



Landmark Trees

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**ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR:**

1 Grange Gardens  
London  
NW3 7XG

**INSTRUCTING PARTY:**

Landview Properties  
8 Harmood Grove  
London  
NW1 8DH

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## DOCUMENT HISTORY

Revision	Status	Comments	Date
Rev 0	Verified	For External Issue (to Planning)	11/8/22

## 1. SUMMARY

- 1.1 The existing site is a residential property with substantive rear garden containing a number of trees potentially constraining development. The proposal includes the replacement of the existing annex with a detached dwelling.
- 1.2 There are 19 trees on the property and adjoining land outside of the application boundary that are within close proximity to the development and need to be assessed. These are judged mostly moderate and low-quality trees, with the poor quality T4 the only exception.
- 1.3 The report has assessed the impacts of the development proposals and concludes there would be at most a low impact on the resource: a small portion of trees will be removed or pruned to facilitate construction. Those removed have more collective than individual specimen value, such that their loss could be mitigated with new planting, bringing its own benefits to a relatively unmanaged resource.
- 1.4 Whilst the default position is that structures be located outside the Root Protection Area\* (RPA) of trees to be retained, there are some modest encroachments that could not be avoided in the design of the scheme. The report has demonstrated that the tree(s) can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with the RPA; the report also proposes a series of mitigation measures to improve the soil environment that is used by the tree for growth. Net impacts are assessed therefore as being low.
- 1.5 Notwithstanding the above assurances, the report sets out a series of recommendations prior and during construction that will ensure impacts to trees are minimised. These are detailed in sections 6.3 and 8 of this report.
- 1.6 In conclusion, the proposal, through following the above recommendations, will have no, or very limited, impact on the existing trees and is acceptable.

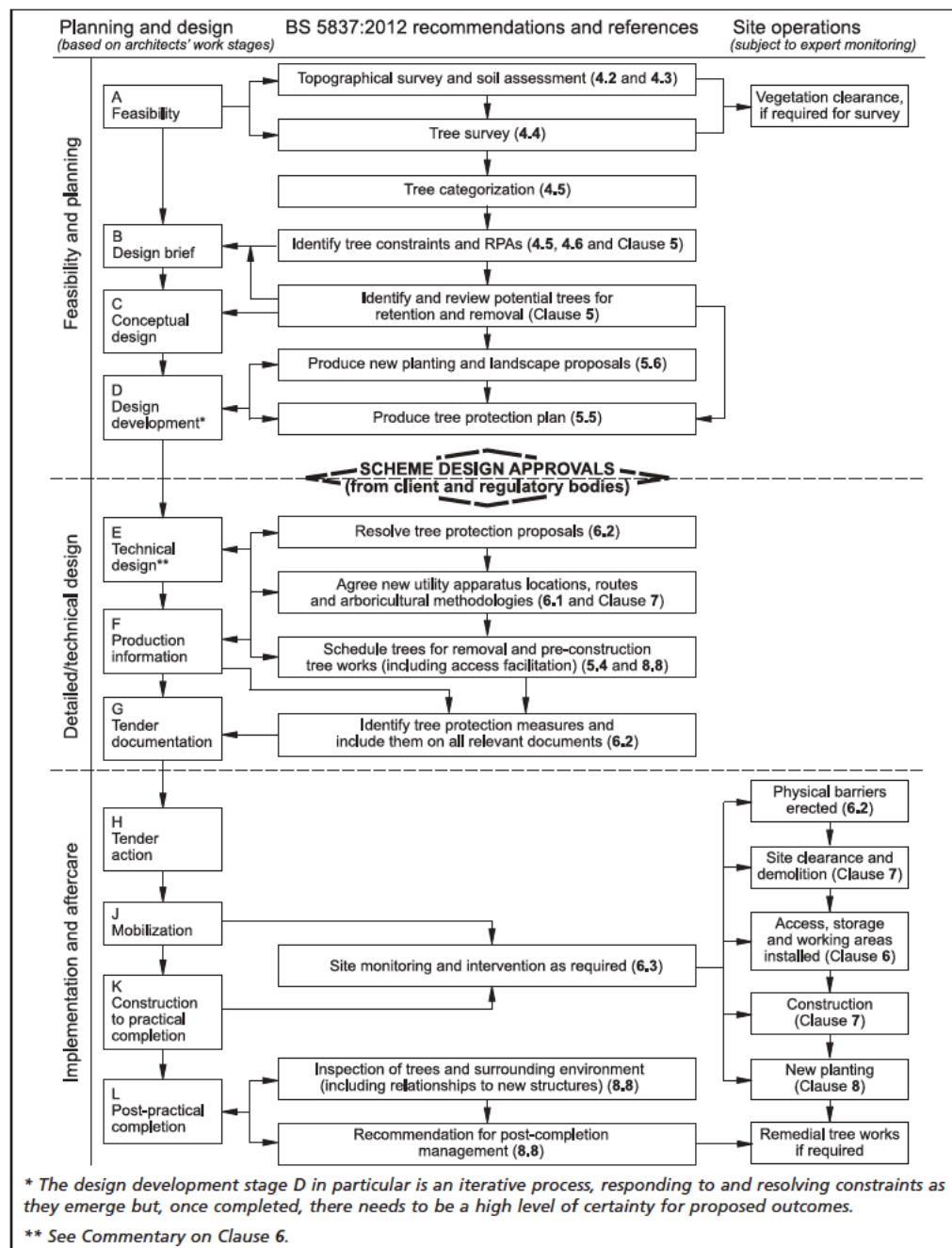
\* British Standards Institute: Trees in relation to design, demolition and construction BS 5837: 2012 HMSO, London

## 2. INTRODUCTION

### 2.1 Terms of Reference

- |       |  |
|-------|--|
| 2.1.1 | This Arboricultural Impact Assessment report has been prepared by Landmark Trees (LT) on behalf of Landview Properties ('the Applicant'), to support a full planning application submitted to the London Borough of Camden ('LBC').  |
| 2.1.2 | The application relates to the demolition of a one storey annex building with roof terrace located at the south end of 2 Grange Gardens, to be replaced with a new 2 storey, split level single family home.   |
| 2.1.3 | This report will assess the impact on trees and their constraints, identified in our survey. Although the proposals were known at the time of the survey, Landmark Trees endeavour to survey each site blind, working from a topographical survey, wherever possible, with the constraints plan informing their evolution. The purpose of the report is to provide guidance on how trees and other vegetation can be integrated into construction and development design schemes. The overall aim is to ensure the protection of amenity by trees which are appropriate for retention.   |
| 2.1.4 | Trees are a material consideration for a Local Planning Authority when determining planning applications, whether or not they are afforded the statutory protection of a Tree Preservation Order or Conservation Area. British Standard BS 5837:2012 Trees in Relation to Design, Demolition and Construction sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and new developments. The Standard recommends a sequence of activities (see Fig.1 overleaf) that starts in the initial feasibility and design phase (RIBA Stage 2 'Concept Design') with a survey to qualify and quantify the trees on site and establish the arboricultural constraints to development (above- and below-ground) to inform the design in an iterative process, and continues with an assessment of the arboricultural impacts of the final design and measures to mitigate such impacts should they be negative. Detailed technical specifications for mitigation and protection measures are devised in the design phase that follows (RIBA Stage 3-4 'Developed and Technical design'), and the sequence ends with the Implementation and Aftercare phase (RIBA Stages 5-7) with the implementation of those measures once planning permission is granted, guided by Arboricultural Method Statements (RIBA Stage 4-5, 'Technical Design and Construction) and professional guidance where appropriate. |
| 2.1.5 | <b>This report is produced to support the Design Team to the Scheme Design Approvals stage in the process chart overleaf.</b>  |

Figure 1 The design and construction process and tree care



## 2.2 Drawings Supplied

- 2.2.1 The drawings supplied by the client and relied upon by Landmark Trees in the formulation of our survey plans are:
- Existing site survey: 2GG\_SO1\_Survey
- Proposals: 2GG\_P02\_10082022

## 2.3 Scope & Limitations of Survey

- 2.3.1 As Landmark Trees' (LT) arboricultural consultant, Ross Gamblin surveyed the trees on site on 21<sup>st</sup> April 2021, recording relevant qualitative data in order to assess both their suitability for retention and their constraints upon the site, in accordance with British Standard 5837:2012 Trees in relation to design, demolition and construction – Recommendations [BS5837:2012].
- 2.3.2 Our survey of the trees, the soils and any other factors, is of a preliminary nature. The trees were SURVEYED on the basis of the Visual Tree Assessment method expounded by Mattheck and Breloer (The Body Language of Trees, DoE booklet Research for Amenity Trees No. 4, 1994). LT have not taken any samples for analysis and the trees were not climbed but inspected from ground level.
- 2.3.3 The results of the tree survey, including material constraints arising from existing trees that merit retention, should be used (along with any other relevant baseline data) to inform feasibility studies and design options. For this reason, the tree survey should be completed and made available to designers prior to and/or independently of any specific proposals for development. Tree surveys undertaken after a detailed design has been prepared can identify significant conflicts: in such cases, the nature of and need for the proposed development should be set against the quality and values of affected trees. The extent to which the design can be modified to accommodate those trees meriting retention should be carefully considered. Where proposed development is subject to planning control, a tree survey should be regarded as an important part of the evidence base underpinning the design and access statement
- 2.3.3 A tree survey is generally considered invalid in planning terms after 2 years, but changes in tree condition may occur at any time, particularly after acute (e.g. storm events) or prolonged (e.g. drought) environmental stresses or injuries (e.g. root severance). Routine surveys at different times of the year and within two - three years of each other (subject to the incidence of the above stresses) are recommended for the health and safety management of trees remote from highways or busy access routes. Annual surveys are recommended for the latter.
- 2.3.4 The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.

