Landmark Trees

ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR:

31 Elsworthy Road

London

NW3 3BT

INSTRUCTING PARTY:

BB Partnership

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PART 1: MAIN TEXT

PART 2 - APPENDICES

PART 3 - PLANS

DOCUMENT HISTORY

Revision	Status	Comments	Date
Rev 0	DRAFT	For Internal Review (Client / Design Team)	8/3/21
Rev 01a	Reviewed	For Internal Review	12/3/21
Rev 01b	Reviewed	For External Issue	29/3/21

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 a basement extension into the rear garden.

1.2 There are 21 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 with T17 and T18 as standout high quality specimens. All trees are material constraints on development, but these latter require particular consideration.

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. Similarly, though pruning here is to serve development, 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 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 BB Partnership (the Applicant's agent), to support a full planning application submitted to the London Borough of Camden ('LBC').

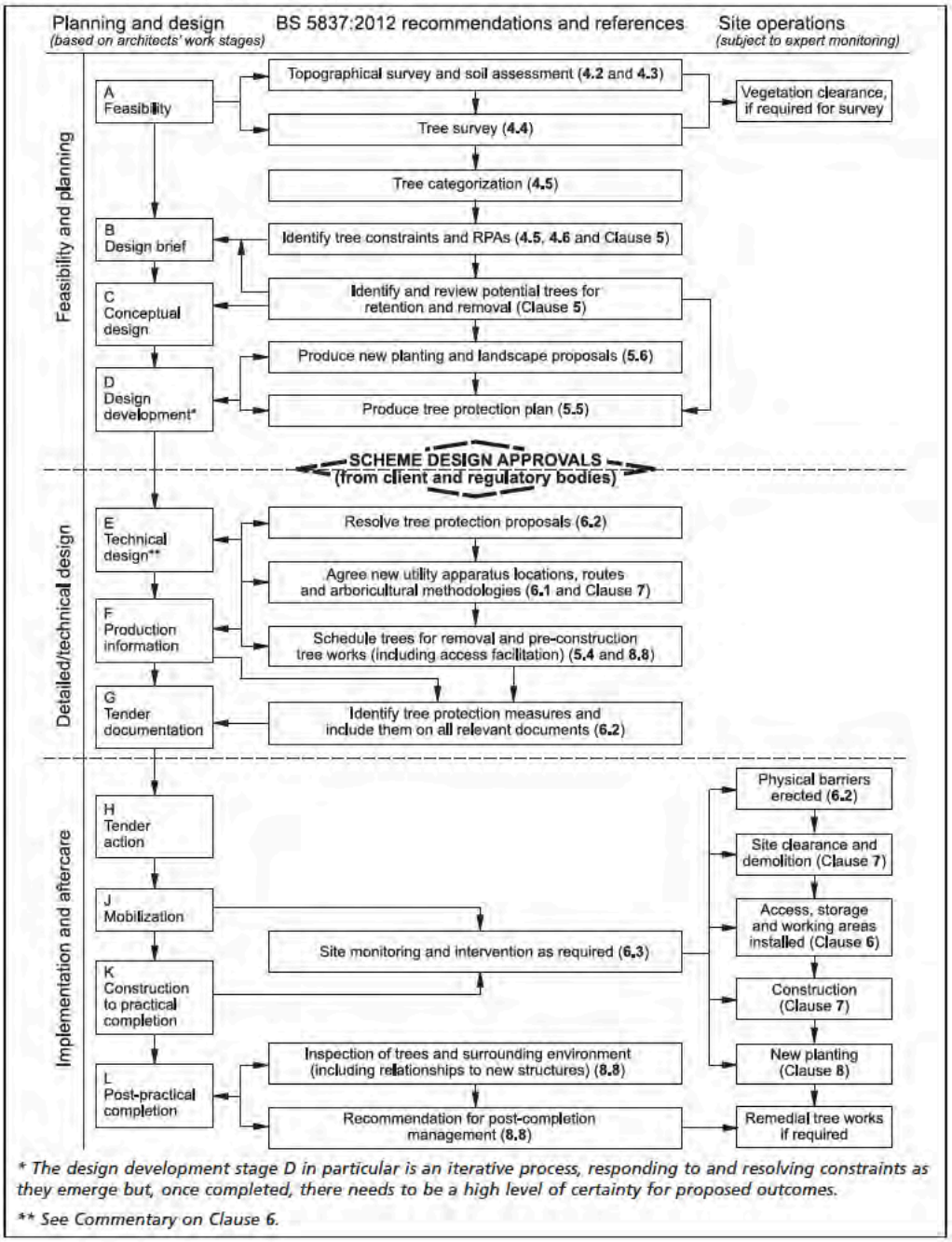
2.1.2 The application relates to the formation of a new basement extension under the footprint of the house, 48% of the front garden and 35% of the rear garden, a single storey rear extension and internal remodeling. An A/C enclosure will be located in the rear garden close to the rear boundary.

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 **This report is produced to support the Design Team to the Scheme Design Approvals stage in the process chart overleaf.**

Figure 1 The design and construction process and tree care



** The design development stage D in particular is an iterative process, responding to and resolving constraints as they emerge but, once completed, there needs to be a high level of certainty for proposed outcomes.*

*** See Commentary on Clause 6.*

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: L10058 - T

Proposals: GEO Proposed Basement 21.02.17 & GEO Proposed Site Plan 21.02.17

2.3 Scope & Limitations of Survey

2.3.1 As Landmark Trees' (LT) arboricultural consultant, Kim Dear surveyed the trees on site on 24th November 2020, 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.

