

Landmark Trees

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**ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR:**

83 Belsize Park Gardens  
London  
NW3 4NJ

**INSTRUCTING PARTY:**

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**Ref:** SMR/83BPG/AIA/01a

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## DOCUMENT HISTORY

Revision	Status	Comments	Date
Rev 0	DRAFT	For Internal Review (Client / Design Team)	31/3/23
Rev 01a	Authorised	For External Issue	5/4/23

## 1. SUMMARY

- 1.1 The existing site is a residential property with small front and moderate rear gardens containing a number of trees; there are also trees at neighbouring sites, in gardens and the separate triangular area of green open space to the rear; all of these trees potentially constraining development. The proposal includes some partial demolition with construction of a ground-floor rear extension extending 1.9m from the existing rear façade, new paved terracing and an air source heat pump.
- 1.2 There are 4 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, but the two hawthorns on the frontage (T2 & T3) are prominently positioned in the streetscape. All trees are material constraints on development.
- 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: no trees will be removed but there would be some minor pruning to facilitate construction. Though pruning here is to serve development, by providing clearance for construction access over the extant drive / parking area, if undertaken to best practice the scale envisaged should not be altogether untoward in an occupied site.
- 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 have not been 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 and include a Full Arboricultural Method Statement with Tree Protection Plan to reconcile construction activities with the tree protection measures. These can be secured by planning condition.
- 1.6 In conclusion, the proposal, through following the above recommendations, will have 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

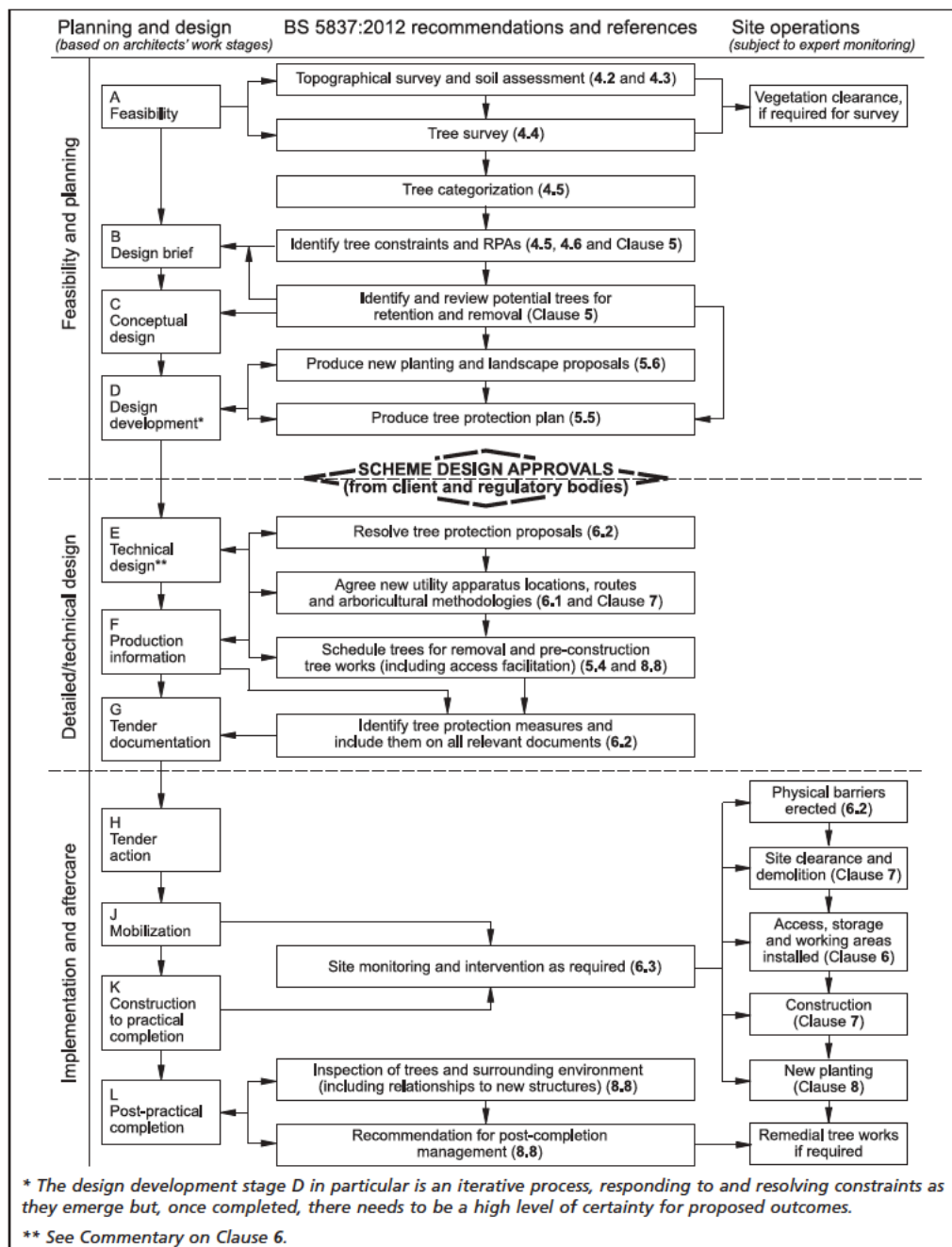
## 2. INTRODUCTION

### 2.1 Terms of Reference

- 2.1.1 Studio MR instructed Landmark Trees (LT) to prepare this Arboricultural Impact Assessment on behalf of their client, to support a full planning application submitted to London Borough of Camden ('LBC').
- 2.1.2 The application relates to the development of 83 Belsize Park Gardens, London NW3 4NJ. The proposals include some partial demolition with construction of a ground floor rear extension, extending 1.9M from the existing rear facade and approx. 5.6M away from the bay tree T1 in the rear garden; beyond the proposed extension would be areas of new paving to form terraces, set at +/- 140mm above the existing ground level for a flush threshold at the new sliding doors; a new air source heat pump is also proposed.
- 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' as defined in 2012) 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 This report is produced to support the Design Team to the Scheme Design Approvals stage in the process chart below.

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: MBS21314 – FPG - R1

Proposals: Proposed Site Plan BPG – P2 - 002; Proposed Ground Floor Plan BPG – P2 - 100

## 2.3 Scope & Limitations of Survey

- 2.3.1 As Landmark Trees' (LT) arboricultural consultant, Conor Fitzpatrick DipArbL4 MA surveyed the trees on site on 28<sup>th</sup> March 2023, 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.
- 2.3.4 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.
- 2.3.5 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 (RPAs), 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. Physical measures required to protect trees during construction are then added to this plan to create an Outline Tree Protection Plan. General observations, discussion, conclusions and recommendations follow, below.



### 3. SITE CHARACTERISTICS

#### 3.1 Property Description & Planning Context



Photograph 1: Aerial photograph showing the site in context (Source: Google Satellite layer – imagery 2023)

- 3.1.1 The application site comprises a semi-detached family dwelling house of three storeys (two storeys with rooms at attic level served by gables / dormers) set within small front and larger rear gardens connected via a side gated passage. The property is located on the south western side of Belsize Park Gardens, quite close to the junction with Lambolle Place and adjacent to Lancaster Stables. The triangular area of green open space at the centre of the triangle formed



by Belsize Park Gardens, Lambolle Place, and Eton Avenue is within the same ownership but excluded from the 'red line' of the application site.

