATED ROOT PROTECTION AREA IN RELATION TO THE ASH TREES.

15.1 British Standard 5837 provides generic guidance in relation to free-growing trees whose spatial root development has not been affected to any extent by site-related factors, such as foundations, compacted soil, or competition from other trees. When site-related factors become significant, the use of the theoretical Root Protection Areas is largely academic, and more holistic assessments must be used.

15.2 The Ash trees on the site have clearly been affected by site related factors. The trees are located adjacent to the public footpath and carriageway, and they are growing very close together. The site conditions do not appear to have affected the overall growth of the trees, although their spatial root development will have been affected.

15.3 In order to comply with British Standard 5837 the following table includes the radii of the theoretical Root Protection Areas of the Ash trees (T1 & T2) located within the curtilage of the property. There is no requirement to include category "U" trees, but tree "T1" has been included for completeness. The table is based on site measurements and the data in Annex "D" of the current British Standard 5837. The theoretical RPA circles are shown on the plan below.

The theoretical Root Protection area of the Plane (T1)

No.	Location	Tree species	Radius of Circle.	RPA (m^2)
T1	Western boundary	Ash (U)	6.9m	150.0
T2	Western boundary	Ash (C1)	6.0m	113.0

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

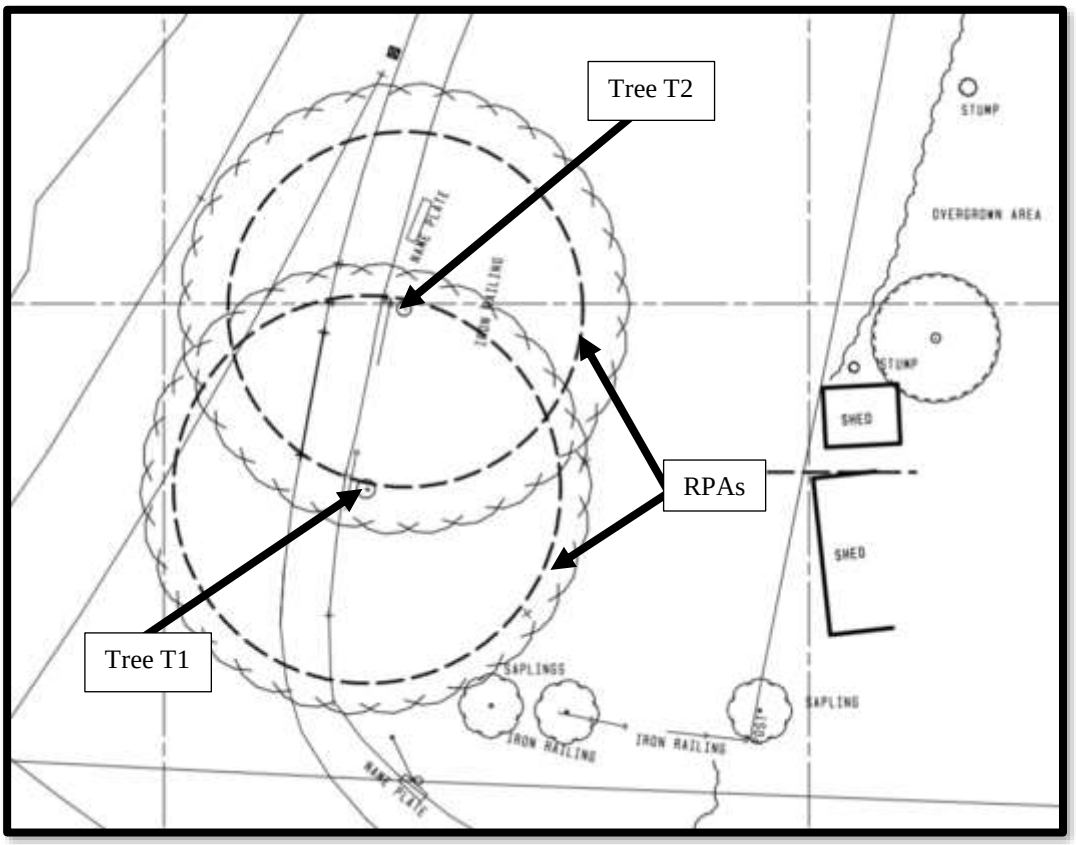
15.4 As mentioned previously it is generally accepted within the Arboricultural industry that the theoretical Root Protection Areas are not precise, and that it is possible in certain circumstances to encroach into the theoretical Root Protection Areas by between 10% and 20% without harming the trees. It is also generally accepted that Ash as a species is capable of withstanding significant root pruning.

