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**BS5837:2012 TREE SURVEY AND
ARBORICULTURAL IMPACT ASSESSMENT:
1 Copse Close, Northwood, Middlesex, HA6 2XG**

Dated: 21st August 2023

Our reference: GHA/DS/160000:23

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Arboricultural Impact Assessment

Location: 1 Copse Close, Northwood, Middlesex, HA6 2XG

Our reference: GHA/DS/160000:23

Client: DDA

Dated: 21st August 2023

Prepared by: Glen Harding MICFor, MSc (Forestry), MArborA

Date of Inspection: 15th August 2023

Instructions

Issued by – DDA

TERMS OF REFERENCE – GHA Trees were instructed to survey the subject trees within and adjacent to 1 Copse Close, Northwood, Middlesex, in order to assess their general condition and to provide a planning integration statement for the indicative proposed development that safeguards the long term wellbeing of the retained trees in a sustainable manner.

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Executive Summary

The proposal for the site is to construct a new detached house following the demolition of the existing structure. The existing swimming pool and pool building will be removed as part of the scheme. The proposed scheme requires the removal of one small and relatively insignificant (C category) tree. Some minor pruning is proposed, this work is assessed to be minor and will not adversely impact the health or amenity value of the subject trees and is also work that would be desirable regardless of the proposals. The retained trees require protection in accordance with industry best practice and BS 5837: 2012 – Trees in relation to design, demolition and construction – recommendations, in order to ensure their longevity.

Documents Supplied

The client supplied the following documents:

- Topographical survey
- Existing layout plans
- Proposed layout plans

Scope of Survey

- 1.1 The survey is concerned with the arboricultural aspects of the site only.
- 1.2 The planning status of the subject property was not investigated in detail.
- 1.3 A qualified Arboriculturist undertook the report and site visit and the contents of this report are based on this. Whilst reference may be made to built structure or soils, these are only opinions and confirmation should be obtained from a qualified expert as required.
- 1.4 Trees in third party ownership were surveyed from within the subject property, therefore a detailed assessment was not possible and some (if not all) measurements were estimated. Where the stem location of a third party tree has been estimated, this is noted on the plan.
- 1.5 Dense vegetation or climbers (such as ivy) also prohibited full inspections for some trees; this is noted where applicable.
- 1.6 No discussions took place between the surveyor and any other party.
- 1.7 The trees were inspected on the basis of the Visual Tree Assessment method expounded by Mattheck and Breleor (The body language of tree, DoE booklet Research for Amenity Trees No. 4, 1994)
- 1.8 The survey was undertaken in accord with British Standard 5837: 2012 – Trees in relation to design, demolition and construction – recommendations.
- 1.9 Tree works will be required to be in accord with British Standard 3998 – 2010 (Tree Work - Recommendations).
- 1.10 Underground services near to trees will need to be installed in accord with the guidance given in BS5837.
- 1.11 The client's attention is drawn to the responsibilities under the Wildlife and Countryside Act (1981).

Survey Method

- 2.1 The survey was conducted from ground level with the aid of binoculars if needed.
- 2.2 No tissue samples were taken nor was any internal investigation of the subject trees undertaken.
- 2.3 No soil samples were taken.
- 2.4 The height of each subject tree was estimated using a clinometer and recorded to the nearest half metre.
- 2.5 The stem diameter for each tree was measured in line with the requirements set out in BS 5837: 2012 – Trees in relation to design, demolition and construction – recommendations.
- 2.6 The crown spreads were measured with an electronic distometer and recorded to the nearest half metre. Where the crown radius was notably different in any direction this has been noted on the Plan (appendix A) and within the tree table (Appendix B). The crowns of those trees that are proposed for removal, or trees where the crown spread is deemed insignificant in relation to the proposed development are not always shown on the appended plan; however their stem locations are marked for reference.
- 2.7 The Root Protection Area (RPA) for each tree is included in the tree table, both as an area, and as the radius of a circle.
- 2.8 The crown clearance was measured using a clinometer and recorded to the nearest half metre. Where it is significantly lower in one direction, this is noted within the tree table at appendix B.
- 2.9 All of the trees that were inspected during the site visit are detailed on the plan at Appendix A; this plan was produced in colour and **MUST** only be scanned or reproduced in colour. The trees on this plan are categorised and shown in the following format:

COLOUR CODING AND RATING OF TREES:

Category A – Trees of high quality with an estimated remaining life expectancy of at least 40 years. Colour = light **green** crown outline on plan.