## 2.4 Survey Data & Report Layout

- 2.4.1 Detailed records of individual trees are given in the survey schedule in Appendix 1. General husbandry recommendations are distinguished at Appendix 2 from minimum requirements to facilitate development which form part of the planning application at Appendix 3. The former may still be relevant to providing a safe site of work, of course. Planning considerations notwithstanding, we trust these necessary recommendations are passed on to relevant parties with due diligence and the trees to be managed appropriately.
- 2.4.2 A site plan identifying the surveyed trees, based on the Instructing Party's drawings / topographical survey is provided in Part 3 of this report. This plan also serves as the Tree Constraints Plan with the theoretical Recommended Protection Areas (RPA's), tree canopies and shade constraints, (from BS5837: 2012) overlain onto it. These constraints are then overlain in turn onto the Instructing Party's proposals to create a second Arboricultural Impact Assessment Plan in Part 3. General observations, discussion, conclusions and recommendations follow, below.

### 3.0 SITE CHARACTERISTICS

#### 3.1 Property Description & Planning Context



Photograph 1: Aerial view of application site (Source: Google Earth)

- |       |  |
|-------|--|
| 3.1.1 | The site is located at 2 Grange Gardens in Hampstead, and forms part of an early 1980's development set within a secluded green backdrop populated by mature trees. No 2 is located at the edge of Grange Gardens development bordering Templewood Avenue. |
| 3.1.2 | The site slopes gently down from east to west.   |
| 3.1.3 | We understand that T2 is subject to a Tree Preservation Order, it is a criminal offence to prune, damage or fell such trees without permission from the local authority. We do though understand that the site stands outside any Conservation Area.       |
| 3.1.4 | Relevant local planning policies comprise Policy 7.21 of the London Plan 2016 and Policies A3 and D1 of the Camden Local Plan (adopted 3rd July 2017).   |



### 3.2 Soil Description

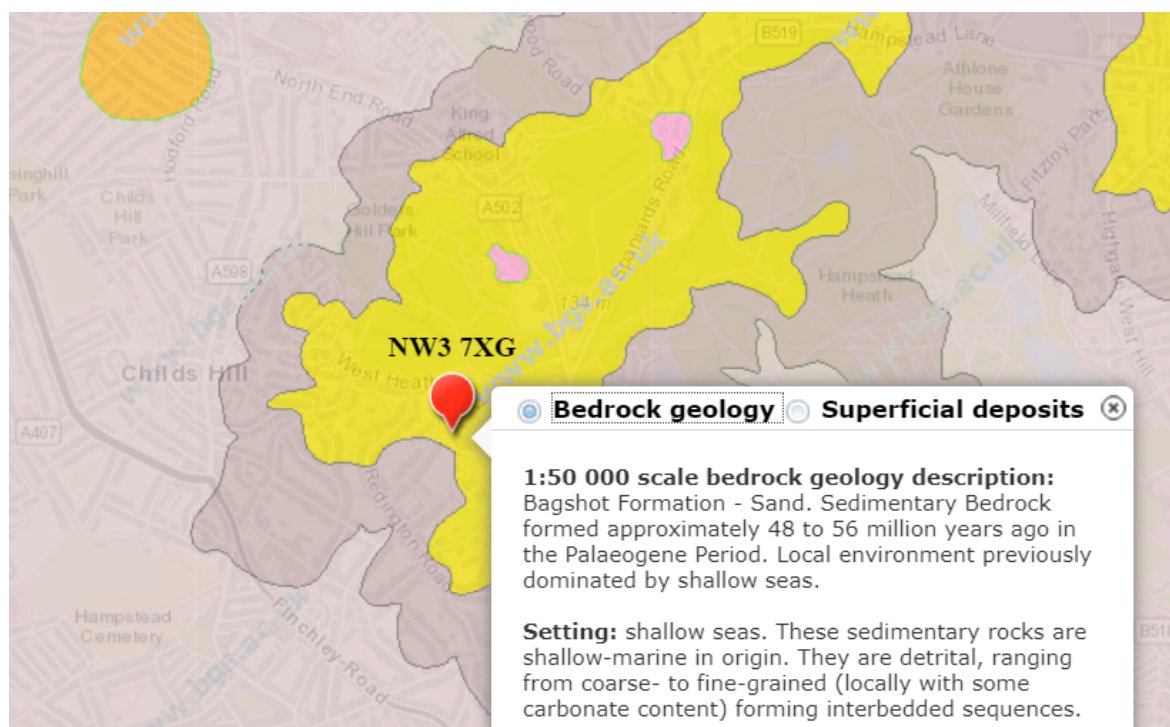


Figure 2: Extract from the BGS Geology of Britain Viewer

- 3.2.1 In terms of the British Geological Survey, the site overlies the Bagshot Beds (shown in yellow above). Bagshot Beds are sandier than the surrounding Claygate and London clay but the actual distribution of the soil series are not as clearly defined on the ground as on plan and there may be anomalies in the actual composition of clay, silt and sand content.
- 3.2.2 Sand and gravel soils are less prone to compaction during development than clay soils, potentially reducing the threat to tree health from construction traffic. The design of foundations near problematic tree species will also need to take into consideration subsidence risk in relation to the clay subsoil and its depth. Further advice from the relevant experts on the specific soil properties can be sought as necessary.

### 3.3 Subject Trees

- |       |   |
|-------|---|
| 3.3.1 | Of the 19 surveyed trees, 7 are category* B (Moderate Quality), 11 are category C (Low Quality) and 1 is category U (Poor Quality); none are category A (High Quality). |
| 3.3.2 | The tree species found on the site comprise English oak, box elder, wild cherry, pines, holly, elder, yew, red oak, sweet gum and Leyland cypress.                      |
| 3.3.3 | In terms of age demographics there is a broadly even mix of semi-mature, early mature and mature specimens present.   |

\*page 9 of: [British Standards Institute: Trees in relation to design, demolition and construction BS 5837: 2012 HMSO, London](#)

- |       |   |
|-------|---|
| 3.3.4 | Full details of the surveyed trees can be found in Appendix 1 of this report. |
| 3.3.5 | There are recommended works for G1 and T11. These are listed in Appendix 2.   |



Photograph 2: Single storey annex to be replaced





Photograph 3: G1 encroaching on annex



Photograph 4: Protected pine T2

Arboricultural Impact Assessment Report: 1 Grange Gardens, London NW3 7XG

Instructing party: Landview Properties, 8 Harmood Grove, London NW1 8DH

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## 4.0 DEVELOPMENT CONSTRAINTS

### 4.1 Primary Constraints

- 4.1.1 BS5837: 2012 gives Recommended Protection Areas (RPA's) for any given tree size. The individual RPA's are calculated in the Tree Schedule in Appendix 1 to this report, or rather the notional radius of that RPA, based on a circular protection zone. The prescribed radius is 12-x stem diameter at 1.5m above ground level, except where composite formulae are used in the case of multi-stemmed trees.
- 4.1.2 Circular RPA's are appropriate for individual specimen trees grown freely, but where there is ground disturbance, the morphology of the RPA can be modified to an alternative polygon, as shown in the diagram below (Figure 2). Alternatively, one need principally remember that RPA's are area-based and not linear – notional rather than fixed entities.