- 3.1.2 The site is relatively level throughout.
- 3.1.3 We are not aware of the existence of any Tree Preservation Orders\*, but understand the site stands within a Conservation Area, which will affect the subject trees: it is a criminal offence to prune, damage or fell such trees without permission from the local authority.
- 3.1.4 Camden's online planning information clarifies that the site is within the Belsize Conservation Area. Unlike most of Belsize Park Gardens, the Conservation Area statement (published April 2003) shows the property to be located within "Sub Area Three: Eton Avenue" and is noted as being a building / group of buildings that make a positive contribution to the conservation area (with the timber fence and railing on low red brick wall identified in the Streetscape Audit as being traditional materials and features which enhance the conservation area). The Conservation Area statement guidance indicates that "The Council will consider the removal of existing trees only where necessary for safety or maintenance purposes or as part of a replanting/nature conservation programme."; and that "All trees which contribute to the character or appearance of the Conservation Area should be retained and protected. Developers will be expected to incorporate any new trees sensitively into the design of any development and demonstrate that no trees will be lost or damaged before, during or after development."
- 3.1.5 Relevant local planning policies comprise Policies G1 and G7 of the London Plan 2021 and Policies A3, D1 and D2 of the Camden Local Plan (adopted 3rd July 2017).

\* If the client is aware of such, we ask that they confirm these details with us. A purchaser of a site will be informed of the existence of any TPOs during the conveyancing process; an existing owner of a site must be served with a copy of any TPOs made during their ownership. Landmark Trees can investigate the matter further on instruction from the client, but this is beyond our normal scope of instruction as it can take c. 28 days to fully discover this information (which is beyond our standard turnaround and will substantially delay the issue of the instructed report). Some LPAs maintain registers online and / or offer a more rapid telephone or email response. These services though are not wholly reliable and we have had experience of receiving incorrect advice.

## 3.2 Soil Description

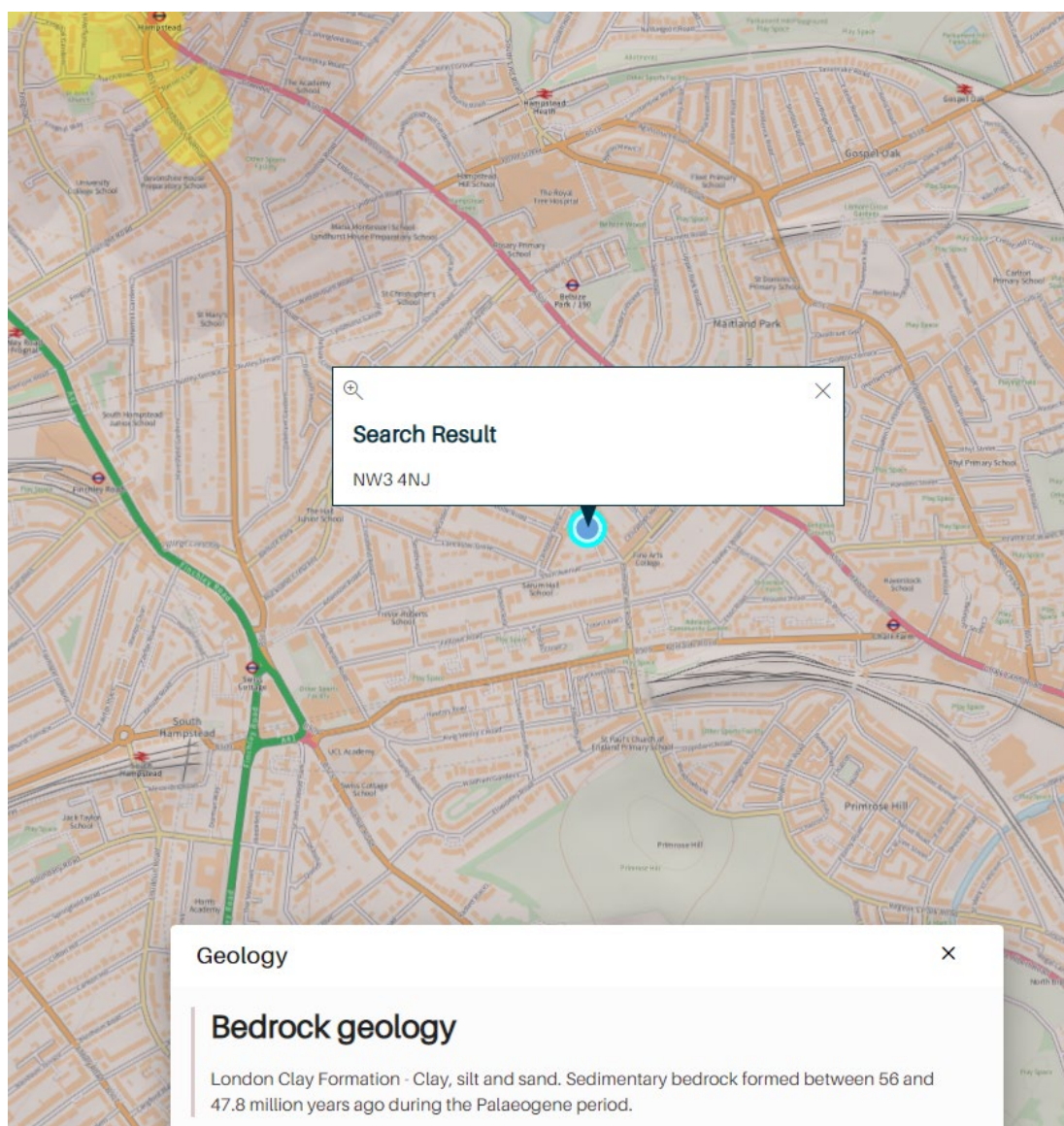


Figure 2: Extract from the BGS Geology of Britain Viewer

- 3.2.1 In terms of the British Geological Survey, the site overlies the London Clay Formation (see indicated location on Fig.2 plan extract above). The associated soils are generally, highly shrinkable clay; e.g. slowly permeable seasonally waterlogged fine loam over clay. Such highly plastic soils are prone to movement: subsidence and heave. 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 Clay soils are prone to compaction during development with damage to soil structure potentially having a serious impact on tree health. The design of foundations near problematic tree species will also need to take into consideration subsidence risk. 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 4 surveyed trees, 1 is category\* B (Moderate Quality) and the other 3 are category C (Low Quality); none are category A (High Quality) or U (Poor Quality).
- 3.3.2 The tree species found on / immediately adjacent to the site comprise bay laurel, hawthorn and bird cherry.
- 3.3.3 In terms of age demographics, there are predominantly mature specimens present with a semi-mature tree overhanging from neighbouring land.
- 3.3.4 At the time of inspection, vertical cracks were evident on the stems of bay T1 and Ganoderma brackets were observed at its base. It is thus recommended that decay testing investigation be undertaken of this tree – the findings of which may affect the currently assessed B categorisation (moderate quality); i.e. it could conceivably be downgraded.
- 3.3.5 Full details of the surveyed trees can be found in Appendix 1 of this report.
- 3.3.6 In addition to the further investigation of the bay T1 referred to above, there are recommended general husbandry works for the two hawthorn trees (T2 & T3) on the site frontage. These are listed in Appendix 2.

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





Photograph 2: View of street frontage

(Source: Google Street View – image capture Jul 2022)

Arboricultural Impact Assessment Report: 83 Belsize Park Gardens, London NW3 4NJ

Instructing party: Gaby and Stuart Riley, The Chapel House, 100A Fellows Road, London NW3 3JG

Prepared by: Ann Currell & Adam Hollis of Landmark Trees, Holden House, 4th Floor, 57 Rathbone Place, London W1T 1JU

## 4. DEVELOPMENT CONSTRAINTS

### 4.1 Primary Constraints

- 4.1.1 BS5837: 2012 gives Recommended Protection Areas (RPAs) for any given tree size. The individual RPAs 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 RPAs 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 3). Alternatively, one need principally remember that RPAs are area-based and not linear – notional rather than fixed entities.