Category B – Trees of moderate quality with an estimated remaining life expectancy of at least 20 years. Colour = mid **blue** crown outline on plan.

Category C – Trees of low quality with an estimated remaining life expectancy of at least 10 to 20 years, or young trees with a stem diameter below 150mm. Colour = uncoloured crown outline on plan.

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. Colour = **red** crown outline on plan.

All references to tree rating are made in accordance with BS 5837: 2012 – Trees in relation to design, demolition and construction – recommendations’, Table 1.

The Site

- 3.1 The site is located on Copse Close, a residential road located to the south of Northwood.
- 3.2 A good tree cover is present on the site itself as well as adjacent sites, with many semi-mature and mature trees of both native and exotic origin characterising the local area.
- 3.3 Access to the property is currently gained via a driveway to the front of the site.

The Subject Trees

- 4.1 The details of the subject trees are set out in the Schedule at Appendix B.
- 4.2 Of the nineteen individual trees, and groups of trees surveyed, three have been assessed as BS 5837 category A, seven have been assessed as BS category B, with the remaining trees being assessed as BS 5837 category C.

Category A	3 trees
Category B	7 trees / groups
Category C	9 trees / groups

The Proposal

- 5.1 The proposal for the site is to construct a new detached house following the demolition of the existing structure.
- 5.2 The existing swimming pool and pool building will be removed as part of the scheme.
- 5.3 The proposed location of the above structures can be seen on the appended plan.

Arboricultural Impact Assessment

PROPOSED TREE REMOVAL / RETENTION:

6.1 T11 is proposed for removal as part of the new development, as this tree could not be effectively retained as it is located within the outline of the new structures, or located too close to make its retention feasible / sustainable. This tree has been given a C category grading in accordance with BS 5837 and therefore should not act as a limitation on the effective use of the site, or impose any significant constraints on the layout (see table 1 BS5837).

TREE PRUNING TO ACCOMODATE THE PROPOSAL OR ACCESS TO THE SITE

6.2 There is a slight overhang of the new structure from the crown of T6. The defining branch structure of this tree is however well clear of the proposed upper building line and therefore building works can progress safely without the need for any facilitation pruning.

6.3 T4, T9 and T12 will be pruned to improve clearances from the proposed new structure. A full specification for the proposed pruning to each tree can be seen in the tree table at appendix B.

6.4 The proposed tree work is assessed to be minor and will not adversely impact the health or amenity value of these trees. This is also work that would be desirable regardless of the proposals given these trees relationship with the existing house.

6.5 The implementation of the proposal does not lead to the requirement to prune any of the other retained trees, or shrubs.

ASSESSMENT OF RETAINED TREES ROOT PROTECTION AREAS

6.6 Section 4.6.3 of BS 5837: 2012 states that the Root Protection Area (RPA) of each tree should be assessed by an arboriculturalist considering the likely morphology and disposition of the roots, when known to be influenced by past or existing site conditions.

6.7 The RPAs of several trees have been amended to take account of the existing structures; these adjustments can be seen on the appended plan.

6.8 The other RPAs have been drawn as notional circles, as there are no structures within their RPAs that have been assessed to significantly impact the root layout.

ASSESSED IMPACT ON RPAS BY PROPOSED STRUCTURES

6.9 There is a small encroachment into the RPA of T6; this encroachment equates to 0.7% and is therefore assessed to be within acceptable levels. This is a healthy tree which will tolerate this small amount of root loss and recover quickly. The new building is also set further from this tree than the existing house and therefore the tree will benefit from space for new root growth in this area.

6.10 The proposed new structures are situated outside of the assessed RPAs of all of the other trees proposed for retention, therefore these trees pose no below ground constraints on the new structures or vice versa.

PROPOSED ACCESS TO THE NEW DEVELOPMENT

6.11 Where sections of the new driveway are within the RPAs of T4 and T6, a no-dig construction will be necessary, to ensure that all existing ground levels are retained in their current form, as well as ensuring that satisfactory moisture and oxygen can be obtained from the underlying soil by any tree roots in this area. A design for this proposed access route must be drawn up by a structural engineer, in close co-ordination with the retained arboriculturalist.