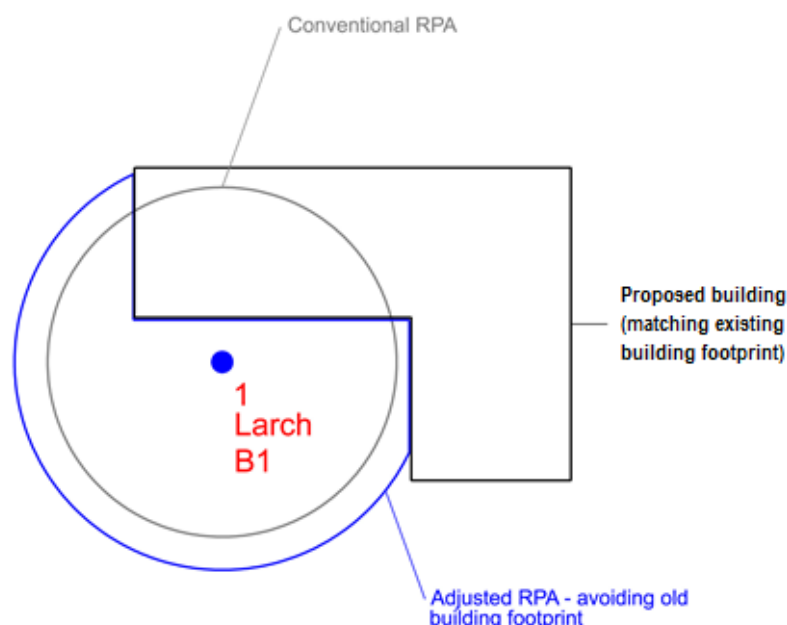


Figure 2 – Generic BS 5837 RPA Adjustments

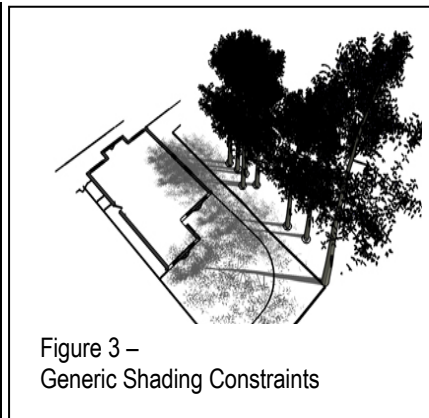
- 4.1.3 In BS5837, paragraph 4.6.2 states that RPA's should reflect the morphology and disposition of the roots; where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution. This can be done as a desktop / theoretical exercise but is not altogether (scientifically) reliable and may also invite disagreement / differences of opinion as to that distribution.

- 4.1.4 LT prefer where possible and practical to raise the issue of modification but suspend judgment until such time as more reliable site investigations have been undertaken (Tree Radar scans and / or trial pits). Of course, the justification for these investigations will depend upon whether trees are (or are likely to be once modified) subject to impacts and also upon their quality / condition: it is generally not worth commissioning a radar study to locate the roots of a poor- or low-quality tree. On other occasions, there may not be the opportunity to commission investigations, either because the access is restricted by ownership / tenancy or the report's turnaround simply does not allow it, and they may need to follow on or be conditioned. **No a priori RPA modifications have been made in this instance on account of the prevailing site conditions.**
- 4.1.5 The quality of trees will also be a consideration: U Category trees are discounted from the planning process in view of their limited useful life expectancy. Again, Category-C trees would not normally constrain development individually, unless they provide some external screening function.
- 4.1.6 At paragraph 5.1.1. BS5837: 2012 notes that "Care should be exercised over misplaced tree preservation; attempts to retain too many or unsuitable trees on a site are liable to result in excessive pressure on the trees during demolition or construction work, or post-completion demands on their removal."

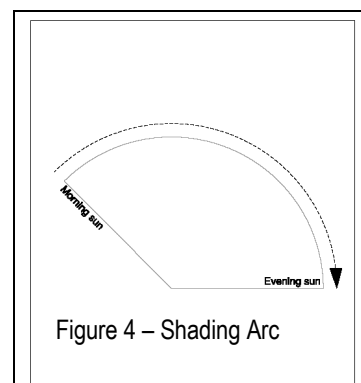
- 4.1.8 In theory, only moderate quality trees and above are significant material constraints on development. However, low quality trees comprise a constraint in aggregate, in terms of any collective loss / removal, where replacement planting is generally considered appropriate.
- 4.1.9 In this instance, the moderate quality trees have the potential to pose significant constraints to development of the site.

## 4.2 Secondary Constraints

4.2.1 The second type of constraint produced by trees that are to be retained is that the proximity of the proposed development to the trees should not threaten their future with ever increasing demands for tree surgery or felling to remove nuisance shading (Figure 3), honeydew deposition or perceived risk of harm.



4.2.2 The shading constraints are crudely determined from BS5837 by drawing an arc from northwest to east of the stem base at a distance equal to the height of the tree, as shown in the diagram opposite. Shade is less of a constraint on non-residential developments, particularly where rooms are only ever temporarily occupied.



4.2.3 This arc (see Figure 4) represents the effects that a tree will have on layout through shade, based on shadow patterns of 1x tree height for a period May to Sept inclusive 10.00-18.00 hrs daily.

4.2.4 Assuming that they will be retained, the orientation of the on-site trees means they have the potential to provide a variety of secondary constraints, including shading, organic deposition and the potential need to maintain crown clearance in the future. The significance of these constraints will vary depending on the location and proximity to the proposed re-development which is considered below (in Sections 5 & 6). As specified by BS5837, this section (4) of the report considers only the site as it is, not in the light of pending proposals.

*Note: Sections 5 & 6 below will now assess the impacts of the proposals upon constraints identified in Section 4 above. Table 1 in Section 5 presents the impacts in tabular form (drawing upon survey data presented in Appendices 1 & 2). Impacts are presented in terms of whole tree removal and the effect on the landscape or partial encroachment (% of RPA) and its effect on individual tree health. Section 6 discusses the table data, elaborating upon the impacts' significance and mitigation.*

Tree No.	B.S. Cat	English Name	Impact	% RPA affected	Age Class	Growth Vitality	Structural Condition	Species tolerance	Impact on Tree Rating	Impact on Site Rating	Mitigation
6	B2	Red Oak	Wall Construction Within RPA	2.2	SM	Normal	Fair	Moderate	Moderate	Low	Discontinuous foundations
8	B2	Scots Pine	Wall Construction Within RPA	0.8	EM	Normal	Good	Moderate	Low	Low	Discontinuous foundations
9	B2	Sweet Gum	Felled to Facilitate Development		SM	Normal	Good	N/a	N/a	Medium	New planting / landscaping
11	C2	Yew	Felled to Facilitate Development		EM	Moderate	Fair	N/a	N/a	Low	New planting / landscaping



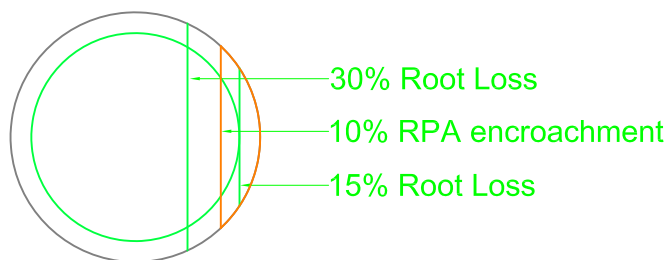
## 6.0 ARBORICULTURAL IMPLICATIONS

### 6.1 Rating of Primary Impacts

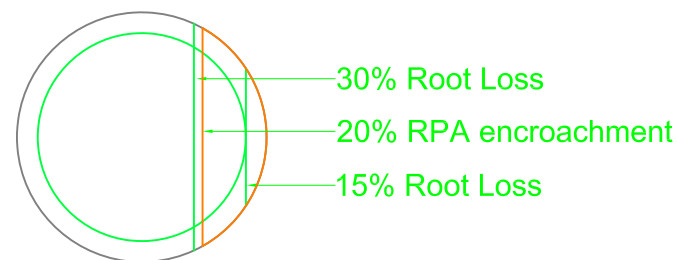
- 6.1.1 The principal impacts in the current proposals are the removal of T9 and T11. In terms of resource management, these comprise a relatively small portion of the whole. Whilst T9 has some individual specimen value, their loss could be mitigated with new planting, bringing its own benefits of enrichment and diversification to a relatively unmanaged and subsisting resource. The immediate reduction in canopy cover through felling is therefore is rated as a low impact unlikely to harm either the resource or the wider area.
- 6.1.2 Further impacts to retained trees comprise the encroachments of the RPA of T6 and T8 by the new dwelling's boundary wall. The impact of this to both trees is very minor in absolute terms but has the potential to be of significance to T6 if discontinuous footings that allow the retention of roots passing below the line of the wall are not employed.
- 6.1.3 In our view, the tree(s) are of a species, age and condition sufficient to remain viable in the circumstances, given that the area lost to encroachment can be compensated for elsewhere, contiguous with the RPA, and provided the series of mitigation measures outlined below are followed to both reduce the immediate impact of working methods and also improve the soil environment that is used by the tree for growth. Supervision and monitoring of such measures will also be essential. Subject to these provisos the net impacts are assessed as being low.