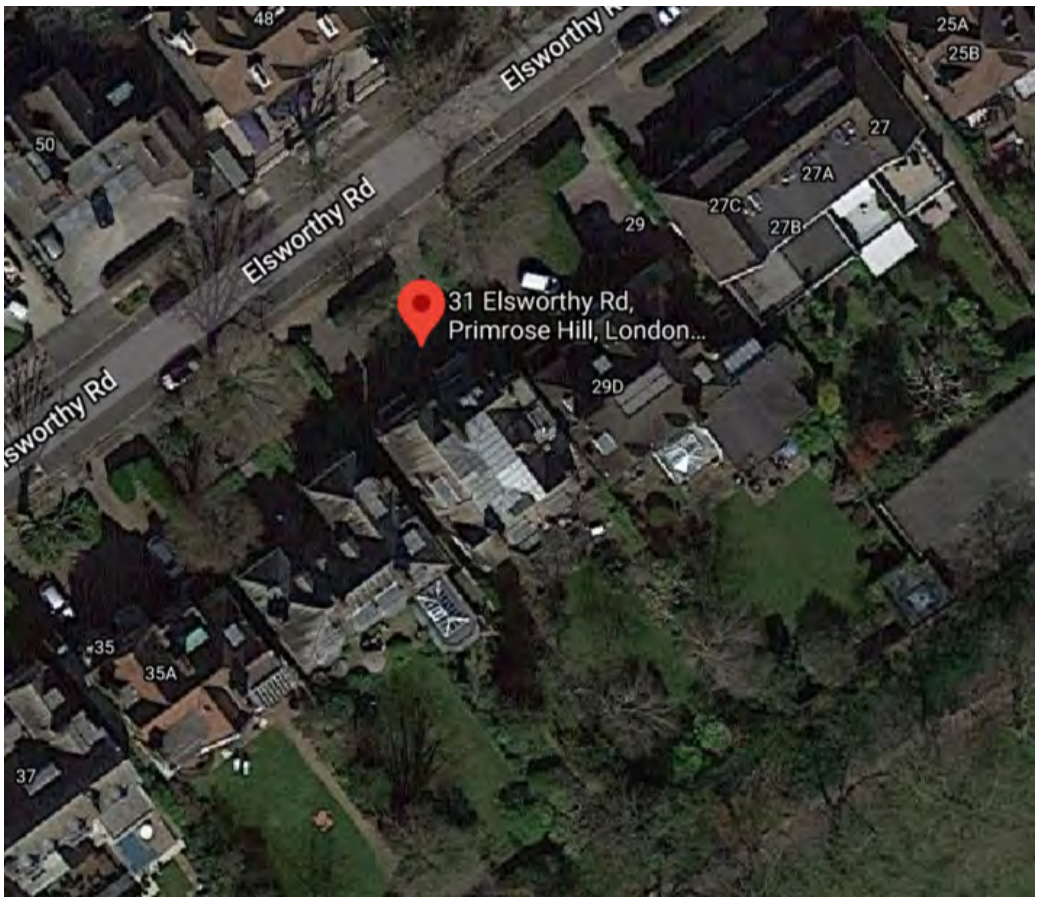
2.3.4 The survey does not cover the arrangements that may be required in connection with the laying or removal of underground services.

2.4 Survey Data & Report Layout

2.4.1	Detailed records of individual trees are given in the survey schedule in Appendix 1. Recommendations for tree works that comprise the minimum requirements to facilitate development and which form part of the planning application are provided at Appendix 2.
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 photograph of application site (Source: Google Maps)

3.1.1	31 Elsworthy road is a large detached dwelling house located on the southern side of Elsworthy Road and has direct access onto Primrose Hill via a gate in the rear garden.
3.1.2	The site is relatively level throughout.
3.1.3	There are no Tree Preservation Orders on the property, but understand the site stands within the Elsworthy Road 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	Relevant local planning policies comprise Policies G1, G5 and G7 of the London Plan 2021 and Policies A3, A5, D1, and D2 of the Camden Local Plan (adopted 3rd July 2017).

3.2 Soil Description

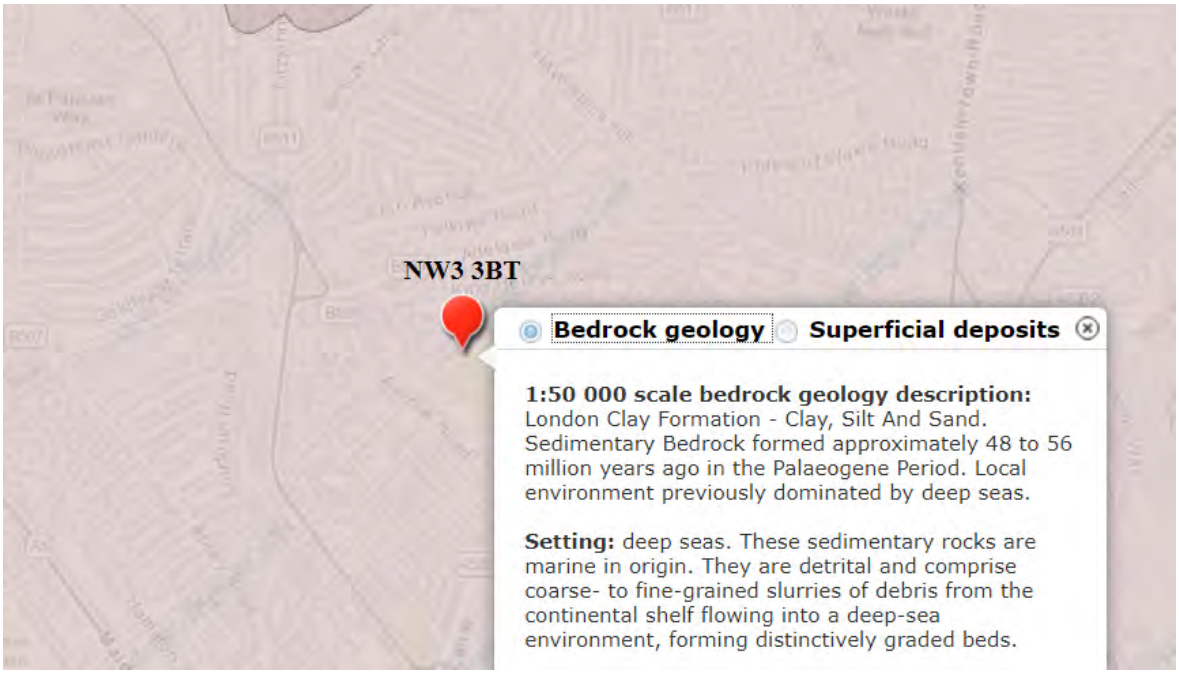


Figure 2: Extract from the BGS Geology of Britain Viewer

3.2.1	In terms of the British Geological Survey, the site overlies the London Clay Formation (see indicated location on Fig.1 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 21 surveyed trees, 2 are category* A (High Quality), 7 are category* B (Moderate Quality) and 12 are category C (Low Quality); none are category U (Poor Quality).
3.3.2	The tree species found on the site comprise olive, false acacia, Himalayan birch, Southern magnolia, elder, Lawson cypress, Chinese privet, corkscrew hazel, willow-leaved pear, common ash, river birch, Bhutan pine, London plane and plum.
3.3.3	In terms of age demographics there are predominantly young and early mature specimens present with a few semi-mature and mature trees 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.