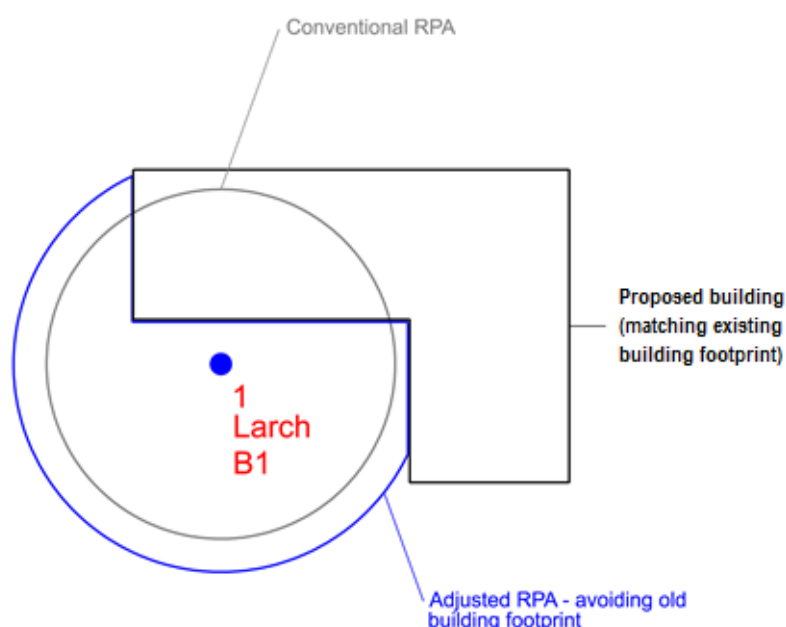


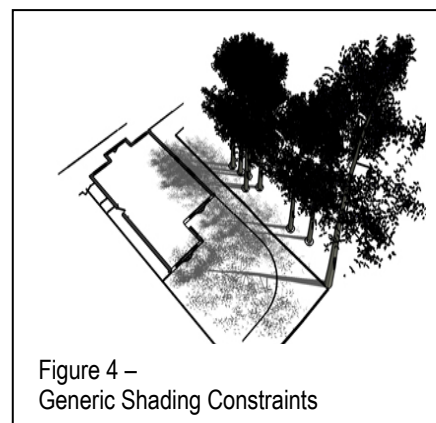
Figure 3 – Generic BS 5837 RPA Adjustments

- 4.1.3 In BS5837, paragraph 4.6.2 states that RPAs 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.

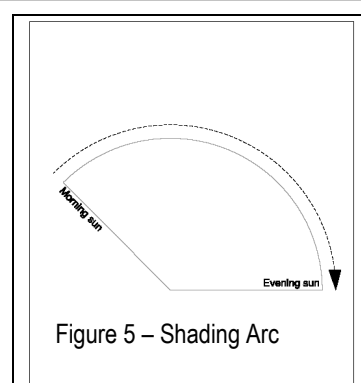
- 4.1.4 LT prefer where possible and practical to raise the issue of modification but suspend judgment until such time as more reliable site investigations have been undertaken (Tree Radar scans and / or trial pits). Of course, the justification for these investigations will depend upon whether trees 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. In this case, it should be noted that a trial pit 1m in depth was excavated at the west corner of the proposed extension (see 6.1.3), but that **no a priori RPA modifications have been made.**
- 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."
- 4.1.7 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.
- 4.1.8 In this instance, there is a category B tree within the site (plus prominently located category C trees on the frontage) which potentially pose primary constraints upon development, however, the potential impacts can be minimised provided the trees are adequately protected and the appropriate methodologies are employed during development.

### 4.3 Secondary Constraints

4.3.1 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 4), honeydew deposition or perceived risk of harm.



4.3.2 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.



4.3.3 This arc (see Figure 5) 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.

4.3.4 Assuming that they will be retained, the orientation of the on-site trees will ensure that shading constraints are limited, with leaf deposition and honey-dew likely to be as it is today. However, the trees have the potential to provide a variety of secondary constraints, including 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.*



Hide irrelevant

Show All Trees

Table 1: Arboricultural Impact Assessment

(Impacts assessed prior to mitigation and rated with reference to Matheny &

Ref SMR\_83BPG\_AIA

B.S. Cat.	Tree No.	Species	Impact	Tree / RPA Affected	Age	Growth Vitality	Species Tolerance	Impact on Tree Rating	Impact on Site Rating	Mitigation
B	T1	Bay, Laurel	Building Construction within RPA	9.81 m	Mature	Moderate	Good	Low	N/A	Low-invasive foundation design
			Patio Construction >20% RPA	4.15 %						No-dig construction

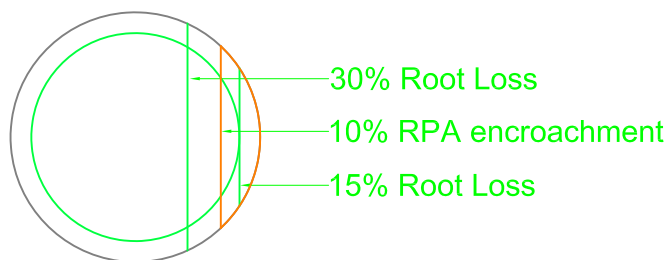
## 6. ARBORICULTURAL IMPLICATIONS

### 6.1 Rating of Primary Impacts

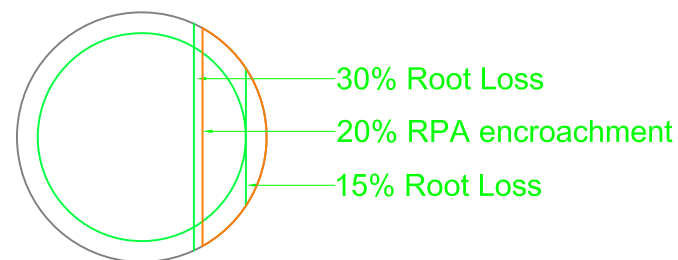
- 6.1.1 No trees need to be removed to facilitate the proposed redevelopment. Some minor pruning back of branches overhanging the existing drive / parking area to facilitate construction may be appropriate (subject to contractor access requirements), as detailed in Appendix 3 - but although in this case specified to facilitate access for the proposed construction works, it is considered reasonable to expect regular maintenance pruning regardless of development to provide adequate clearance given the current and ongoing use of this space. However, in the interests of good husbandry, regardless of development, it is recommended that further investigation (decay testing) be undertaken given the presence of development vertical cracks in the stems and Ganoderma fungal brackets at the base of bay T1.
- 6.1.2 The principal impacts in the current proposals thus comprise the encroachments into the RPA of bay T1. It should be noted that the RPA has not been shown modified because, in the light of the proximity and age of surrounding built form, the whole of the rear garden in which redevelopment is proposed has been considered as an area where the protection of the roots and soil structure should be treated as a priority.
- 6.1.3 In terms of encroachment, the proposals comprise three elements: (i) new built form extending the dwelling, (ii) new terracing, and (iii) the air source heat pump – each of which will be considered separately below.
- 6.1.4 As the proposed redevelopment involves mostly internal demolition and rearrangement, the actual increase in external footprint for the ground floor extension is limited. The calculated encroachment into the 'nominal circle RPA' is 9.81 m<sup>2</sup> / 4.15%. It should, however, be noted that a trial pit 1m in depth was excavated at the west corner of the proposed extension (the closest position to bay T1) and no roots were apparent (photographs are provided at Appendix 4). The potential impact on the bay can be mitigated with the use of low-invasive foundation design.
- 6.1.5 Two areas of new paving to form terraces into the rear garden are proposed, one projecting from the ground floor extension and the other from the reconfigured reception room, both being set at +/- 140mm above the existing ground level for a flush threshold at the new doors. The potential impact on the tree of increasing the amount of hard surfacing will be mitigated by the use of no-dig construction techniques and permeable surfacing.
- 6.1.6 The proposed air source heat pump has been positioned as far from bay T1 as is technically possible and the services to and from it will run horizontally above ground along the wall behind the tree. The calculated encroachment into the 'nominal circle RPA' for the enclosure base is 1.35 m<sup>2</sup> / 0.56%. To further minimise the potential impact on T1, the enclosure base will use non-invasive methodology (e.g. screw piles or no-dig construction techniques).