- 6.1.4 There is no set RPA encroachment that is immediately permissible. However, at para 5.3.a of BS5837, the project arboriculturist is charged with demonstrating that the tree(s) will remain viable in the instance of RPA encroachment. Whilst there is little research on RPA encroachment itself, there have been various commonly cited studies of root severance (see overleaf). Whilst the RPA is not coextensive with the wider root system, one can make some correlations after Thomas (2014): in average (sic) conditions, a straight line tangential with a tree's canopy would transect 15% of the root system, for another mid-way to the trunk that figure would be 30%. In the current cases, **the impacts would be well below of the lower of these two parameters** as can be seen in Plan 2 in the Appendix or where more irregular in profile, can be gleaned from the percentage RPA encroachments in Table 1. There is no precise correlation between % RPA and root impairment or loss. However, in our experience, most RPA tend to exceed the free-grown canopy spread a little (c. x 1.2 -1.5), suggesting by reference to both Thomas and Fig. 5a - 5c overleaf, RPA encroachments marginally understate the percentage root loss. The informal 20% RPA threshold may equate to c. 30% root loss, and 10% RPA encroachment to c. 20% root loss. The assumptions made here are relatively crude and apply more to open grown trees but are nonetheless illustrative.

RPA: 5m

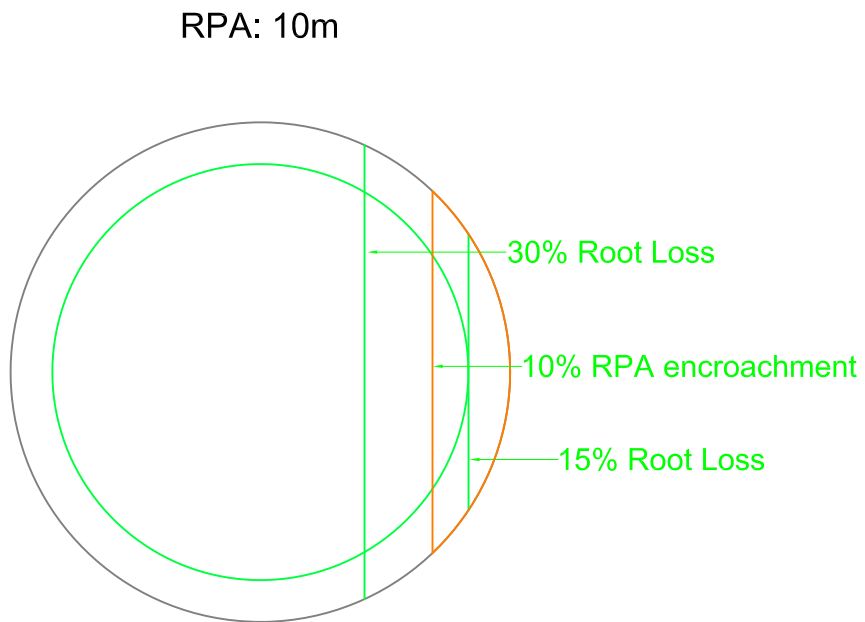


Area 7.98 sq.m. (10.0%)

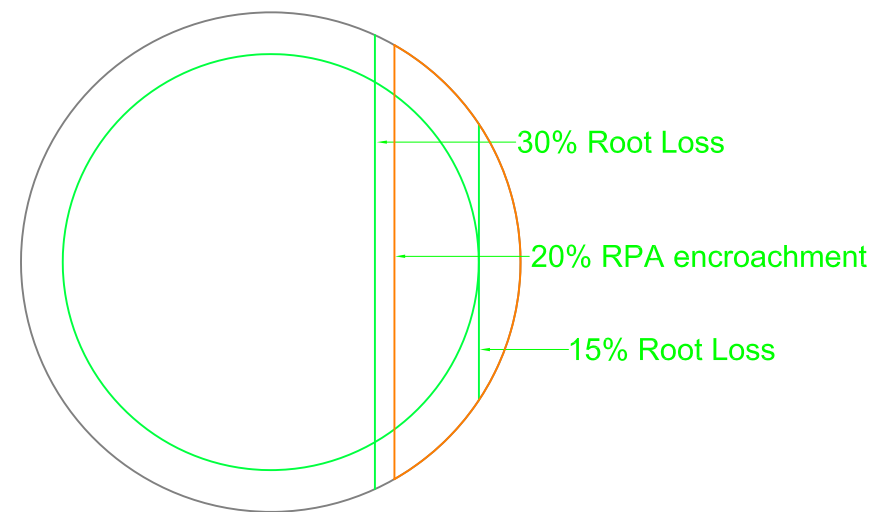


Area 15.96 sq.m. (20.0%)

Figure 5a: approximate correlation between RPA encroachment and actual root loss on a free-grown tree of 5m RPA radius (after Thomas (2014))



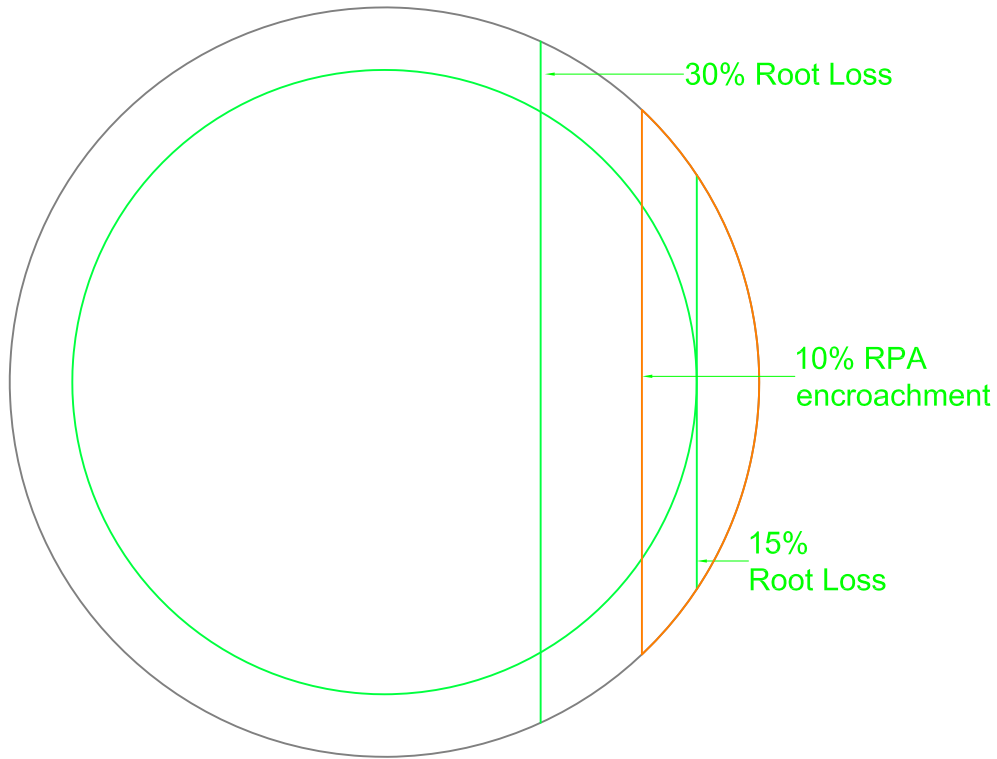
Area 31.17 sq.m. (10.0%)