Photograph 2: Existing front driveway surface

Photograph 3: Stem of the ash T13

Photograph 4: The low quality T8 – T12

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.

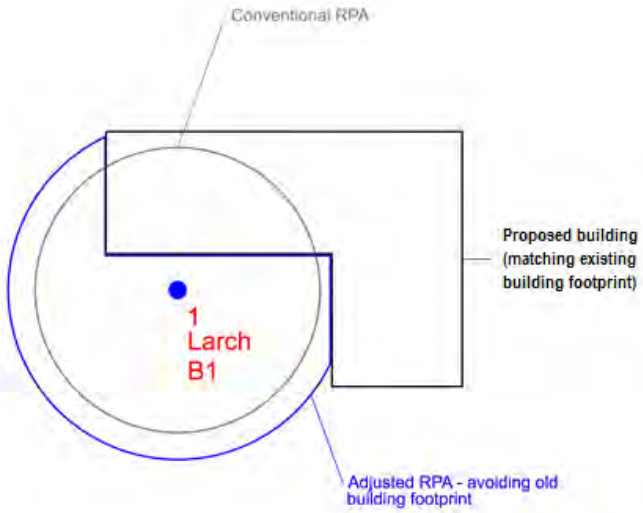


Figure 3– Generic BS 5837 RPA Adjustments (for fictitious site)

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). In this instance Tree Radar scans were undertaken at various points within the rear garden, the findings of which are provided at Appendix 4. **No a priori RPA modifications have been made following these investigations although they did indicate relatively little rooting towards the centre of the application site.**

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 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, the high and moderate quality trees have the potential to pose significant constraints upon development. It should though be noted that the Tree Radar findings and their locations around / beyond the site boundaries largely temper these constraints.

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.

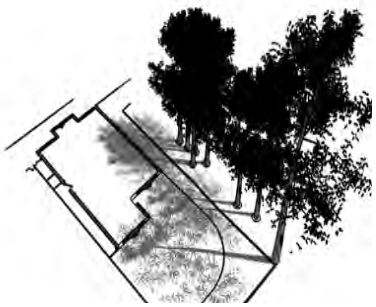


Figure 3 –
Generic Shading Constraints

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.

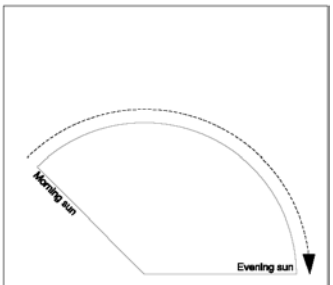


Figure 4 – Shading Arc

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- and off-site trees will ensure that shading constraints are minimal, with leaf deposition and honey-dew likely to be as it is today. 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.

5.0

Table 1: Arboricultural Impact Assessment

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

Hide irrelevant | Show All Trees

Ref ETN_CTF_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
C	1	Olive	Felled to Facilitate Development	N/A m² %	Young	Normal	N/A	N/A	Low	New planting / landscaping
B	2	False Acacia	Basement Construction within Canopy	N/A m² %	Early Mature	Normal	Moderate	Very Low	Very Low	Remedial tree surgery (see Rec. Works)
C	5	Magnolia, Southern	Felled to Facilitate Landscape	N/A m² %	Young	Moderate	N/A	N/A	Low	New planting / landscaping
C	8	Cypress, Lawson	Felled to Facilitate Development	N/A m² %	Young	Moderate	N/A	N/A	Low	New planting / landscaping
C	9	Magnolia, Southern	Felled to Facilitate Development	N/A m² %	Semi-mature	Moderate	N/A	N/A	Low	New planting / landscaping
C	10	Privet, Chinese	Felled to Facilitate Development	N/A m² %	Young	Moderate	N/A	N/A	Low	New planting / landscaping

5.0

Table 1: Arboricultural Impact Assessment

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

Hide irrelevant | Show All Trees

Ref ETN_CTF_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
C	11	Hazel, Corkscrew	Felled to Facilitate Development	N/A m² / %	Young	Moderate	N/A	N/A	Low	New planting / landscaping
C	12	Pear, Willow-leaved	Felled to Facilitate Development	N/A m² / %	Young	Moderate	N/A	N/A	Low	New planting / landscaping
B	13	Ash, Common	Basement Construction within RPA Note: Tree Radar findings show impact less than indicated by gross figure	38.3 m² / 23.51 %	Post-Mature	Poor	Moderate	Low	Low	Hand dig top 750mm of basement line thro' RPA
B	14	Birch, river	Drive Replacement within RPA	N/A m² / %	Early Mature	Normal	Moderate	Very Low	Very Low	No-dig construction
C	15	Birch, river	Drive Replacement within RPA	N/A m² / %	Early Mature	Normal	Moderate	Very Low	Very Low	No-dig construction
C	16	Pine, Bhutan	Felled to Facilitate Development	N/A m² / %	Young	Moderate	N/A	N/A	Low	New planting / landscaping

5.0

Table 1: Arboricultural Impact Assessment

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

Hide irrelevant | Show All Trees

Ref ETN_CTF_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
A	17	Plane, London	Drive Replacement within RPA	N/A m² %	Mature	Normal	Good	Very Low	Very Low	No-dig construction
A	18	Plane, London	Drive Replacement within RPA	N/A m² %	Mature	Normal	Good	Very Low	Very Low	No-dig construction

6.0 ARBORICULTURAL IMPLICATIONS

6.1 Rating of Primary Impacts

6.1.1 The principal impacts in the current proposals are the removal of the 7 trees listed in Table 1. (An eighth tree, T1 olive, is to be felled also, but is too small to qualify as a planning constraint). In terms of resource management, these comprise a relatively small portion of the whole canopy cover. Those removed generally have more collective than individual specimen value such that their loss could be readily mitigated with new planting, bringing its own benefits of enrichment and diversification to a relatively unmanaged and subsisting resource. Similarly, though pruning of T2 is required here to serve development, undertaken to best practice, the scale envisaged should not be altogether untoward in a more managed and occupied site. The immediate reduction in canopy cover through felling and / or pruning is therefore is rated as a low impact unlikely to harm either the resource or the wider conservation area.