- 6.1.7 In our view, the tree is 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.
- 6.1.8 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 case, for the reasons set out above, **the impacts would be markedly below either 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 - although theoretically were the terracing also to be included the impacts cumulatively would be greater. 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. 6a - 6c 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

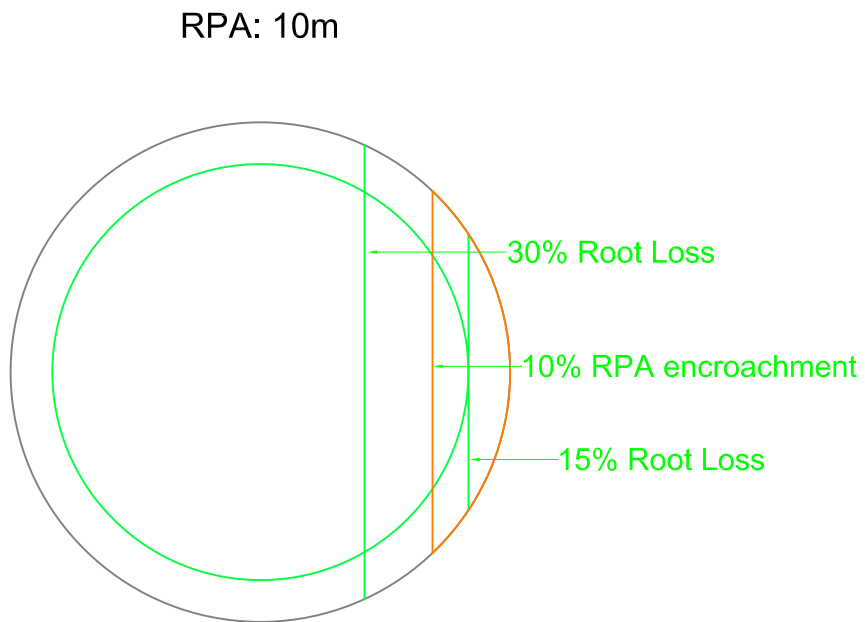


Area 7.98 sq.m. (10.0%)

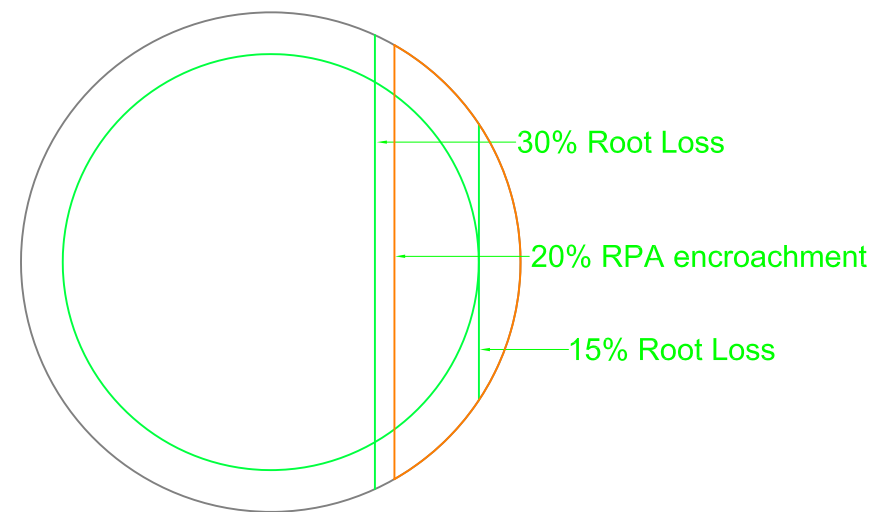


Area 15.96 sq.m. (20.0%)

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



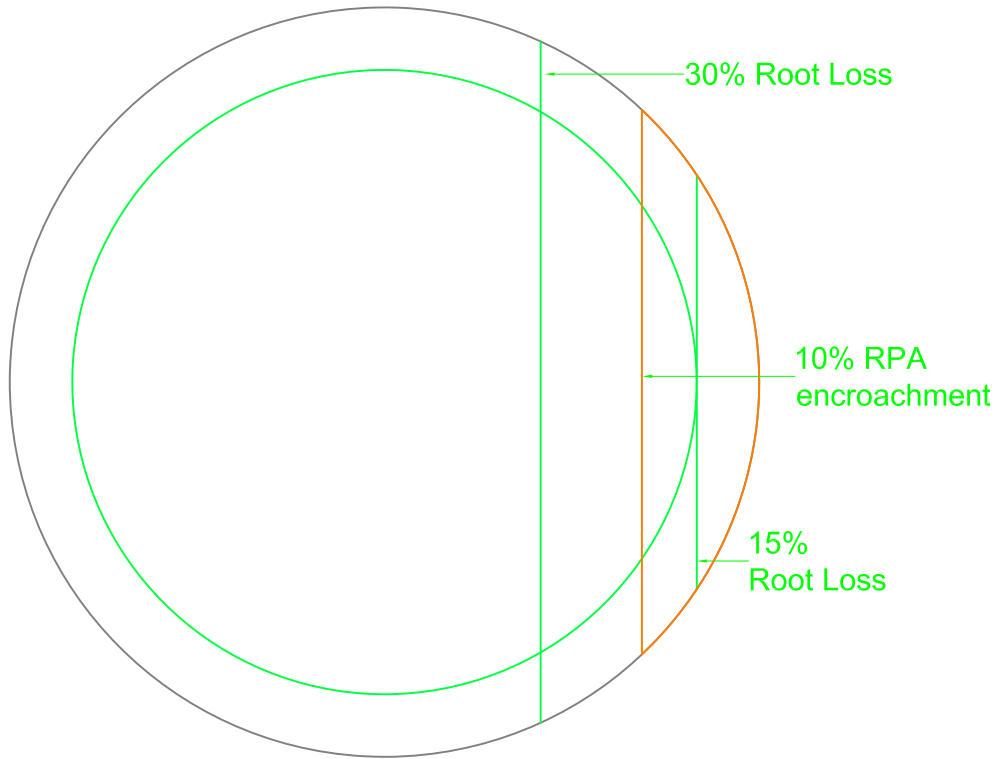
Area 31.17 sq.m. (10.0%)