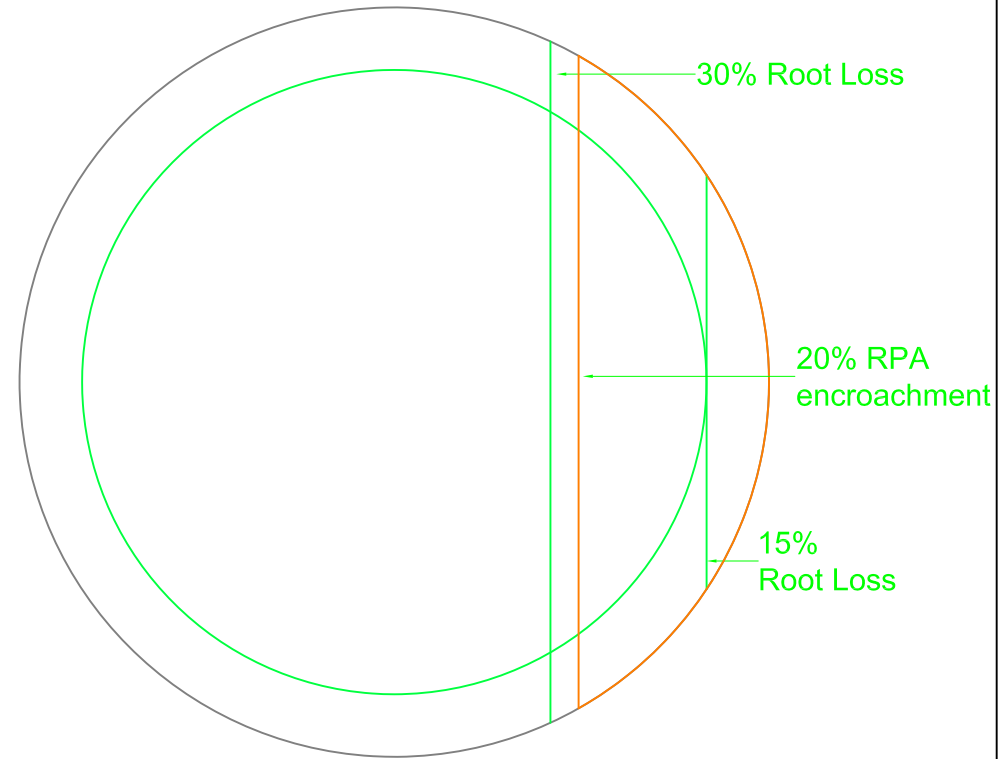
Area 62.33 sq.m. (20%)

Figure 5b: approximate correlation between RPA encroachment and actual root loss on a free-grown tree of 10m RPA radius (after Thomas (2014))

RPA: 15m



Area 70.7 sq.m. (10.0%)



Area 141.4 sq.m. (20.0%)

Figure 5c: approximate correlation between RPA encroachment and actual root loss on a free-grown tree of 15m RPA radius (after Thomas (2014))

- 6.1.5 Published references suggest healthy trees tolerating up to 30-50% root severance in general (Coder, Helliwell and Watson in CEH 2006). **"In practice 50% of roots can sometimes be removed with little problem**, provided there are vigorous roots elsewhere. Inevitably, this degree of root loss will temporarily slow canopy growth and even lead to some dieback" (Thomas 2014). Clearly, it is not the purpose of this report to sanction impacts to test a tree's physiological tolerance, where the guidance recommends the avoidance of impact / RPA encroachment as the default position. However, it has not proved possible at the design stage to avoid such encroachment altogether, and in that regard, the project arboriculturalist has determined that the retained trees can remain viable in the scheme before planning.
- 6.1.6 The trees in question are shown in Table 1 above to be healthy specimens of species with a good resistance to development impacts, and of an age quite capable of tolerating these limited impacts. Nor do the site characteristics suggest specific soil anomalies (e.g. heavy clay) having a bearing on such considerations, provided appropriate measures (e.g. ground protection) are taken.
- 6.1.7 As per BS5837 recommendations (at 5.3.a), the above assessment demonstrates that the tree(s) can remain viable and as per the equivalent hatching in Plan 2 of the Appendices that the area(s) lost to encroachment can be compensated for elsewhere. The guide also recommends (at 5.3.b) the arboriculturalist propose a series of mitigation measures (to improve the soil environment that is used by the tree for growth). These are provided at 6.3 below.

## 6.2 Rating of Secondary Impacts

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|-------|--|
| 6.2.1 | Following the removal of the part of G1 adjacent to the new dwelling, it will not be subject to shading and nor will there be any great need to maintain canopy clearance and therefore, the secondary impacts of development are minimal. |
|-------|--|

## 6.3 Mitigation of Impacts

- |       |  |
|-------|--|
| 6.3.1 | The replanting scheme will offer considerable enhancement, replacement trees will have the advantage of being specifically selected for the proposed site, healthy and fit-for-purpose. Design can provide for a diverse range of native and ornamental species that will compliment rather than conflict with the proposals, so providing a more sustainable long-term resource for the future. A selection of tree species and cultivars for open and constricted sites is provided in Appendix 4. |
|-------|--|

- |       |  |
|-------|--|
| 6.3.2 | RPA encroachments are shown in Plan 2 compensated for elsewhere on contiguous land, it will be noted that the use of discontinuous foundations for the boundary wall is assumed and as such, only the wall's footprint is deemed to encroach within the RPA of T6. Soft ground within the remaining RPAs of these trees will be treated with a 75mm layer of mulch which will be maintained in place throughout the duration of construction activities. |
|-------|--|

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| 6.3.3 | All plant and vehicles engaged in demolition works should either operate outside the RPA, or should run on a temporary surface designed to protect the underlying soil structure. The demolition of the building should proceed inwards in a "pull down" fashion. Hard surfacing can be lifted with caution by a skilled machine operator again working away from the tree. |
|-------|---|

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| 6.3.4 | The wall encroachments will require the use of specialised foundation techniques, such as discontinuous piles and above ground beam. The foundation pits within the RPA should be trial-excavated by hand using a double-headed spade ("shove-holer") or similar to minimise breadth of hole required for inspection. |
|-------|---|

- |       |   |
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| 6.3.5 | Nuisance deposition can be further mitigated with routine maintenance, light pruning / deadwooding and the fitting of filtration traps on guttering (see Figure 5 below). |
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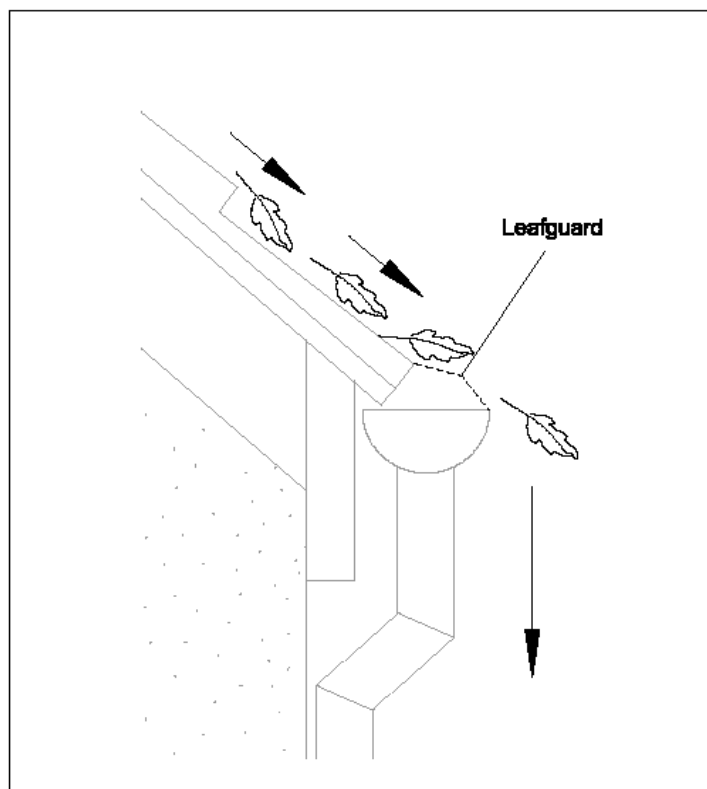


Figure 5: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

## 7.0 CONCLUSION

- 7.1 The potential impacts of development are all relatively low in terms of both quality of trees removed and also RPA encroachments of trees retained. In the latter case, the report has demonstrated as per BS5837 paragraph 5.3.1 (a) that the tree(s) can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA; the report also proposes as per paragraph 5.3.1 (b) a series of mitigation measures to improve the soil environment that is used by the tree for growth.
- 7.2 The full potential of the impacts can thus be largely mitigated through design and precautionary measures. These measures can be elaborated in Method Statements in the discharge of planning conditions.
- 7.3 The species affected are generally tolerant of root disturbance / crown reduction and the retained trees are generally in good health and capable of sustaining these reduced impacts.
- 7.4 The trees that are recommended for felling are of little individual significance, such that their loss will not affect the visual character of the area.
- 7.5 Therefore, the proposals will not have any significant impact on either the retained trees or wider landscape thereby complying with Policy 7.21 of the London Plan 2016 and Policies A3 and D1 of the Camden Local Plan (adopted 3rd July 2017). Thus, with suitable mitigation and supervision the scheme is recommended to planning.