HARD LANDSCAPING IN RPAS

6.12 Where sections of the new patio are within the RPAs of retained trees, a no-dig construction will be necessary, to ensure that all existing ground levels are retained in their current form, as well as ensuring that satisfactory moisture and oxygen can be obtained from the underlying soil by any tree roots in this area. A design for this proposed access route must be drawn up by a structural engineer, in close co-ordination with the retained arboriculturalist. Porous materials must be used to ensure rainwater can penetrate the soil beneath the new patio.

INSTALLATION OF SERVICES

6.13 The full details of existing and proposed new services have not been made available at the time of writing.

6.14 New services MUST be routed to avoid all RPAs of retained trees on site and within nearby sites. From an assessment of the subject site, undertaken in conjunction with the project architect, there is no reason to assume this isn't possible. Inspection chambers must also be sited outside the RPAs of any nearby trees.

Post Development Pressure

FUTURE TREE AND STRUCTURE RELATIONSHIPS

7.1 The retained trees are at a satisfactory distance from the proposed new building and highly unlikely to give rise to any inconvenience.

7.2 Regular inspections of the retained trees by a suitably qualified Arboriculturalist and subsequent remedial works will ensure that the trees are maintained in a suitable manner, to exist in harmony with the new structures and its occupants for many years to come.

Tree Protection Measures and Preliminary Method Statement for Development Works

8.1 TREE WORK

A list of all tree works that are required (including trees to be removed) is included in the tree table at Appendix B. Where any tree work is needed, this work **MUST** be in accordance with British Standard 3998 - 2010 (Tree Work - Recommendations).

8.2 TREE PROTECTION BARRIERS

It is essential for the future health of the trees to be retained on site, that **all** development activity is undertaken outside the root protection zone of these trees. The position of the fence **MUST** be marked out with biodegradable marker paint on site and agreed with appropriate representatives from the LPA and contractor. The fencing **MUST** be erected **prior** to any works in the vicinity of the trees and removed only when all development activity is complete. The protective fencing **MUST** be as that shown in BS 5837 (see Appendix C). The herras panels **MUST** be joined together using a minimum of two anti-tamper couplers which **MUST** be installed so they can only be removed from the inside of the fence. The panels **MUST** be supported by stabilizer struts, which **MUST** be installed on the inside and secured to the ground using pins or appropriate weights.

The Fence must be marked with a clear sign reading:

"Construction Exclusion Zone – No Access"

8.3 GROUND PROTECTION – LIGHTWEIGHT ACCESS ONLY

Where any additional ground protection is required, these areas **MUST** be covered with a permeable membrane, with 150mm layer of compressible woodchip overlaying it; an 18mm marine ply boards will then be secured on top of the woodchip to allow a 1.5tonne mini-digger to access the area without causing major compaction or soil erosion.

8.4 REMOVAL / DEMOLITION OF THE EXISTING STRUCTURES

Some existing structures located within / near the RPAs of retained trees will need to be removed.

METHODOLOGY:

- The above ground parts of the structures **MUST** be removed by hand, using hand tools only (to include hand held pneumatic drill assuming compressor is positioned outside RPAs).
- The removed material **MUST** be moved to and stored outside of the RPA of all of the retained trees. This can either be done by transporting small pieces by hand or using a machine to lift this material; any such machine **MUST** be parked outside the RPA or on appropriate ground protection.
- The sub-bases can be removed using a 360 excavator. The machine **MUST** work from outside the RPA. The machine **MUST** start work at the points nearest to any retained trees, working backward away from each tree so that the remaining hard surfacing can be used to support the load of the machine and protect the ground. (**NOTE: the size of any such machine should be checked before starting works, to ensure a) the existing surface will support the machines load and b) that there is sufficient crown clearances to avoid any potential for crown damage**). This work **MUST** be undertaken utilising a banksman.

- If during the work, any roots from the retained trees are discovered in excess of 25mm, the retained arboriculturalist **MUST** be contacted immediately to assess the roots and arrange subsequent working methods that will cause no damage to the tree(s).
- Care **MUST** be taken to avoid damage to the soil beneath these structures. If any roots are exposed, these should be covered immediately and the retained arboriculturalist **MUST** be contacted immediately to assess the roots and arrange subsequent working methods that will cause no damage to the tree(s).
- The swimming pool must be backfilled with inert material.