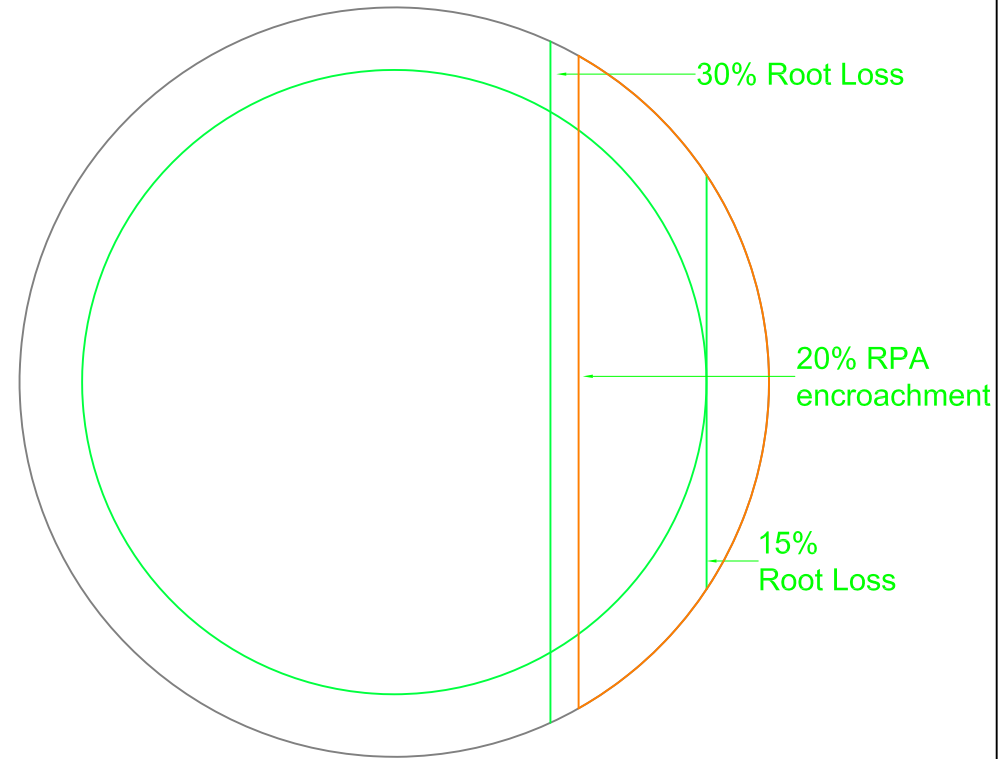
Area 62.33 sq.m. (20%)

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))

- 6.1.9 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.
- 6.1.10 The tree in question is shown in Table 1 above to be a moderately healthy specimen of species (albeit with internal decay) with a reasonable resistance to development impacts, and of an age quite capable of tolerating these limited impacts. Nor do the site characteristics suggest specific soil anomalies having a bearing on such considerations, provided appropriate measures (e.g. ground protection) are taken (see 6.3 below).
- 6.1.11 As per BS5837 recommendations (at 5.3.1a), 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 5.3.1b) the arboriculturist 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

- 6.2.1 There will always be marginal secondary impacts of honeydew / litter deposition and partial shade on this site, regardless of development, with some of the shading being attributable to existing built form. The proposals do entail building an ground floor extension slightly closer to the existing off-site tree stock to the rear / side of the site, but the shading in this area is due to the height of and relationship with the existing building; the proposed rear terracing would simply alter the surfacing of part of the existing rear garden and thus the status quo is unlikely to change with further development, which is the salient point for planning to consider. Thus, the secondary impacts of development are minimal.

## 6.3 Mitigation of Impacts

- 6.3.1 As identified above, the proposed development potentially poses impacts on the tree stock – but these can be minimised if appropriate measures are put in place to reconcile construction activities, controlled working and site supervision, and other tree protection measures. Whilst full details of tree protection measures can be secured by condition(s), outline precautions are provided below.
- 6.3.2 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.
- 6.3.3 The existing hard surfacing to the side and rear of the site, which will be the focus of demolition / construction access arrangements, will be retained in situ and appropriately supplemented to withstand anticipated loading until the main building construction works are completed. At the landscaping stage where necessary for the new terracing, the hard surfacing will be first broken up with manual power tools and then carefully lifted with caution by a skilled machine operator again working away from the tree(s).
- 6.3.4 The building encroachment will require the use of specialised foundation techniques, such as mini-piling or pad and raised beam. The foundation pits within the RPA should be trial-excavated by hand under arboricultural supervision using a double-headed spade (“shove-holer”) or similar to minimise breadth of hole required for inspection; any roots encountered will be cleanly pruned back to an appropriate junction with a sharp pruning saw or secateurs. Roots larger than 25mm diameter may only be cut in consultation with an arboriculturalist.
- 6.3.5 The services to and from the air source heat pump where they run horizontally above ground along the wall behind the tree will be installed under arboricultural supervision. The base / enclosure will require a non-invasive methodology – e.g. screw piles or no-dig construction technique using a cellular confinement system with no fines aggregate for the sub-base (the latter

would mean the finished section is likely to be 150mm above grade, depending on final specification, which will need to be factored into the overall finished levels).

- 6.3.6 The replacement paving/hard landscaping, which will be set approx. 140mm above the existing ground level, will require a no-dig construction technique - either using a cellular confinement system with no fines aggregate for the sub-base or simply building upon the existing sub-base without disturbing the ground below. Choice of construction method will initially depend upon root penetration within the existing sub-grade. The key principle is not to excavate in the presence of roots and to provide a porous surface to promote healthy soil water relations for future root growth. A further consideration in the use of a more expensive cellular confinement system or similar, may be the claimed reduction in risk of possible future slab / surface displacement by roots of trees growing in paved areas. The degree of encroachment (>20% of RPA) means that a permeable paving surface (e.g. gravel or block paving) is required.
- 6.3.7 Nuisance deposition can be mitigated with routine maintenance, light pruning / deadwooding and the fitting of filtration traps on guttering (see Figure 7 below).

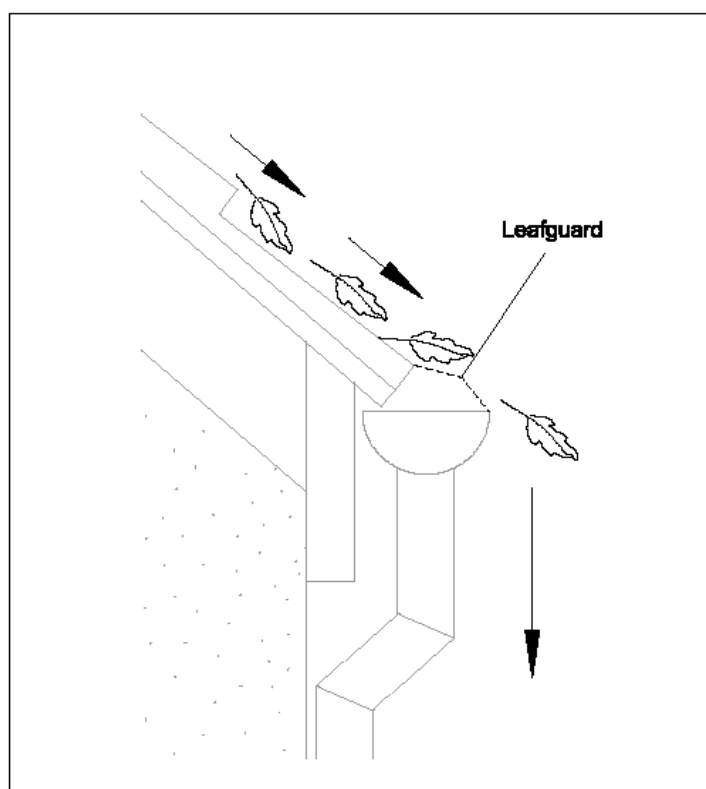


Figure 7: Filtration traps, as shown above, could be fitted on the gutters which can easily be maintained at 2-3m above ground.