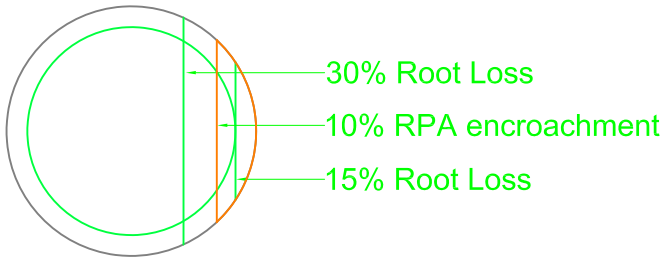
6.1.2 Further impacts to retained trees comprise the encroachment of the RPA of T13 by 23.5% on plan by the basement extension. In practice, the Tree Radar findings in Appendix 4 indicate low-density rooting in the vicinity, suggesting the impact to the tree will be considerably less than this gross figure might otherwise indicate. We do of course accept that some root loss will occur as a result of the formation of the basement level but the radar findings indicate this is not of a scale likely to impinge the ongoing viability of a tree that is essentially a monolith. Clearly, the terrace area is not a priority for rooting for this tree; an RPA is a design tool reflecting an area identified by the project arborist as a priority for the protection of roots. Therefore, the gross percentage should be taken with some scepticism. Notwithstanding the above assurance, the new paving within the RPA of this tree will be afforded a no-dig installation to at least maintain the (future) possibility of a rooting resource.

6.1.3 The replacement of the front driveway encroaches within the RPA of the retained trees on the site's frontage and therefore will need to be undertaken in a controlled manner.

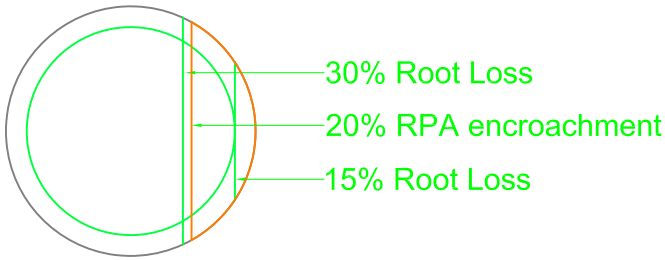
6.1.4 In our view, the affected tree(s) are of a species, age and condition sufficient to remain viable in the circumstances, given that the area lost to encroachment can be compensated for elsewhere, contiguous with the RPA, and provided the series of mitigation measures outlined below are followed 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.

6.1.5	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 somewhere between 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))

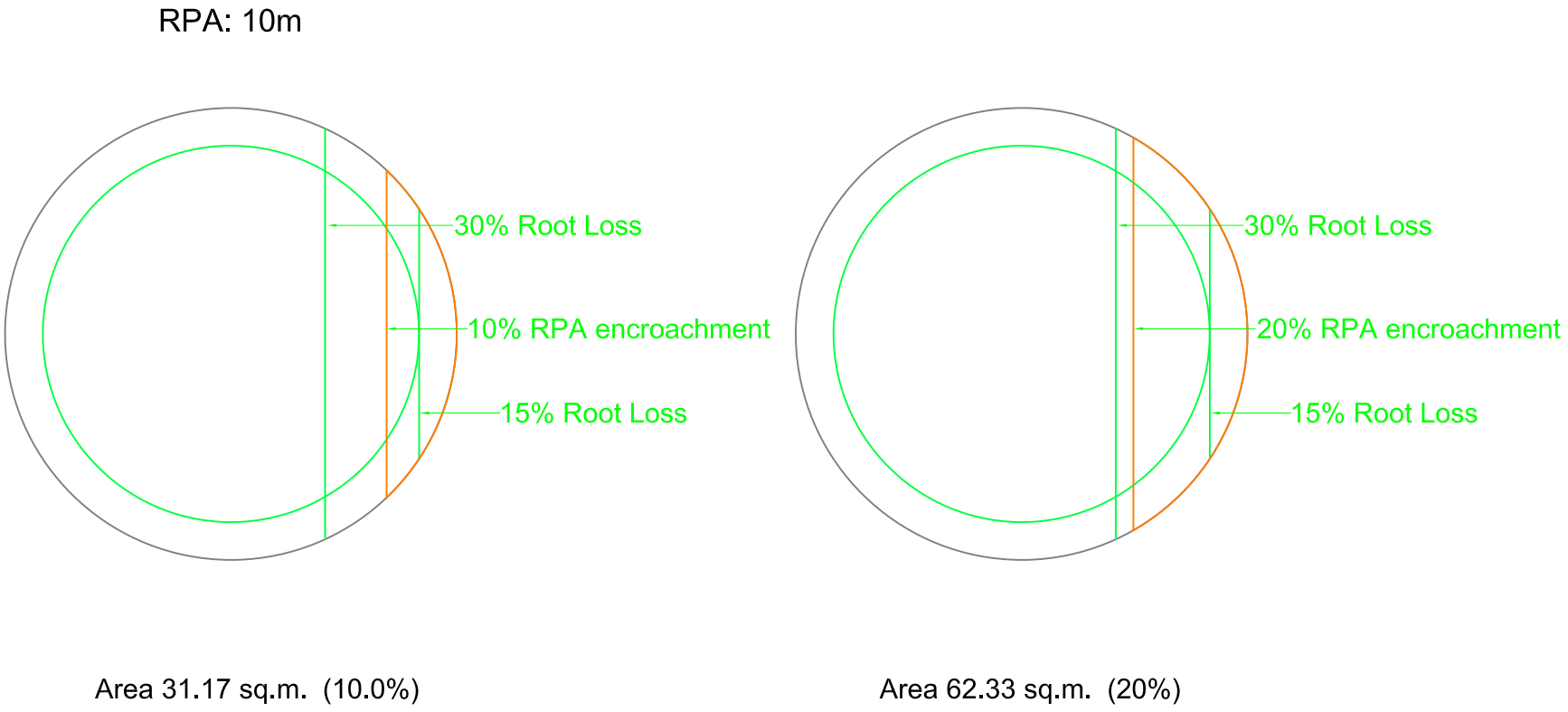


Figure 5b: approximate correlation between RPA encroachment and actual root loss on a free-grown tree of 10m RPA radius (after Thomas (2014))