## 8.0 RECOMMENDATIONS

### 8.1 Specific Recommendations

- |       |   |
|-------|---|
| 8.1.1 | Tree works recommendations in Appendix 2 are not part of the current application, but requirements of general maintenance that will need to be applied for (subject to para. 3.3 of this report and any other relevant constraints in planning or leasehold) by the client separately. Consent for the current planning application does not impart any consent for the Appendix 2 maintenance works. Please note, though, the owner and / or manager of a property have a duty to maintain a safe site of work and to protect occupiers of the surrounding land / members of the public from tree hazards. Works recommended in this report should be enacted in a timely fashion by the relevant party regardless of the progress of the development. |
| 8.1.2 | Recommendations for works required to facilitate development are found in Appendix 3 and a selection of columnar tree species cultivars for constricted sites provided in Appendix 4. Any tree removals recommended within this report should only be carried out with local authority consent.   |
| 8.1.3 | Excavation and construction impacts within the RPA's of trees identified in Table 1 above, will need to be controlled by method statements specifying mitigation methods suggested in para 6.3 above and by consultant supervision as necessary. These method statements can be provided as part of the discharge of conditions.  |
| 8.1.4 | Replace felled trees with native ornamental nursery stock under current best practice; i.e. conforming to and planted in accordance with the following:   |

- |  |
|--|
| <ul style="list-style-type: none"> <li>• BS8545: 2014 Code of Practice for Trees from Nursery to Landscape</li> <li>• BS 3936-1: 1992 Nursery stock. Specification for trees and shrubs; and</li> <li>• BS 5236:1975 Cultivation and Planting of Trees in the Advanced Nursery Stock Category.</li> <li>• All replacement stock should be planted and maintained as detailed in BS 4428:1989 (Section 7): Recommendations for General Landscape Operations.</li> </ul> |
|--|

## 8.2 General Recommendations for Sites Being Developed with Trees

- |       |  |
|-------|--|
| 8.2.1 | Any trees which are in close proximity to the proposed development should be protected with a Tree Protection Barrier (TPB). Protective barrier fencing should be installed immediately following the completion of the tree works, remaining in situ for the entire duration of the development unless otherwise agreed in writing by the Council. It should be appropriate for the intensity and proximity of the development, usually comprising steel, mesh panels 2.4m in height ('Heras') and should be mounted on a scaffolding frame (shown in Fig 2 of BS5837:2012). The position of the TPB can be shown on plan as part of the discharge of conditions, once the layout is agreed with the planning authority. The TPB should be erected prior to commencement of works, remain in its original form on-site for the duration of works and be removed only upon full completion of works. |
| 8.2.2 | A TPB may no longer be required during soft landscaping work but a full arboricultural assessment must be performed prior to the undertaking of any excavations within the RPA of a tree. This will inform a decision about the requirement of protection measures. It is important that all TPBs have permanent, weatherproof notices denying access to the RPA.  |
| 8.2.3 | The use of heavy plant machinery for building demolition, removal of imported materials and grading of surfaces should take place in one operation. The necessary machinery should be located above the existing grade level and work away from any retained trees. This will ensure that any spoil is removed from the RPAs. It is vital that the original soil level is not lowered as this is likely to cause damage to the shallow root systems.   |
| 8.2.4 | Any pruning works must be in accordance with British Standard 3998:2010 Tree work [BS3998].  |
| 8.2.5 | Where sections of hard surfacing are proposed in close proximity to trees, it is recommended that "No-Dig" surfacing be employed in accordance with BS5837:2012 and 'The Principles of Arboricultural Practice: Note 1, Driveways Close to Trees, AAIS 1996 [APN1]'.   |
| 8.2.6 | If the RPA of a tree is encroached by underground service routes then BS5837:2012 and NJUG VOLUME 4 provisions should be employed. If it is deemed necessary, further arboricultural advice must be sought.  |
| 8.2.7 | Numerous site activities are potentially damaging to trees e.g. parking, material storage, the use of plant machinery and all other sources of soil compaction. In operating plant, particular care is required to ensure that the operational arcs of excavation and lifting machinery, including their loads, do not physically damage trees when in use.  |

- 8.2.8 To enable the successful integration of the proposal with the retained trees, the following points will need to be taken into account:
- 1) Plan of underground services.
  - 2) Schedule of tree protection measures, including the management of harmful substances.
  - 3) Method statements for constructional variations regarding tree proximity (e.g. foundations, surfacing and scaffolding).
  - 4) Site logistics plan to include storage, plant parking/stationing and materials handling.
  - 5) Tree works: felling, required pruning and new planting. All works must be carried out by a competent arborist in accordance with BS3998.
  - 6) Site supervision: the Site Agent must be nominated to be responsible for all day-to-day arboricultural matters on site. This person must:
    - be present on site for the majority of the time;
    - be aware of the arboricultural responsibilities;
    - have the authority to stop work causing, or may cause harm to any tree;
    - ensure all site operatives are aware of their responsibilities to the trees on site and the consequences of a failure to observe these responsibilities;
    - arrange with the retained arboricultural consultant an initial pre-start briefing to inspect tree protection measures and agree a schedule of monitoring thereof on an initial monthly basis to be reviewed over the duration of works.
    - give advance notice (ideally 2 weeks) to retained arboricultural consultant to arrange for supervision of any excavation (especially for services and foundations) within RPA
    - make immediate contact with the local authority and/or a retained arboricultural consultant in the event of any tree related problems occurring.
- 8.2.9 These points can be resolved and approved through consultation with the planning authority via their Arboricultural Officer.
- 8.2.10 The sequence of works should be as follows:
- i) initial tree works: felling, stump grinding and pruning for working clearances;
  - ii) installation of TPB for demolition & construction;
  - iii) installation of underground services;
  - iv) installation of ground protection;
  - v) main construction;
  - vi) removal of TPB;
  - vii) soft landscaping.

## 9.0 COMPLIANCE: Trees and the Planning System

- 9.1 Under the UK planning system, local authorities have a statutory duty to consider the protection and planting of trees when granting planning permission for proposed development. The potential effect of development on trees, whether statutorily protected (e.g. by a tree preservation order or by their inclusion within a conservation area) or not, is a material consideration that is taken into account in dealing with planning applications. Where trees are statutorily protected, it is important to contact the local planning authority and follow the appropriate procedures before undertaking any works that might affect the protected trees.
- 9.2 The nature and level of detail of information required to enable a local planning authority to properly consider the implications and effects of development proposals varies between stages and in relation to what is proposed. Table B.1 provides advice to both developers and local authorities on an appropriate amount of information. The term “minimum detail” is intended to reflect information that local authorities are expected to seek, whilst the term “additional information” identifies further details that might reasonably be sought, especially where any construction is proposed within the RPA.

- 9.3 This report delivers information appropriate to a full planning application and to these specific proposals as per BS5837 Table B.1 below, providing both minimum details and further additional material in the form of general tree protection recommendations and constructional variation.

Table B.1 Delivery of tree-related information into the planning system

Stage of process	Minimum detail	Additional information
Pre-application	Tree survey	Tree retention/removal plan (draft)
Planning application	Tree survey (in the absence of pre-application discussions) Tree retention/removal plan (finalized) Retained trees and RPAs shown on proposed layout Strategic hard and soft landscape design, including species and location of new tree planting Arboricultural impact assessment	Existing and proposed finished levels Tree protection plan Arboricultural method statement – heads of terms Details for all special engineering within the RPA and other relevant construction details
Reserved matters/ planning conditions	Alignment of utility apparatus (including drainage), where outside the RPA or where installed using a trenchless method Dimensioned tree protection plan Arboricultural method statement – detailed Schedule of works to retained trees, e.g. access facilitation pruning Detailed hard and soft landscape design	Arboricultural site monitoring schedule Tree and landscape management plan Post-construction remedial works Landscape maintenance schedule

## 10.0 REFERENCES

- Barlow JF & Harrison G. 1999. Shade By Trees, Arboricultural Practice Note 5, AAIS, Farnham, Surrey.
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- Centre for Ecology & Hydrology. 2006. Tree Roots in the Built Environment, HMSO, London.
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- Lonsdale D 1999. Research for Amenity Trees No.7: Principles of Tree Hazard Assessment and Management, HMSO, London.
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- Thomas P, 2000 & 2014. Trees: Their Natural History, Cambridge University Press, Cambridge.
- Trowbridge J & Bassuk N (2004) Trees in the Urban Landscape: Site Assessment, Design, and Installation; J Wiley & Sons inc. NJ USA



### Caveats

This report is primarily an arboricultural report. Whilst comments relating to matters involving built structures or soil data may appear, any opinion thus expressed should be viewed as qualified, and confirmation from an appropriately qualified professional sought. Such points are usually clearly identified within the body of the report. It is not a full safety survey or subsidence risk assessment survey. These services can be provided but a further fee would be payable. Where matters of tree condition with a safety implication are noted during a survey they will of course appear in the report.