## 7. CONCLUSION

- 7.1 The potential impacts of development are relatively low: no trees need to be removed, the minor pruning to provide clearance above the existing drive / parking area might reasonably be expected as regular maintenance works given the current and ongoing use of the space; as well as in practical terms of RPA encroachments of tree(s) 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 reasonable health and capable of sustaining these reduced impacts.
- 7.4 Therefore, the proposals will not have any significant impact on either the retained trees, the character and appearance of the Belsize Conservation Area or wider landscape thereby complying with Policies G1 and G7 of the London Plan 2021 and Policies A3, D1 and D2 of the Camden Local Plan (adopted 3rd July 2017). Thus, with suitable mitigation and supervision the scheme is recommended to planning.

## 8. 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. Any tree works recommended within this report should only be carried out with local authority consent.
- 8.1.3 Excavation and construction impacts within the RPAs 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.

### 8.2 General Recommendations for Sites Being Developed with Trees / Outline Arboricultural Method Statement

- 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. Extant areas of RPA that cannot be fenced off and therefore lie outside the CEZ must be protected with fit-for-purpose ground protection. The location and type of ground protection is shown in the Tree Protection Plan in the Appendices.

- 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.
- 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: 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) hard and soft landscaping.

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



## 10.0 REFERENCES

- Barlow JF & Harrison G. 1999. Shade By Trees, Arboricultural Practice Note 5, AAIS, Farnham, Surrey.
- British Standards Institute. 2012. Trees in Relation to Design, Demolition and Construction - Recommendations BS 5837: 2012 HMSO, London.
- 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.
- Matheny, N; Clark, J. R.1998. Trees and Development: A Technical Guide to Preservation of Trees during Land Development. ISA, Champaign, Illinois. USA.
- Mattheck C. & Breloer H. 1994. Research for Amenity Trees No.2: The Body Language of Trees, HMSO, London.
- 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



**Landmark Trees**

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### **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

Bay, Laurel	: Laurus nobilis	Cherry, Bird	: Prunus padus
Bay, Sweet	: Laurus nobilis	Hawthorn, Common	: Crataegus monogyna
Cherry	: Prunus spp		

#### Notes for Guidance:

1. Height describes the approximate height of the tree measured in metres from ground level.
2. 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.
3. Ground Clearance is the height in metres of crown clearance above adjacent ground level.
4. 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 '#'.
5. Protection Multiplier is 12 and is the number used to calculate the tree's protection radius and area
6. Protection Radius is a radial distance measured from the trunk centre.
7. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
8. Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present.
9. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
10. 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)
11. Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
12. Useful Life is the tree's estimated remaining contribution in years.



**Site:** 83 Belsize Park Gardens

**Date** 28/03/23

## Appendix 1

### BS5837 Tree Constraints Survey

**Landmark Trees Ltd**

**020 7851 4544**

**Surveyor(s)** Conor Fitzpatrick

**Ref:** SMR\_83BPG\_AI

Tree No.	English Name	Height	Crown Sprea	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
T1	Bay, Laurel	12	5675	3.0	722	Mature	8.7	Moderate	Fair	B	1	20+	Co-dominant stems Ganoderma decay fungi on stem Vertical cracks on stem. Large amount of epicormic growth at base. Ex-pollard.
T2	Hawthorn, Common	6	4	2.0	380	Mature	4.6	Moderate	Fair	C	1	20+	Pollard (Old) Unprofessionally topped/lopped
T3	Hawthorn, Common	6	4	2.0	370	Mature	4.4	Moderate	Fair	C	1	20+	Pollard (Old) Unprofessionally topped/lopped
T4	Cherry, Bird	7	4	1.0	150	Semi-mature	1.8	Moderate	Fair	C	1	20+	Remote survey only (RS) Overhanging into parking area by 3 - 4 meters. With ground clearance of 1.5 meters.

## APPENDIX 2

### RECOMMENDED TREE WORKS

#### Notes for Guidance:

#### **Priority 1 - Urgent (ASAP), 2 - Standard (within 3 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.



Landmark Trees

**Site** 83 Belsize Park Gardens

**Date** 28/03/23

**Surveyor(** Conor Fitzpatrick

**Ref** SMR\_83BPG\_AIA

**Appendix 2**  
**Recommended Tree**  
**Works**

Hide irrelevant  
Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearanc	Crown Spread	Recommended Works		Comments/ Reasons
T1	Bay, Laurel	B	12	3.0	5675	FInv	Mon	Co-dominant stems Ganoderma decay fungi on stem Vertical cracks on stem. Large amount of epicormic growth at base. Ex-pollard. Recommended husbandry 2
T2	Hawthorn, Common	C	6	2.0	4	CR	2m	Pollard (Old) Unprofessionally topped/lopped Recommended husbandry 2
T3	Hawthorn, Common	C	6	2.0	4	CR	2m	Pollard (Old) Unprofessionally topped/lopped Recommended husbandry 2



## 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



Landmark Trees

**Site** 83 Belsize Park Gardens

**Date** 21\_03\_2023

## Appendix 3

**Surveyor(** Conor Fitzpatrick

**Ref** SMR\_83BPG\_AIA

### Recommended Tree Works To Facilitate Development

Hide irrelevant

Show All Trees

Tree No.	English Name	B.S. Cat	Height	Ground Clearanc	Crown Spread	Recommended Works	Comments/ Reasons
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T4	Cherry, Bird	C	7	1.0	4	CB 1m	Remote survey only (RS) Overhanging into parking area by 3 - 4 meters. With ground clearance of 1.5 meters. To facilitate development
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#### APPENDIX 4: TRIAL PIT PHOTOGRAPHS