15.5 More realistic Root Protection areas are in the region of 6.0 metres for Tree "T1", and 5.5 metres for tree "T2".

15.6 The Constraints Plan on the following page provides an accurate representation of the site at the time of my site visit. The RPAs are marked by black dotted circles as per the plan on page 33 below. A scale copy of the plan will be provided as part of the planning application.

15.7 The current proposal is to remove both of the trees from the site, and to carry out mitigation planting to maintain the visual amenity of the area.

Constraints plan produced by Ken Elener Architectural Design, showing the Theoretical Root Protection Area of the Ashes.



16.0 TREE CONSTRAINTS - ABOVE GROUND CONSTRAINTS.

16.1 Item 5.2 of the current British Standard 5837 recognises that it is possible that some above-ground constraints may arise due to various tree-related factors. The British Standards identifies the following potential constraints:

i. the current ultimate height and spread of the trees;

ii. species characteristics, including evergreen or deciduous, density of foliage, and factors such as susceptibility of honeydew drip, branch drop, fruit fall, etc.

16.2 The current British Standard 5837 accepts that Access Facilitation Pruning is a recognised technique for removing branches on development sites.

16.3 Neither of the Ash trees has been severely pruned in the recent past. However, both trees contain extensive dead wood, and are exhibiting extensive signs of deterioration. Tree "T1" should ideally be removed in any event.

16.4 There are no current signs of Ash Die-back visible in the canopies of the trees, but this disease is in epidemic proportions on the eastern side of the country, and poses a serious risk to Ash trees. If the trees become infected their safe life expectancies could be drastically reduced.

16.5 In my opinion, now would be an appropriate time to remove the trees from the site, and to establish new, healthy trees so maintain the visual amenity of the locality. Suitable replacement species, and positions could be agreed with the Local Planning Authority at an appropriate time.

16.6 The two Ash trees are growing very close together, and effectively form a single canopy. If either of the trees is removed, e.g. tree "T1" it will ruin the visual appearance of the other tree.

17.0 MITIGATION TREE PLANTING.

17.1 As it is proposed to remove the two trees from the site it will be appropriate to carry out some mitigation planting. The legal requirement will be to plant two replacement trees, although it is recommended that three trees be established so as to maintain the tree cover of the locality.

Plan showing the proposed mitigation planting.

17.2 The three trees will consist of two Silver Birch and one Mountain Ash as shown on the plan above.

18.0 BARRIERS AROUND THE TREE(S).

18.1 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.

18.2 Under normal circumstances it is essential that tree protection measures are put in place before any demolition takes place, and before any construction traffic is allowed on the sensitive sections of a site.

18.3 Section 6 of the current British Standard 5837 provides guidance and recommendations relating to the protection of the construction exclusion zone. Abbreviated notes from the British Standard, i.e. which are relevant to the protection of the Ashes 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). Barriers should be maintained to ensure that they remain rigid and complete."

The default specification of the protection should consist of a vertical and horizontal scaffold framework well braced to resist impacts, as illustrated in Figure 2."

18.4 Figures 2 and 3 of British Standard 5837 are included below for ease of reference.

18.5 As the position of the new residence has not currently been agreed, it would be premature to produced a detailed tree protection plan. Such a plan, with a detailed method statement, could be provided once the Local Planning Authority has accepted the proposed planning application. It could form part of a planning condition if required.

Figure 2 of British Standard 5837 showing the proposed recommended method of protecting any retained trees.