A tree survey is generally considered invalid in planning terms after 2 years, but changes in tree condition may occur at any time, particularly after acute (e.g. storm events) or prolonged (e.g. drought) environmental stresses or injuries (e.g. root severance). Routine surveys at different times of the year and within two - three years of each other (subject to the incidence of the above stresses) are recommended for the health and safety management of trees remote from highways or busy access routes. Annual surveys are recommended for the latter.

Tree works recommendations are found in the Appendices to this report. It is assumed, unless otherwise stated ("ASAP" or "Option to") that all husbandry recommendations will be carried out within 6 months of the report's first issue. Clearly, works required to facilitate development will not be required if the application is shelved or refused. However, necessary husbandry work should not be shelved with the application and should be brought to the attention of the person responsible, by the applicant, if different. Under the Occupiers Liability Act of 1957, the owner (or his agent) of a tree is charged with the due care of protecting persons and property from foreseeable damage and injury.' He is responsible for damage and/or nuisance arising from all parts of the tree, including roots and branches, regardless of the property on which they occur. He also has a duty under The Health and Safety at Work Act 1974 to provide a safe place of work, during construction. Tree works should only be carried out with local authority consent, where applicable.

Inherent in a tree survey is assessment of the risk associated with trees close to people and their property. Most human activities involve a degree of risk, such risks being commonly accepted if the associated benefits are perceived to be commensurate.

Risks associated with trees tend to increase with the age of the trees concerned, but so do many of the benefits. It will be appreciated, and deemed to be accepted by the client, that the formulation of recommendations for all management of trees will be guided by the cost-benefit analysis (in terms of amenity), of tree work that would remove all risk of tree related damage.

Prior to the commencement of any tree works, an ecological assessment of specific trees may be required to ascertain whether protected species (e.g. bats, badgers and invertebrates etc.) may be affected.



Landmark Trees

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## PART 2 – APPENDICES

## APPENDIX 1

### TREE SCHEDULE

#### Botanical Tree Names

Cherry, Wild cherry /Gean	: Prunus avium	Laurel, Cherry	: Prunus laurocerasus
Cypress, Leyland	: Cupressus × leylandii	Oak, English	: Quercus robur
Elder	: Sambucus nigra	Oak, Red	: Quercus rubra
Elder, box	: Acer negundo	Pine, Scots	: Pinus sylvestris
Gum, Sweet	: Liquidambar styraciflua	Yew, Common	: Taxus baccata
Holly, Common/English	: Ilex aquifolium		

#### Notes for Guidance:

- Height describes the approximate height of the tree measured in metres from ground level.
- The Crown Spread refers to the crown radius in meters from the stem centre and is expressed as an average of NSEW aspect if symmetrical.
- Ground Clearance is the height in metres of crown clearance above adjacent ground level.
- Stem Diameter (Dm) is the diameter of the stem measured in millimetres at 1.5m from ground level for single stemmed trees. BS 5837:2012 formula (Section 4.6) used to calculate diameter of multi-stemmed trees. Stem Diameter may be estimated where access is restricted and denoted by '#'.
- Protection Multiplier is 12 and is the number used to calculate the tree's protection radius and area
- Protection Radius is a radial distance measured from the trunk centre.
- Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
- Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present.
- Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
- B.S. Cat refers to (British Standard 5837:2012 section 4.5) and refers to tree/group quality and value; 'A' – High, 'B' - Moderate, 'C' - Low, 'U' - Unsuitable for retention. The following colouring has been used on the site plans:
  - High Quality (A) (Green),
  - Moderate Quality (B) (Blue),
  - Low Quality (C) (Grey),
  - Unsuitable for Retention (U) (Red)
- Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
- Useful Life is the tree's estimated remaining contribution in years.



Tree No.	English Name	Height	Crown Spread				Ground Clearance	Stem Diameter	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
1	English Oak	17	8	8	8	8	7	750	M	9.0	Normal	Good	B	1	40+	Offsite. DBH estimated, location approximate; not on survey
2	Pine	14	3	5.5	5	4	4	610	M	7.3	Normal	Good	B	1	40+	Minor static deadwood throughout crown
3	Box Elder	9	4	2.5	3	3	2	170	SM	2.0	Moderate	Poor	C	2	20+	Suppressed and distorted form due to group pressure
4	Wild Cherry	12	4	4	4	4	2	340	M	4.1	Moderate	Poor	U		<10	Mature <i>Ganoderma spp</i> fungal brackets at base, east and west sides. Insect frass present around base. An included bark union at 1.60m. Historically crown reduced. Static deadwood in crown
G1	Holly,Elder,Yew	6	2	2	2	2	0	150	EM	1.8	Moderate	Fair	C	2	40+	Mixed species linear screening hedge. The majority of specimens at the southern extent of group are ivy covered. Some small dead trees within
5	Pine	15	5	5	4.5	4.5	7	550	M	6.6	Normal	Good	B	1	40+	Static deadwood in upper crown, relatively well formed.
6	Red Oak	13	2.5	2	3	4.5	7	320	SM	3.8	Normal	Fair	B	2	40+	Historically topped and apical growth removed, middling resulting form
7	Scots Pine	11	1.5	2.5	2	2.5	3.5	290	EM	3.5	Normal	Good	B	2		Minor static deadwood in crown
8	Scots Pine	13	2.5	2	4	1	4	330	EM	4.0	Normal	Good	B	2	40+	Minor static deadwood in crown
9	Sweet Gum	11	0.5	3.5	4	4	1	290	SM	3.5	Normal	Good	B	2	40+	Crown distorted due to group pressure, bias to south
10	Leyland Cypress	5.5	2	2	2	2	0	60	SM	2.4	Moderate	Poor	C	2	10+	Lower crown thinning out/ localised dieback, limbs beginning to subside
11	Yew	7.5	1	1.5	1.5	2	0.5	440	EM	5.3	Moderate	Fair	C	2	10+	Bifurcated from 1.50m, South western stem is dead, with dead cambium strip running down to base. Crown beginning to show uniform thinning
12	Yew	8	0.5	1	2	0	4	280	EM	3.4	Moderate	Fair	C	2	20+	Historically a twin stemmed tree. Minor lean to south. Vertical area of missing bark on remaining stem from 2.50-3.00m. Phototropic form. Epicormics on stem. Historically over lifted leaving poor resulting form
13	Yew	10	4	1.5	4	4	4	630	EM	7.6	Moderate	Fair	C	2	10+	Historically a twin stemmed tree with the most northern stem removed at 3.50m. Epicormics on stem. Crown thinning out. Vertical strips of dead cambium up west side of stem. Historically over lifted leaving poor resulting form
14	Yew	12	1.5	3.5	3.5	3	1	550	EM	6.6	Moderate	Fair	C	2	20+	Epicormics up lower stem, historically over lifted leaving poor resulting form
15	Yew	11	2.5	1	4	0	1	310,270	EM	4.9	Moderate	Poor	C	2	20+	Bifurcated from 0.30m. Phototropic form. Over lifted historically. Poor form. End weighted limbs

Tree No.	English Name	Height	Crown Spread				Ground Clearance	Stem Diameter	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
16	Cherry Laurel	6	4	3.5	3.5	1	0.5	190	SM	2.3	Normal	Good	C	1	40+	Low spreading habit
17	Leyland Cypress	7	2	2	2	2	1	220	SM	2.6	Moderate	Good	C	2	10+	Crown conflicting with outbuilding on north west side
18	Holly	6	1.5	1.5	1.5	1.5	0.5	150	SM	1.8	Moderate	Fair	C	2	10+	Phototropic form, Bifurcated with included bark union at 1.50m, conflicting with outbuilding

## APPENDIX 2

### RECOMMENDED TREE WORKS

#### Notes for Guidance:

#### **Husbandry 1 - Urgent (ASAP), 2 - Standard (within 6 months), 3 - Non-urgent (2-3 years)**

- CB - Cut Back to boundary/clear from structure.
- CL# - Crown Lift to given height in meters.
- CT#% - Crown Thinning by identified %.
- CR#% - Crown Reduce by given maximum % (of outermost branch & twig length)
- DWD - Remove deadwood.
- Fell - Fell to ground level.
- FInv - Further Investigation (generally with decay detection equipment).
- Pol - Pollard or re-pollard.
- Mon - Check / monitor progress of defect(s) at next consultant inspection which should be <18 months in frequented areas and <3 years in areas of more occasional use. Where clients retain their own ground staff, we recommend an annual in- house inspection and where practical, in the aftermath of extreme weather events.
- Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