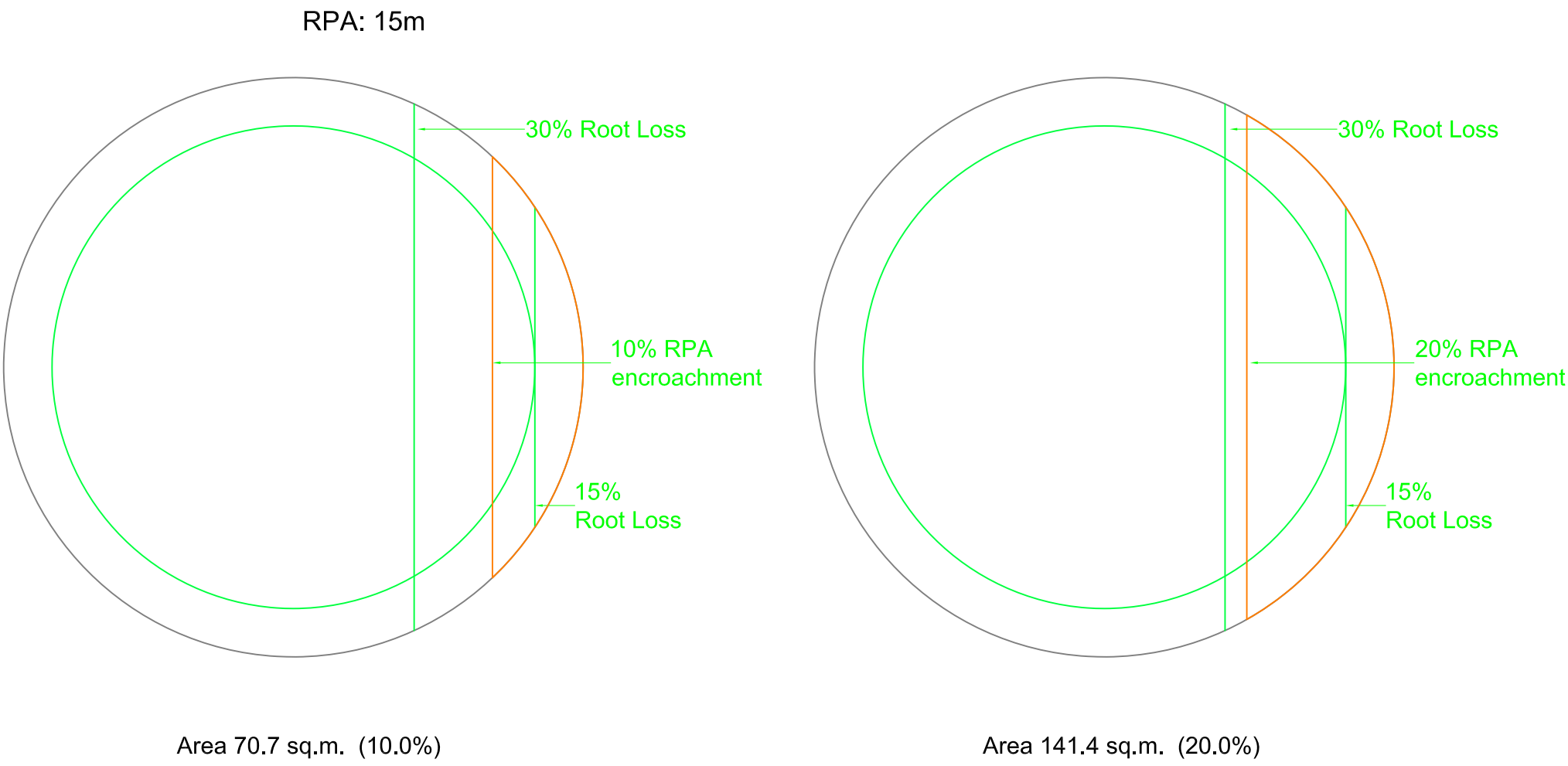


Figure 5c: approximate correlation between RPA encroachment and actual root loss on a free-grown tree of 15m RPA radius (after Thomas (2014))

6.1.6 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.

6.1.7 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.

6.1.8 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 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 The juxtaposition of the retained tree stock to the proposals means that there will only be marginal secondary impacts of honeydew / litter deposition and partial shade on this site. Thus, the secondary impacts of development are minimal.

6.3 Mitigation of Impacts

6.3.1 The replanting scheme will offer considerable enhancement and replaces low quality trees. 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 of >5% area are shown in Plan 2 compensated for elsewhere on contiguous land. The parts of the RPA of T13 within the application site that are outside the basement footprint will be treated with biochar or similar to improve rooting conditions therein. Although T7 is not directly impacted, it is close to the basement and there would be no harm extending the treatment to this specimen tree.

6.3.3 The path of the basement foundations through the RPA of T13 will be manually excavated to 750mm depth under arboricultural supervision; any roots encountered within the trenches / pits will be cleanly pruned back to an appropriate junction with a sharp pruning saw or secateurs back to a junction. Roots larger than 25mm diameter may only be cut in consultation with an arboriculturalist. The path of services to the A/C unit could be box hoarded above ground through the shrub border above the roots of T7 birch.

6.3.4 The terrace encroachment to the RPA of T13will require a no-dig construction technique, using a cellular confinement system with no fines aggregate for the sub-base. The degree of encroachment means that a permeable paving surface (e.g. gravel or block paving) is required. The finished section is likely to be 100mm above grade, depending on final specification, which will need to be factored into the overall finished site levels. The cellular confinement system with a temporary hard surface (e.g. road stone) can be used for site access during construction and the surface material replaced on completion of construction.

6.3.5	The replacement paving/hard landscaping 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.
6.3.6	The immediate canopy encroachment can be avoided with a minor crown reduction to T2.

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 Policies G1, G5 and G7 of the London Plan 2021 and Policies A3, A5, D1 and D2 of the Camden Local Plan (adopted 3rd July 2017). Thus, with suitable mitigation and supervision the scheme is recommended to planning.

8.0 RECOMMENDATIONS

8.1 Specific Recommendations

8.1.1 Recommendations for works required to facilitate development are found in Appendix 2 and a selection of columnar tree species cultivars for constricted sites provided in Appendix 3. Any tree removals recommended within this report should only be carried out with local authority consent.

8.1.2 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.

8.1.3 Replace felled trees with native ornamental nursery stock under current best practice; i.e. conforming to and planted in accordance with the following:

- BS8545: 2014 Code of Practice for Trees from Nursery to Landscape
- BS 3936-1: 1992 Nursery stock. Specification for trees and shrubs; and
- BS 5236:1975 Cultivation and Planting of Trees in the Advanced Nursery Stock Category.
- All replacement stock should be planted and maintained as detailed in BS 4428:1989 (Section 7): Recommendations for General Landscape Operations.