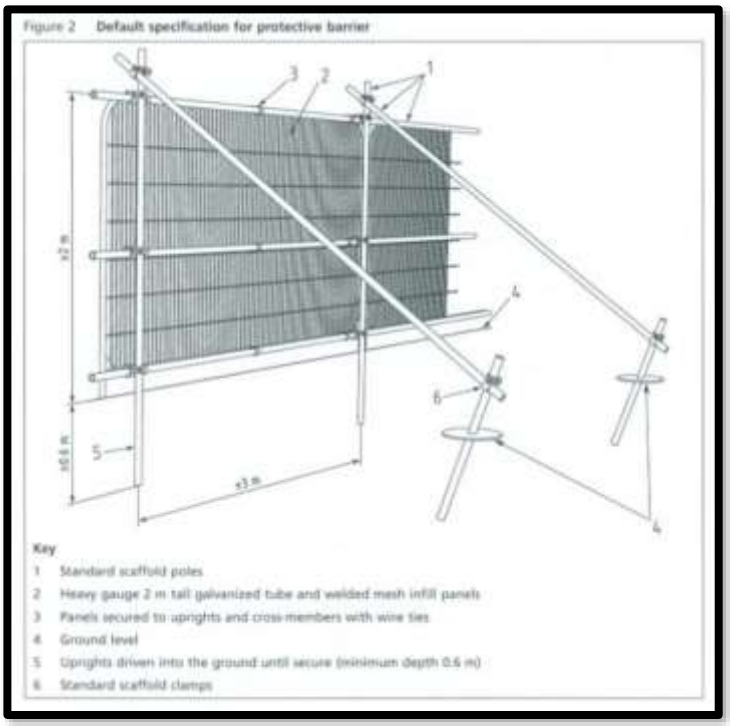
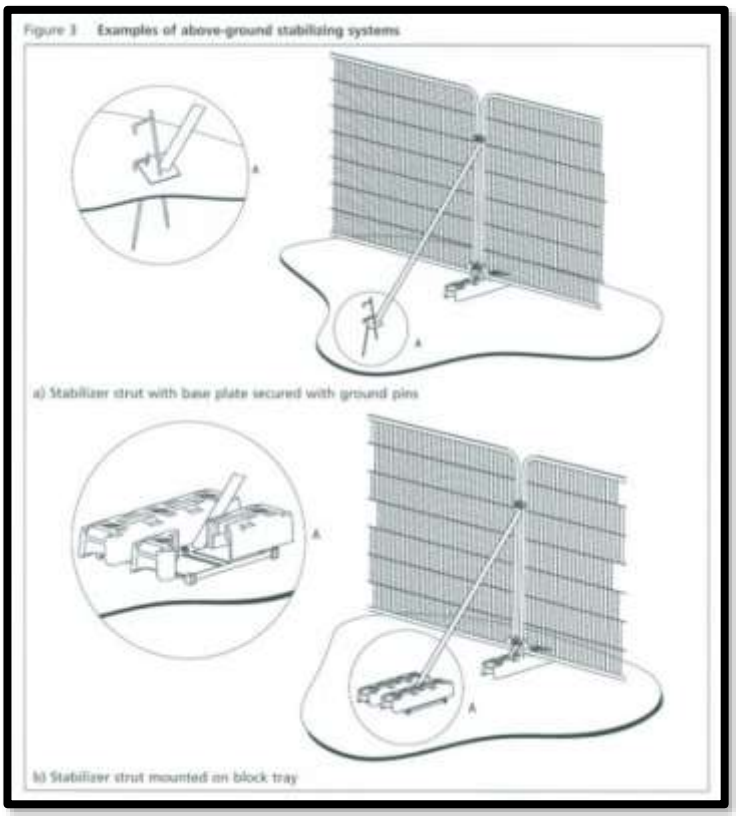


Figure 3 of British Standard 5837 showing the proposed recommended method of protecting any retained trees.



19.0 CONCLUSIONS.

19.1 The site is currently derelict, and it is proposed to construct a new three-bedroomed detached house on it.

19.2 The site is not located within a Conservation Area.

19.3 There are two legally protected, poor quality Ash trees located on the site. Both trees are deteriorating, and have relatively short, safe life expectancies. The tree closest to the junction (tree "T1") has a British Standard 5837 category rating of "U", whilst the second tree ("T2") has a category rating of "C1".

19.4 Theoretical Root Protection Areas for the trees have been included within the text. This has been done to comply with British Standard 5837. However, in this instance the calculations are largely academic. More appropriate figures would be 6.0 metre radius for tree "T1", and 5.5 metres for tree "T2".

19.5 The canopies of both trees are sparse, and should not be used as an above constraint to the proposed development.

19.6 In my opinion, neither tree should be used to adversely affect the development of the site. If either one of the trees is removed the shape of the canopy of the remaining tree would be ruined.

19.7 It is proposed to carry out tree mitigation to maintain the tree cover of the locality.

19.8 Any tree works will be carried out in accordance with British Standard 3998 "Tree Work" 2010, and will not be carried out during the bird breeding season.

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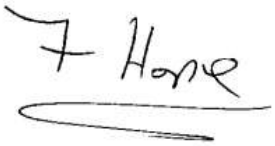

3rd October 2018

APPENDIX -A-

Dr. Frank Hope

PROFESSIONAL QUALIFICATIONS AND EXPERIENCE

Dr. Hope has been involved with the land-based industries for the past 48 years. During this time he has worked for local government, the Royal Horticultural Society, the Institute of Groundsmanship and private industry. In the early 1970's he trained at the RHS Gardens Wisley and later became a practical arborist in the gardens. For four years he was a lecturer in Horticulture and Arboriculture at the Cheshire College of Agriculture, and has more recently been a part-time lecturer to the BTEC National Diploma course in Countryside management, at the Cambridgeshire College of Agriculture. He has been an Arboricultural and Horticultural examiner for the Royal Forestry Society, the Royal Horticultural Society and the Institute of Groundsmanship.