8.5 BOUNDARY TREATMENTS

Boundary fencing installation / upgrades **MUST** be undertaken as part of the soft landscaping phase and **MUST** be installed ONLY when all machinery that is on site for the main build has permanently left the site (NB. If needed, boundary fencing can also be installed prior to the commencement of site works, i.e.. before any machinery has been bought onto the site). Where sections of new / upgraded fencing are located within the RPA of ANY tree that is to be retained, this work **MUST** be undertaken by hand using hand tools only. The locations of the new fence upright posts will be finalised following trial digs to confirm there are no major (over 25mm) roots present; if any such roots are found, the location must be altered. If any smaller roots are found, these can be cut using sharp hand sharp tools to leave a 'clean' cut, in order to minimise the risk of infection by decay pathogens. The post holes within the RPAs should then be lined with plastic sheeting before any concrete or cement is placed into the hole, in order that there is no risk of leaching into the nearby soil as the mixture dries.

8.6 SITE HUTS, WELFARE FACILITIES AND STORAGE OF EQUIPMENT, MATERIALS AND CHEMICALS

All site huts **MUST** be positioned outside of the retained trees RPA's.

8.7 MIXING OF CONCRETE

All mixing of cement / concrete **MUST** be undertaken outside of the RPA of all of the retained trees.

8.8 USE CRANES, RIGS AND BOOMS

Precautionary measures **MUST** be observed to avoid contact of any retained trees when manoeuvring cranes rigs or booms into position.

8.9 INCOMING SERVICES, DRAINAGE AND SOAKAWAYS

New services **MUST** be routed to avoid all RPAs of retained trees on site and within nearby sites. From an assessment of the subject site, undertaken in conjunction with the project architect, there is no reason to assume this isn't possible. Inspection chambers **MUST** be sited outside the RPA.

8.10 ON SITE SUPERVISION

Regular site supervision is essential to ensure all potentially damaging activities near to trees are properly supervised. A pre start site meeting **MUST** occur to ensure all parties are aware of their responsibilities relating to tree protection on site; this **MUST** include a site induction for key personnel.

Key personnel:

Name	Position	Contact number / email:
Glen Harding	Retained arboriculturalist	07884 056 025 Or info@ghatrees.co.uk
TBC	Local authority Arboricultural Officer	TBC
TBC	Site manager	TBC

8.11 OTHER TREE PROTECTION PRECAUTIONS

- **NO** fires lit on site within 20 metres of any tree to be retained.
- **NO** fuels, oils or substances with will be damaging to the tree shall be spilled or poured on site.
- **NO** storage of any materials within the root protection zone.

8.12 HARD / SOFT LANDSCAPING NEAR RETAINED TREES

All new pathways and hard landscaping areas within the Root Protection Areas (RPA's) of the retained trees **MUST** be designed using no-dig, up and over construction techniques, and be specified in close co-ordination with the retained Arboriculturalist. Porous materials **MUST** also be used when surfacing near the trees. No machinery will be used for this work, which **MUST** all be done by hand.

8.13 DISMANTLING PROTECTIVE BARRIERS

Protective barriers must only be completely removed when all machinery, and equipment has left site.

Conclusion

- 9.1 In conclusion, the principal arboricultural features within the site can be retained and adequately protected during development activities.
- 9.2 No significant or important trees will be lost to facilitate the proposed scheme.
- 9.3 Subject to precautionary measures as detailed above, the proposal will not be injurious to trees to be retained.

Recommendations

- 10.1 Site supervision – An individual e.g. the Site Agent, must be nominated to be responsible for all arboricultural matters on site. This person must:

- a. Be present on the site the majority of the time.
- b. Be aware of the arboricultural responsibilities.
- c. Have the authority to stop any work that is, or has the potential to cause harm to any tree.
- d. Be responsible for ensuring that all site personnel are aware of their responsibilities towards trees on site and the consequences of the failure to observe those responsibilities.
- e. Make immediate contact with the local authority and / or retained arboriculturalist in the event of any related tree problems occurring whether actual or potential.

10.2 It is recommended, that to ensure a commitment from all parties to the healthy retention of the trees, that details are passed by the architect or agent to any contractors working on site, so that the practical aspects of the above precautions are included in their method statements, and financial provision made for these.