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)	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

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Landmark Trees

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

PART 2 – APPENDICES

APPENDIX 1

TREE SCHEDULE

Botanical Tree Names

Acacia, False (Robinia)	: Robinia Pseudoacacia	Olive	: Olea europaea
Ash, Common	: Fraxinus excelsior	Pear, Willow leaved	: Pyrus salicifolia
Birch, Himalayan	: Betula utilis	Pine, Bhutan	: Pinus wallichiana
Birch, River	: Betula nigra	Plane, London	: Platanus acerifolia
Cypress, Lawson	: Chamaecyparis lawsonia	Plum spp	: Prunus spp
Elder	: Sambucus nigra	Privet, Chinese	: Ligustrum sinense
Hazel, Corkscrew	: Corylus avellana 'Contorta'		
Magnolia, Southern	: Magnolia grandiflora		

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.

Landmark Trees

Site: 31 Elsworthy Road

Date: 24/11/20

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Kim Dear

Ref: BBP_31EWR_AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
1	Olive	4	1.5,1,1.5,1	1.5	65	Young	0.8	Normal	Fair	C	3	10+	
2	False Acacia	12	7566	4.5	370	Early Mature	4.4	Normal	Fair	B	2	20+	Included bark in main stem unions
3	Birch, Himalayan	12	4453	4.0	284	Early Mature	3.4	Normal	Good	B	2	20+	
4	False Acacia	13	5666	5.0	693	Mature	8.3	Moderate	Fair	B	2	20+	Ivy clad Remote survey only (RS) in neighbouring garden
5	Magnolia, Southern	5	1.5,1,1.5,2	3.0	100	Young	1.2	Moderate	Poor	C	2	<10	Basal cavity
6	Elder	5	2131	2.0	150	Semi-mature	1.8	Moderate	Fair	C	2	10+	Remote survey only (RS)

Landmark Trees

Site: 31 Elsworthy Road

Date: 24/11/20

Appendix 1

BS5837 Tree Constraints Survey Schedule

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Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
'7	Birch, Himalayan	11	5574	5.0	375	Early Mature	4.5	Normal	Good	B	2	20+	
8	Cypress, Lawson	6	1111	2.5	90	Young	1.1	Moderate	Fair	C	2	20+	
9	Magnolia, Southern	6	3222	3.0	200	Semi-mature	2.4	Moderate	Fair	C	2	20+	
10	Privet, Chinese	5	3111	2.5	89	Young	1.1	Moderate	Fair	C	2	20+	
11	Hazel, Corkscrew	4	0111	1.5	80	Young	1.0	Moderate	Fair	C	2	10+	
12	Pear, Willow-leaved	3	1.5,0,1,2	2.0	100	Young	1.2	Moderate	Fair	C	2	20+	

Landmark Trees

Site: 31 Elsworthy Road
Date: 24/11/20

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd
020 7851 4544
Surveyor(s): Kim Dear
Ref: BBP_31EWR_AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
13	Ash, Common	5	1201	3.0	600	Post-Mature	7.2	Poor	Fair	B	3	20+	monolith, some regrowth, cavity at crown break
14	Birch, river	9	3334	3.0	260	Early Mature	3.1	Normal	Good	B	2	20+	
15	Birch, river	7	2332	3.0	210	Early Mature	2.5	Normal	Fair	C	2	20+	Leaning (slightly)
16	Pine, Bhutan	2	111,1.5	0.5	110	Young	1.3	Moderate	Fair	C	2	20+	
17	Plane, London	12	3334	6.0	1100	Mature	13.2	Normal	Good	A	2	>40	Pollarded pollarded this year
18	Plane, London	15	6886	6.0	1150	Mature	13.8	Normal	Good	A	2	>40	last year pollard, good regrowth

Landmark Trees

Site: 31 Elsworthy Road

Date: 24/11/20

Appendix 1

BS5837 Tree Constraints Survey Schedule

Landmark Trees Ltd

020 7851 4544

Surveyor(s): Kim Dear

Ref: BBP_31EWR_AIA

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Stem Diamete	Age Class	Protection Radius	Growth Vitality	Structural Condition	B.S. Cat	Sub Cat	Useful Life	Comments
19	Cypress, Lawson	10	2	2.0	350	Early Mature	4.2	Normal	Good	B	2	40+	Remote survey only (RS)
20	Plum	8	1211	3.0	250	Early Mature	3.0	Moderate	Fair	C	2	20+	Remote survey only (RS)
21	Ash	4	2	3.0	100	Young	1.2			C	2	20+	Remote survey only (RS)

APPENDIX 2

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 31 Elsworthy
Date 24/11/20

Surveyor(s Kim Dear
Ref ETN_CTF_AIA

Appendix 2

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
1	Olive	C	4	1.5	1.5,1,1.5,1	Fell	To facilitate development
2	False Acacia	B	12	4.5	7566	CB 2m (Or consider small rig) Root treatment w. air injection/ compost tea	Included bark in main stem unions To facilitate / mitigate development
5	Magnolia, Southern	C	5	3.0	1.5,1,1.5,2	Fell	Basal cavity To facilitate landscape
'7	Birch, Himalayan	B	11	5.0	5574	RT* *Root treatment w. air injection/ compost tea	To facilitate / mitigate development
8	Cypress, Lawson	C	6	2.5	1111	Fell	To facilitate development
9	Magnolia, Southern	C	6	3.0	3222	Fell	To facilitate development
10	Privet, Chinese	C	5	2.5	3111	Fell	To facilitate development

Site 31 Elsworthy
Date 24/11/20

Surveyor(s Kim Dear
Ref ETN_CTF_AIA

Appendix 2

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
11	Hazel, Corkscrew	C	4	1.5	0111	Fell	To facilitate development
12	Pear, Willow-leaved	C	3	2.0	1.5,0,1, 2	Fell	To facilitate development
16	Pine, Bhutan	C	2	0.5	111,1.5	Fell	To facilitate development

APPENDIX 3: TREE SELECTION FOR URBAN LOCATIONS

Table A4.1: Small Ornamental Tree Species

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

Table A4.2: Medium Specimen Tree Species

Common Name	Species	(Columnar Form for discrete usage)
Chinese red bark birch	Betula albosinensis	Fascination
Mongolian lime	Tilia mongolica	
Hornbeam	Carpinus betulus	Fastigiata Frans Fountaine
Turkish hazel	Corylus colurna	
Maidenhair tree	Gingko biloba	
Pride of India	Koelreuteria paniculata	Fastigiata
European larch	Larix decidua	Sheerwater Seedling
Tulip tree	Liriodendron tulipfera	Fastigiata

Table A4.3: Larger Specimen Tree Species

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

APPENDIX 4: TREE RADAR FINDINGS

Arboraeration Ltd

Tree Root Radar Investigation REPORT

31 Elsworthy Road, London (12th January 2021)

Site survey and report undertaken by James Abbott, for and on behalf of Arboraeration Ltd

1) Background

Site Address: 31 Elsworthy Road, London, NW3 3BT

Arboraeration were instructed to undertake a tree root survey utilizing Ground Penetrating Radar and associated software to identify the location, depth, and size of tree roots from a number of trees that are growing both on and off the property.