Photograph (i): Bay T1 taken from first floor rear balcony



Photograph (ii): Trial pit



Photograph (iii) Trial pit



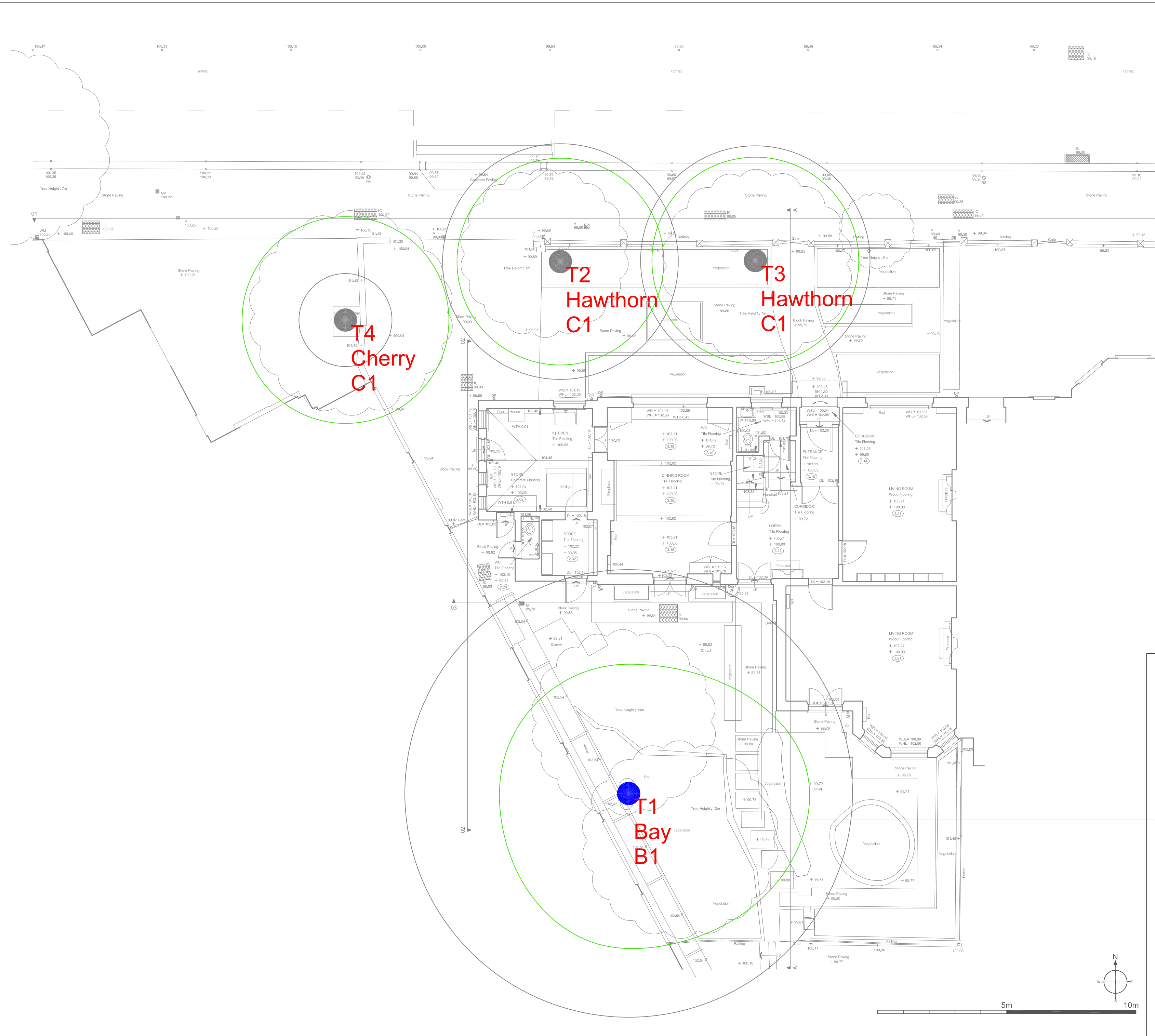
Landmark Trees

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## PART 3 – PLANS

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






**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.

Root 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 base).



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Site: 83 Belsize Park Gardens	1:100@ A2
Drawing Title: Tree Constraints Plan	March 2023

Key:

- Category A  
High Quality
- Category B  
Moderate Quality
- Category C  
Low Quality
- Category U  
Trees Unsuitable for Retention