14th August 2023

Signed:



Glen Harding MICFor, MSc (Forestry), MArborA
For and on behalf of GHA Trees

Appendix A
TREE PLAN
(see separate PDF)

Appendix B

TREE TABLE

Tree Number	Tree Name (species)	Ht (m)	Calculated Stem Diameter (mm)	Number of Stems	Root Protection Area (Radius, m)	N (m)	E (m)	S (m)	W (m)	Age Class	Clearance (m)	Estimated life expectancy	BS Category	Comments / Recommendations
T1	Japanese maple	2.5	179	5	2.15	2	2	2	2	M	1	10-20	C1	Off site - full inspection not possible. Some measurements estimated.
T2	Lawson cypress	10	240	1	2.88	1.6	1.6	1.6	1.6	M	0	10-20	C1	Small tree of limited value in the wider landscape.
G3	Lawson cypress	10 to 14	250	1	3.00	2.5	2.5	2.5	2.5	M	1	10-20	C2	Lapsed hedge.
T4	Silver birch	20	300	1	3.60	5	3	0	4	M	5.5	20-40	B1	Off site - full inspection not possible. Some measurements estimated. Recommend: cut back to north and west laterally by 2m.
G5	Silver birch and holly	6 to 12	200	1	2.40	2.5	2.5	2.5	2.5	M	2	10-20	C2	Off site - full inspection not possible. Some measurements estimated.
T6	Oak	21	800	1	9.60	7	5	8	7	M	9.5 north	40+	A1	Off site - full inspection not possible. Some measurements estimated.
T7	Willow	9	400	1	4.80	3	2	3	4	M	5 south	10-20	C1	Off site - full inspection not possible. Some measurements estimated.
G8	Holly	10	180	1	2.16	1.5	1.5	1.5	1.5	M	5 north	10-20	C2	Lapsed hedge.

Tree Number	Tree Name (species)	Ht (m)	Calculated Stem Diameter (mm)	Number of Stems	Root Protection Area (Radius, m)	N (m)	E (m)	S (m)	W (m)	Age Class	Clearance (m)	Estimated life expectancy	BS Category	Comments / Recommendations
T9	Hornbeam	15	200	1	2.40	4.5	4	2	2	M	5 north	20-40	B1	Off site - full inspection not possible. Some measurements estimated. Recommend: cut back to north laterally by 2m.
T10	Beech	20	400	1	4.80	5	5	5	5	M	6	20-40	B2	Off site - full inspection not possible. Some measurements estimated.
T11	Lawson cypress	17	290	1	3.48	1.5	1.5	1.5	1.5	M	4	10-20	C1	Unremarkable tree of limited value in the wider landscape. Recommend: to be removed.
T12	Hornbeam	12	150	1	1.80	6	2	0	5	M	5 north	10-20	C1	Off site - full inspection not possible. Some measurements estimated. Recommend: cut back to north and west laterally by 2m.
G13	Hornbeam, beech, sycamore, hawthorn	15 to 20	400	1	4.80	5	5	5	5	M	6 over site	20-40	B2	Off site - full inspection not possible. Some measurements estimated.
T14	Sycamore	20	600	1	7.20	6.5	6.5	6.5	6.5	M	5	20-40	B1	Vegetation near base of tree prevented full and detailed inspection.

Tree Number	Tree Name (species)	Ht (m)	Calculated Stem Diameter (mm)	Number of Stems	Root Protection Area (Radius, m)	N (m)	E (m)	S (m)	W (m)	Age Class	Clearance (m)	Estimated life expectancy	BS Category	Comments / Recommendations
T15	Birch	10	346	3	4.16	4	4	4	4	M	3	10-20	C1	Off site - full inspection not possible. Some measurements estimated.
T16	Oak	15	750	1	9.00	5	5	5	3	M	3 east	20-40	B1	Ivy prevented full inspection. Recommend: remove ivy and reinspect.
T17	Oak	20	650	1	7.80	7	4	8	7	M	5	40+	A1	No notable defects recorded during inspection.
T18	Oak	20	650	1	7.80	8	8	8	8	M	6 over site	40+	A1	Off site - full inspection not possible. Some measurements estimated.
G19	Mixed trees	10 to 20	400	1	4.80	5	5	5	5	M	6	20-40	B2	Vegetation near base of tree prevented full and detailed inspection.

KEY :

Tree No: (T= individual tree, G= group of trees, W= woodland)
 Age class: Young (Y), Middle aged (MA), Mature (M), Over mature (OM),
 Veteran (V)

Height (Ht): Measured in metres +/- 1m

Appendix C
TREE FENCING DETAIL

Figure 3 Examples of above-ground stabilizing systems