The topographical survey of the site as well as existing tree dimensions were provided to us by the client.

The purpose of the investigation was to determine whether the trees are rooting into an area of the garden that is proposed for the development of a basement area.

2) Introduction to the Tree Radar Unit

The Tree Radar Unit is a tool specifically designed for use in the arboriculture industry for locating tree roots and plotting their location, size, and depth. The data collection is undertaken using a 900 MHz (megahertz) radar antenna and associated data logger, coupled with a tablet computer that acts both as i) instant display and ii) data recording and conversion device.

Depending on the requirements of the survey and the access requirements of the site, the survey will either be undertaken using i) perimeter scans, ii) line scans or iii) a combination of both. Perimeter scanning involves scanning a circle around a fixed point from the stem of the tree that increase in size, typically by 60cm per scan. Linear scans are fixed lines that are run perpendicular to the direction of the anticipated root growth to attempt to intersect the root at 90^{o} for the most accurate readings.

Once the onsite scanning is complete the required files are uploaded into the analysis software for interpretation and conversion into useful data to inform management decisions.

3) Method Statement

Upon arrival at the site, small core samples of soil were taken at four points around the property to determine the correct settings required to calibrate the unit. The soil was found to be a clay loam with average moisture content.

21 individual scan lines were plotted around the property located as per the plans and specification provided to us by Adam Hollis of Landmark trees as agreed by the client.

6 of the scan lines were through hardstanding and the remainder were through grass and soft landscaping.

4) Site Data and TRU Settings

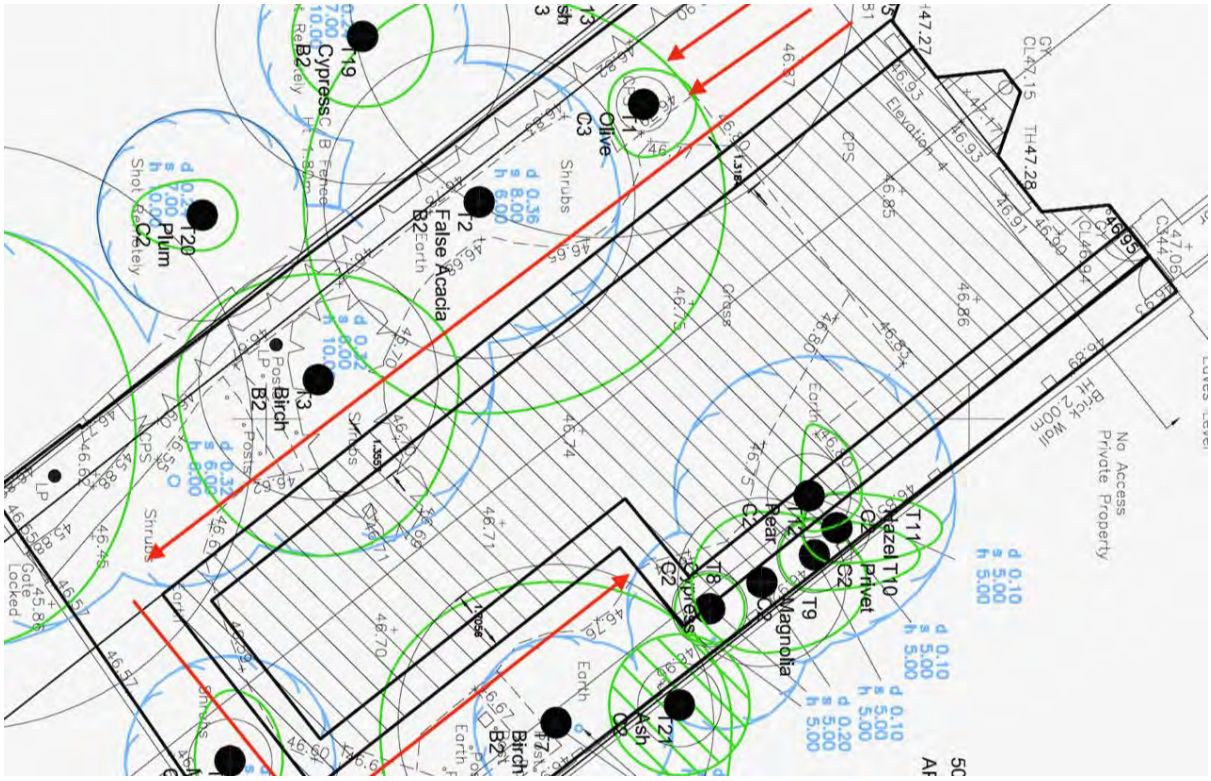
TRU Settings/Data	Value
Soil Composition	Concrete
Dielectric Permittivity	7.0
Recording Depth	90cm
Analysis Zone 1	0cm – 30cm
Analysis Zone 2	30cm - 60cm
Analysis Zone 3	60cm – 90cm

TRU Settings/Data	Value
Soil Composition	Clay Loam, Medium Moisture Content
Dielectric Permittivity	9
Recording Depth	80cm
Analysis Zone 1	0cm – 30cm
Analysis Zone 2	30cm - 60cm
Analysis Zone 3	60cm – 80cm