Category

Crown Spread

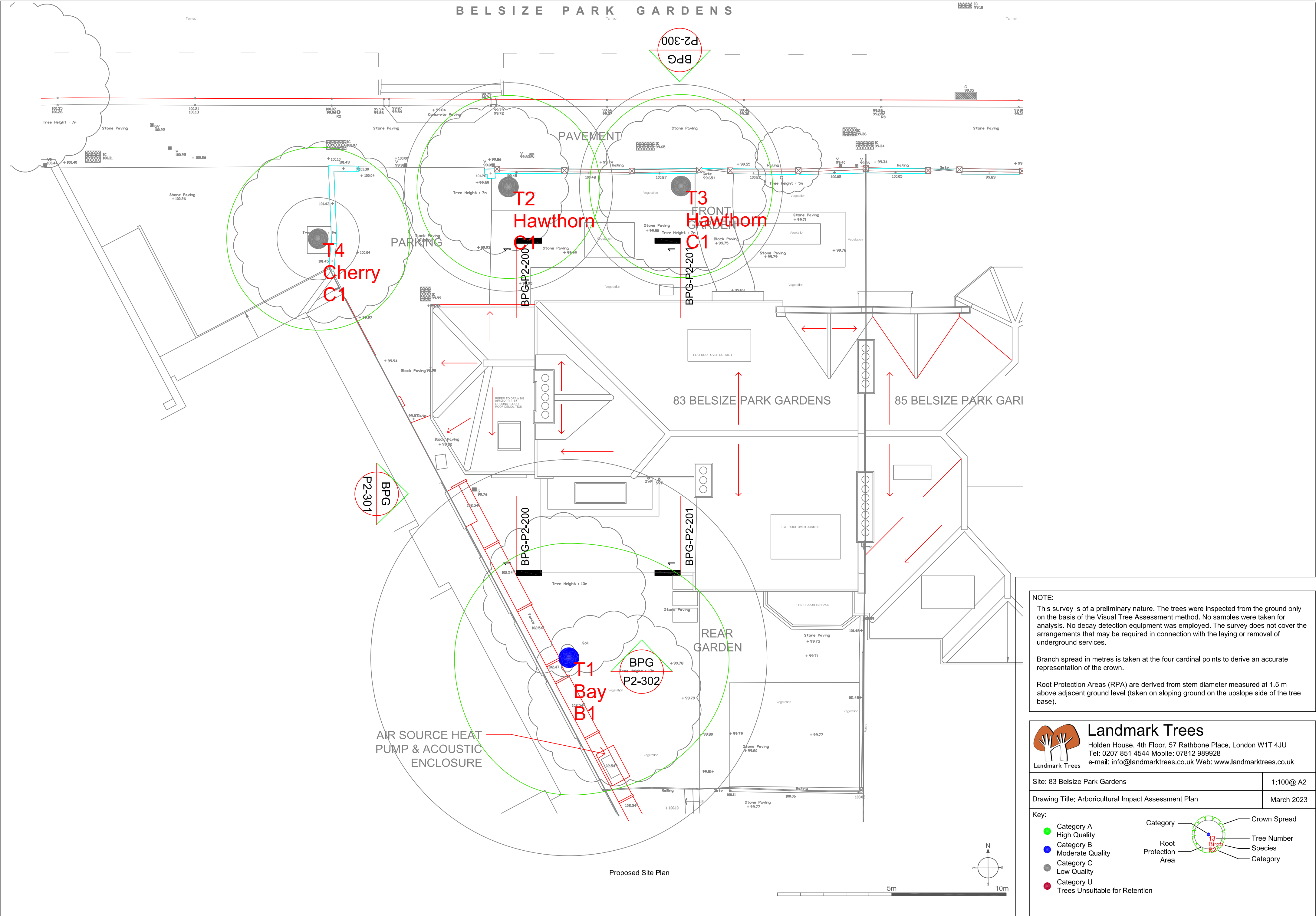
Tree Number

Species

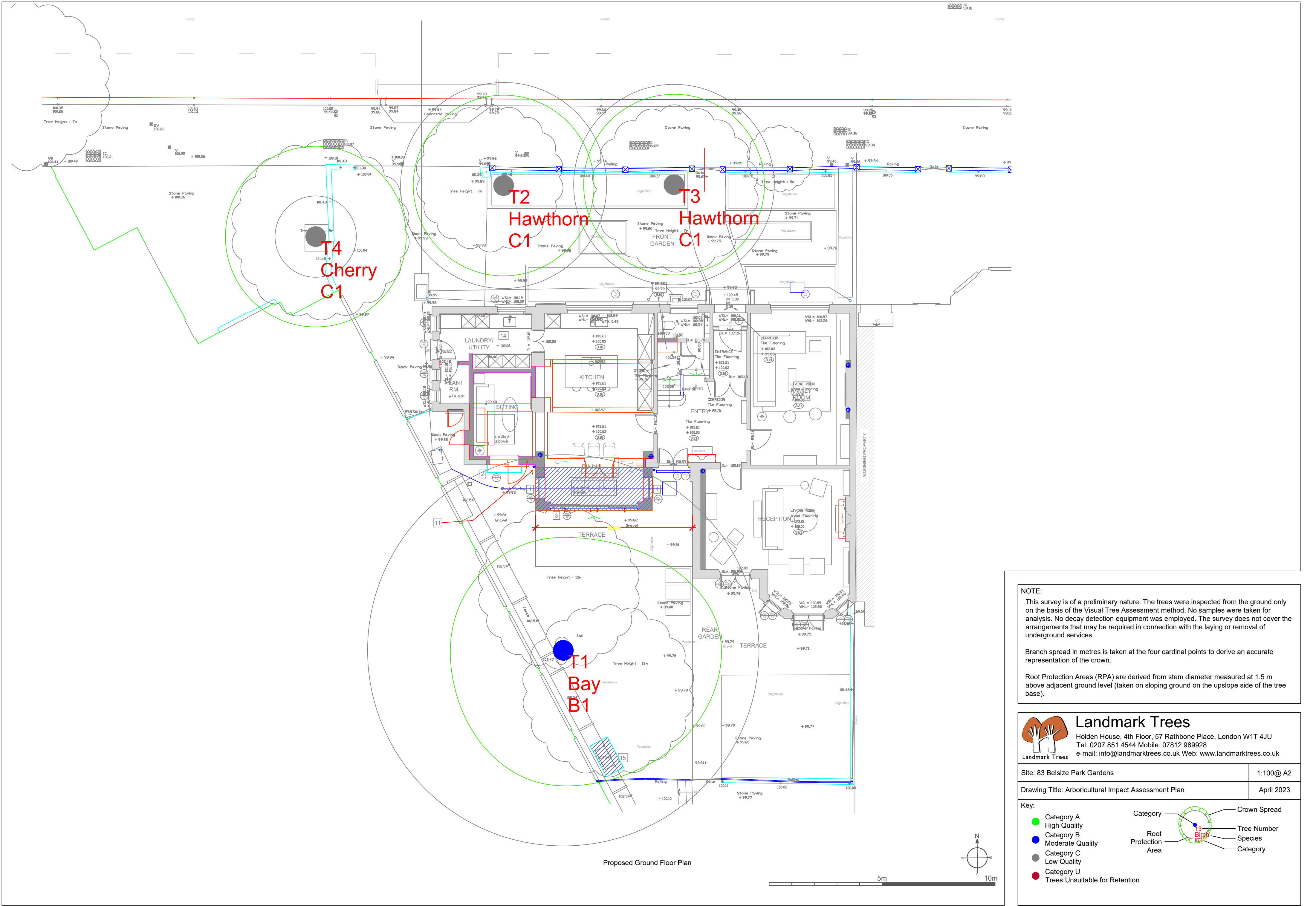
Category

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

- i. Site Plan
- ii. 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.

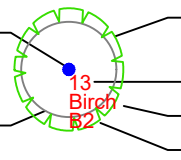
Branch spread in metres is taken at the four cardinal points to derive an accurate representation of the crown.

Root 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 base).

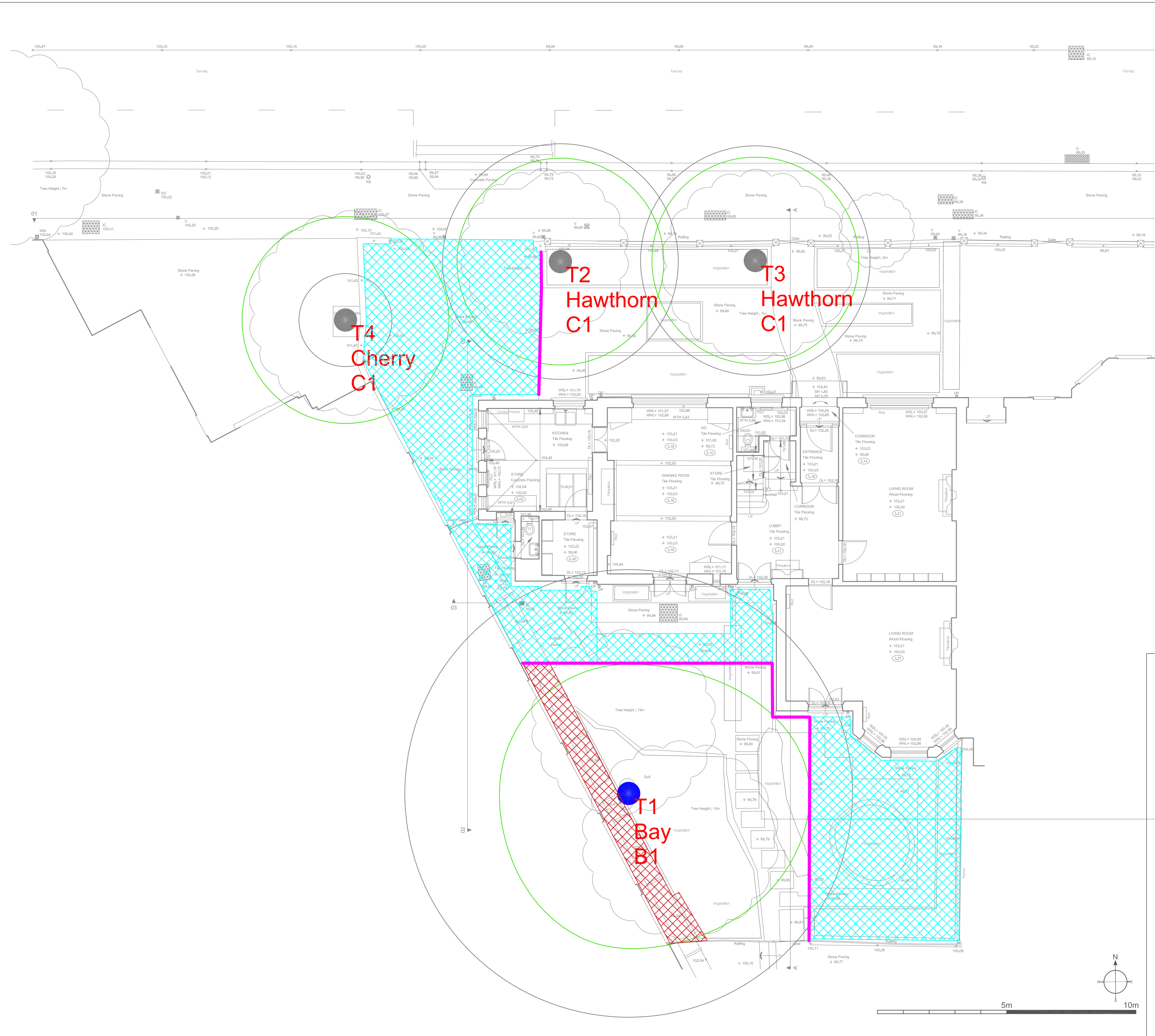


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Site: 83 Belsize Park Gardens		1:100@ A2
Drawing Title: Arboricultural Impact Assessment Plan		April 2023
<b>Key:</b>		
<div><div></div>Category A</div> <div>High Quality</div>	<div><div>Category</div><div>Root Protection Area</div><div>Crown Spread</div><div>Tree Number</div><div>Species</div><div>Category</div></div> 	
<div><div></div>Category B</div> <div>Moderate Quality</div>		
<div><div></div>Category C</div> <div>Low Quality</div>		
<div><div></div>Category U</div> <div>Trees Unsuitable for Retention</div>		

**PLAN 3****OUTLINE TREE PROTECTION PLAN**




**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.

Root 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 base).



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Site: 83 Belsize Park Gardens	1:100@ A2
Drawing Title: Tree Protection Plan	March 2023

**Key:**

- Category A  
High Quality
- Category B  
Moderate Quality
- Category C  
Low Quality
- Category U  
Trees Unsuitable for Retention

- Category
- Root Protection Area
- Work under direct arboricultural supervision

- Crown Spread
- Tree Number
- Species
- Category