The majority of his work is based in East Anglia, and London, although he has taken commissions throughout the world. For example, in the 1980's he was involved in the management and harvesting of a 26,000 acre hardwood crop in Malaya. He carries out technical projects for a range of organisations on both Arboricultural and general Horticultural subjects, and has been involved in the proposed re-development of the Elephant and Castle, and the area around Waterloo station in London. He specialises in both legal and planning aspects of trees.

He has been a technical adviser to the Jockey Club and Racecourse Association, and organised all their training courses for over five years.

During 1997, Dr. Hope 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. He has also given the Association advice on the Arboricultural Appendix to the ISE handbook.

Over the past 20 years, Dr. Hope has been involved in over 3,500 cases involving trees and subsidence damage to buildings. He regularly gives evidence in court, and has experience as a single joint expert. Notable cases in which he has been involved are Siddiqui & Sohanpal -v- London Borough of Hillingdon, Loftus Brigham -v- London Borough of Ealing, Dayani -v- London Borough of Bromley, Berent -v- Family Mosaic & The London Borough of Islington, Robbins -v- London Borough of Bromley, Battley -v- Wycombe District Council, and Middleton –v- Surrey County Council.

For five years (until April 2003), Dr. Hope acted for the Office of the Deputy Prime Minister as an Inspecting Officer on Tree Preservation Order Appeals, which provided him with a detailed insight into this topic.

In addition to having a Doctorate and a Masters degree in Biological Sciences (based on Arboricultural and Horticultural research), Dr Hope holds the National Diploma in Arboriculture (RFS), which is the premier practical qualification for Arboriculture, and the National Diploma in Horticulture (now the Master of Horticulture), administered by the Royal Horticultural Society. The Master of Horticulture is the world premier qualification for general horticulture. Dr. Hope is a past examiner for the final stages of the Master of Horticulture qualification. His personal qualifications are at the highest level; the major ones are as follows:

Doctor of Philosophy (Ph.D):	University of Bath, Biological Sciences Dept. The Development of a computerised Plant Establishment and Growth Model for use with Landscape Trees and Shrubs.
Master of Philosophy (M.Phil):	University of Bath Biological Sciences Dept. The Development of a Computerised Information Retrieval System for Decorative Plant Selection.
National Diploma in Horticulture:	Administered by the Royal Horticultural Society.
National Diploma in Arboriculture (N.D.Arbor):	Royal Forestry Society.
National Certificate in Arboriculture (Distinction):	Royal Forestry Society.

Wisley Diploma in Horticulture:	Royal Horticultural Society.
Advanced Diploma in Horticulture:	Writtle Agricultural College.
Certificate of Education:	Wolverhampton Teacher Training College, (Wolverhampton Polytechnic).

SOME PUBLISHED WORKS

Recognition and Control of Pest and Diseases of Farm Crops	Blandford Press 1980 ISBN 0 7137 0995
The Garden Planner	Hardback - Collins 1981 Softback - Fontana 1981 Softback - Pilot 1983 ISBN 0 00 4116622 Co-author of each edition
QL Gardener Manual	Sinclair Research 1985 ISBN 1 850 160449
The New Organic Grower	Cassall Publishers 1990 ISBN 0 304 34013 8
Turf Culture	Blandford Press 1978 ISBN 0 7137 0873 5
Turf Culture - A manual for the Practising Groundsman	Cassall 1990 ISBN 0-304-31854-X
Rasen	German Edition of Turf Culture ISBN 3-8001-5038-7
NVQ Levels 1 & 2 manuals	Technical author for the British Association of Landscape Industries (BALI) instruction manuals for general horticulture and turfculture at levels 1 and 2, for the National Vocational Qualifications.

Numerous articles on Horticulture, Arboriculture and computers in a range of magazines, e.g. Horticulture Week, The Groundsman, Personal Computer World.

SOME PUBLISHED SOFTWARE

Horticultural Key	Quanta magazine.
Plant Selector II	A.J. Harding Molimerx Ltd.
Computerised Ornamental Plant Retrieval System	University of Bath.
Genus Plant Selector	Intersearch Ltd.
Plant Establishment and Growth Model	University of Bath.
QL Gardener	Sinclair Research.