Tree No.	English Name	Height	Crown Spread				Ground Clearance	B.S. Cat	Comments	Preliminary Recommendations
G1	Holly,Elder,Yew	6	2	2	2	2	0	C2	Mixed species linear screening hedge. The majority of specimens at the southern extent of group are ivy covered. Some small dead trees within	Fell any dead stems at southern end of group - RH2
11	Yew	7.5	1	1.5	1.5	2	0.5	C2	Bifurcated from 1.50m, South western stem is dead, with dead cambium strip running down to base. Crown beginning to show uniform thinning	Remove dead stem - RH2

## APPENDIX 3

### RECOMMENDED TREE WORKS TO FACILITATE DEVELOPMENT (See Table 1)

#### Notes for Guidance:

- RP - Pre-emptive root pruning of foundation encroachments under arboricultural supervision.
- CB - Cut Back to boundary/clear from structure.
- CL# - Crown Lift to given height in meters.
- CT#% - Crown Thinning by identified %.
- CCL - Crown Clean (remove deadwood/crossing and hazardous branches and stubs)\*.
- CR#% - Crown Reduce by given maximum % (of outermost branch & twig length)
- DWD - Remove deadwood.
- Fell - Fell to ground level.
- FInv - Further Investigation (generally with decay detection equipment).
- Pol - Pollard or re-pollard.
- Mon - Check / monitor progress of defect(s) at next consultant inspection which should be <18 months in frequented areas and <3 years in areas of more occasional use. Where clients retain their own ground staff, we recommend an annual in- house inspection and where practical, in the aftermath of extreme weather events.
- Svr Ivy / Clr Bs - Sever ivy / clear base and re-inspect base / stem for concealed defects.

\*Not generally specified following BS3998:2010

Tree No.	English Name	Height	Crown Spread				Ground Clearance	B.S. Cat	Comments	Preliminary Recommendations
9	Sweet Gum	11	0.5	3.5	4	4	1	B2	Crown distorted due to group pressure, bias to south	Fell to Facilitate Development
11	Yew	7.5	1	1.5	1.5	2	0.5	C2	Bifurcated from 1.50m, South western stem is dead, with dead cambium strip running down to base. Crown beginning to show uniform thinning	Fell to Facilitate Development

## APPENDIX 4: TREE SELECTION FOR URBAN LOCATIONS

Table A4.1: Small Ornamental Tree Species

Common Name	Species	(Columnar Form for discrete usage)
Hawthorn	<i>Crataegus monogyna</i>	Stricta
Cockspur	<i>Crataegus prunifolia</i>	Splendens
Cherry	<i>Prunus x hillieri</i>	Spire
Bird cherry	<i>Prunus padus</i>	Albertii
Rowan / Mountain ash	<i>Sorbus aucuparia</i>	Cardinal Royal
Swedish whitebeam	<i>Sorbus intermedia</i>	Brouwers
B. whitebeam	<i>Sorbus x thuringiaca</i>	Fastigiata

Table A4.2: Medium Specimen Tree Species

Common Name	Species	(Columnar Form for discrete usage)
Chinese red bark birch	<i>Betula albosinensis</i>	Fascination
Mongolian lime	<i>Tilia mongolica</i>	
Hornbeam	<i>Carpinus betulus</i>	Fastigiata Frans Fontaine
Turkish hazel	<i>Corylus columna</i>	
Maidenhair tree	<i>Ginkgo biloba</i>	
Pride of India	<i>Koelreuteria paniculata</i>	Fastigiata
European larch	<i>Larix decidua</i>	Sheerwater Seedling
Tulip tree	<i>Liriodendron tulipifera</i>	Fastigiata

Table A4.3: Larger Specimen Tree Species

Common Name	Species	(Columnar Form for discrete usage)
English oak	<i>Quercus robur</i>	f. Koster
American elm	<i>Ulmus americana</i> Princeton	
Cedar of Lebanon	<i>Cedrus libani</i>	



Landmark Trees

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## PART 3 – PLANS

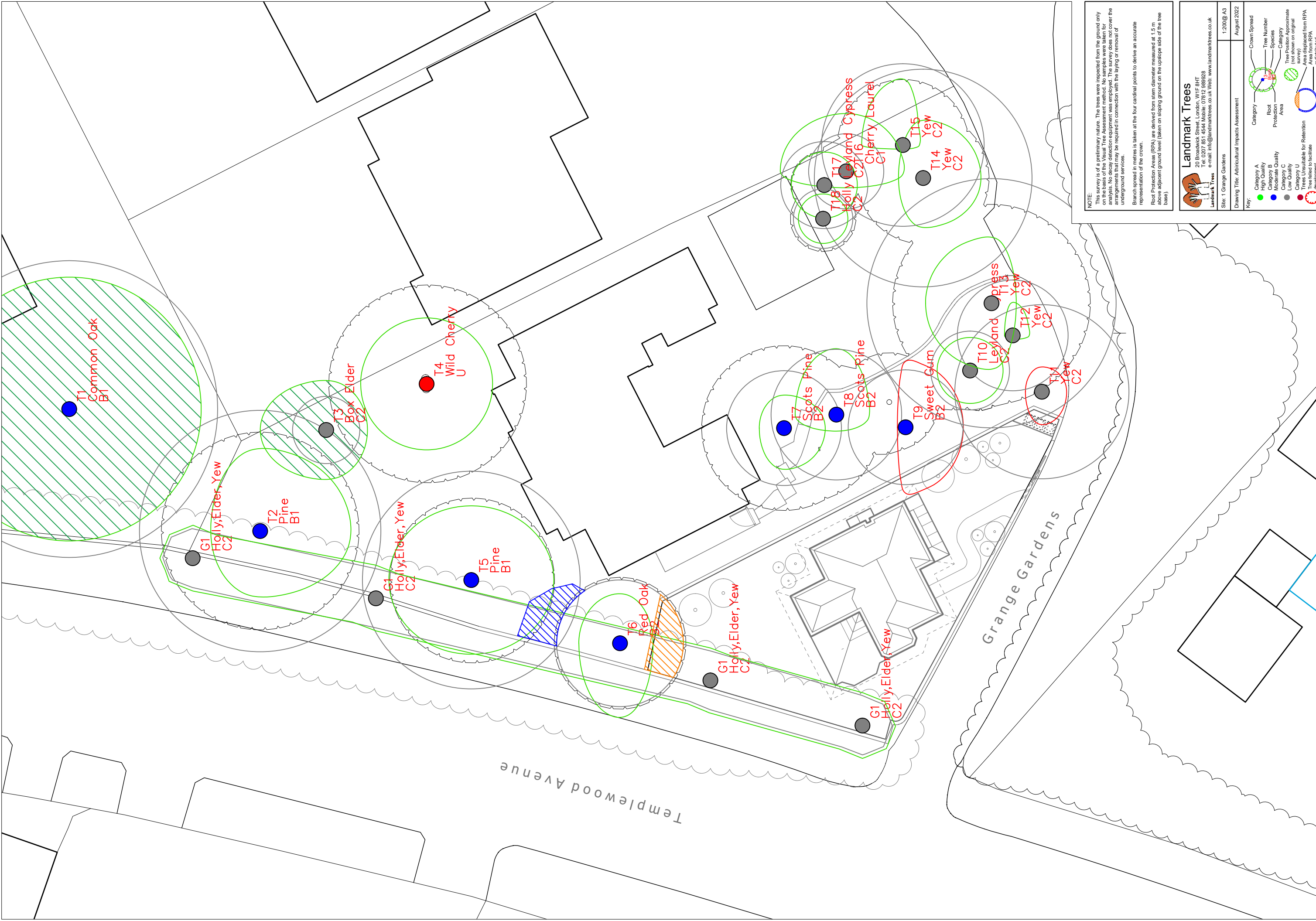


**PLAN 1****TREE CONSTRAINTS PLAN**




**PLAN 2****ARBORICULTURAL IMPACT ASSESSMENT PLAN (S)**

- i. Ground Floor



**NOTE:**  
This survey is of a preliminary nature. The trees were inspected from the ground only on the basis of the Visual Tree Assessment method. No samples were taken for analysis. No decay detection equipment was employed. The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.  
Branch spread in metres is taken at the four cardinal points to derive an accurate representation of the crown.  
Rood Protection Areas (RPA) are derived from stem diameter measured at 1.5 m above adjacent ground level (taken on sloping ground on the upslope side of the tree bases).  
1200@A3



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Drawing Title: Arboricultural Impacts Assessment	
1200@A3	August 2022

**Key:**

Category A	Category	Crown Spread
High Quality	Tree Number	
Category B	Species	
Medium Quality	Protection	
Category C	Area	
Low Quality	Tree Position Approximate (not shown on original)	
Category U	Trees Unsuitable for Retention	
	Area displaced from RPA	
	Area from RPA redistributed	