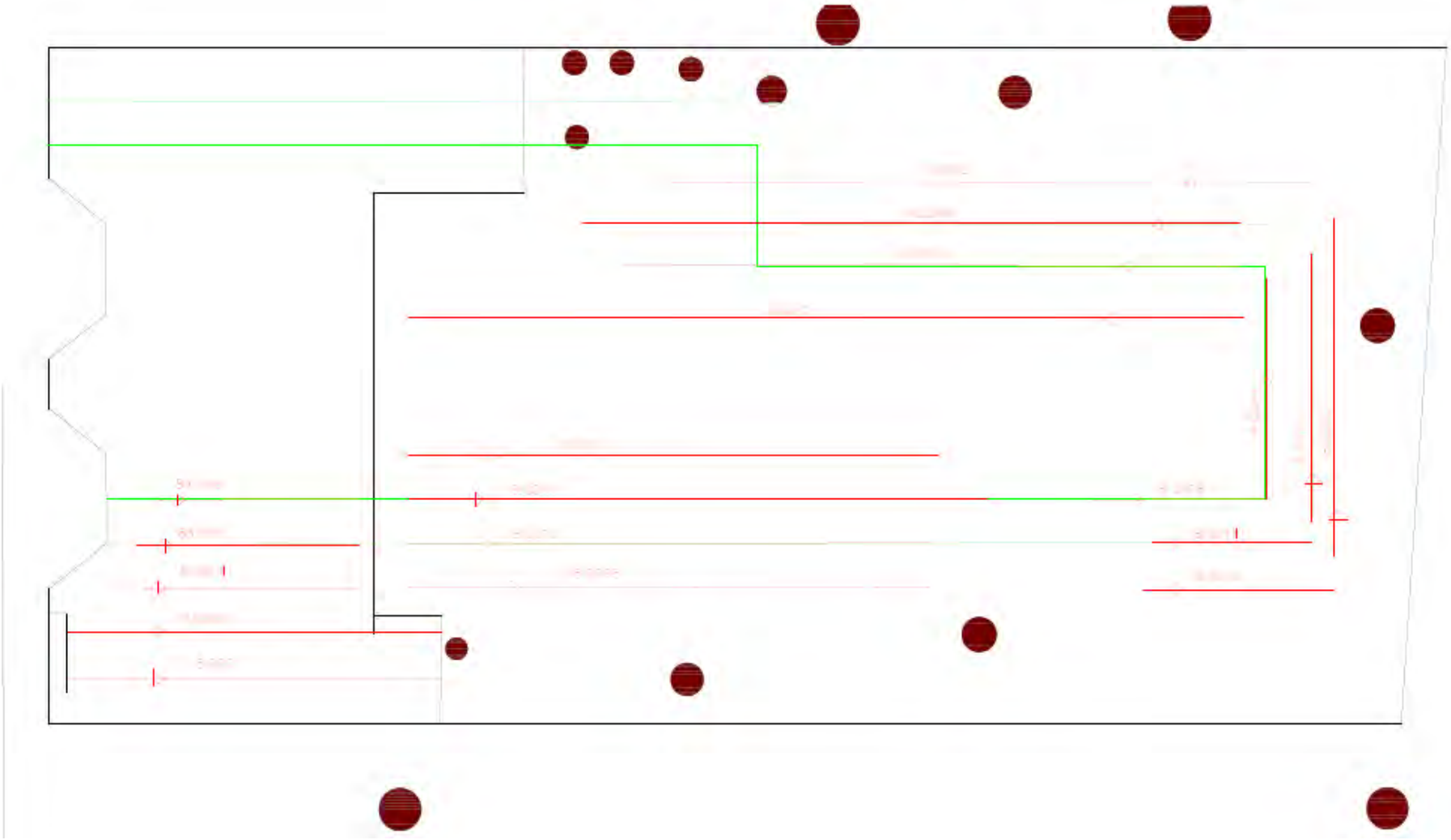
5) Sketch of Scan Lines

The plans below detail the locations of the scan lines relative to the trees on site. The first plan (a) is of the proposed scan lines, the second (b) is of the actual scan lines as completed as we were required to work around specific existing garden features.

a) Proposed Scan Lines



b) Actual Scan Lines and Trial Pit Locations



6) Graphic Results

Below are a series of graphics illustrating the following information:

a) Top Down Root Density Map

The Top Down Root Density Map (a) is divided into 3 sections due to the software restrictions and the number of trees that are found on and around the site.

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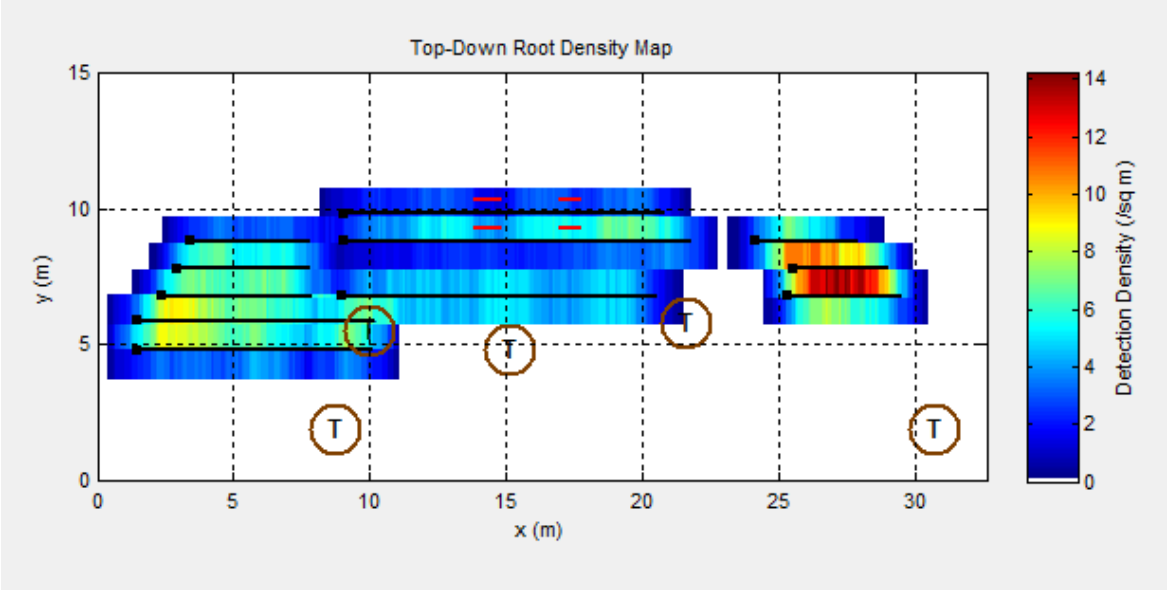
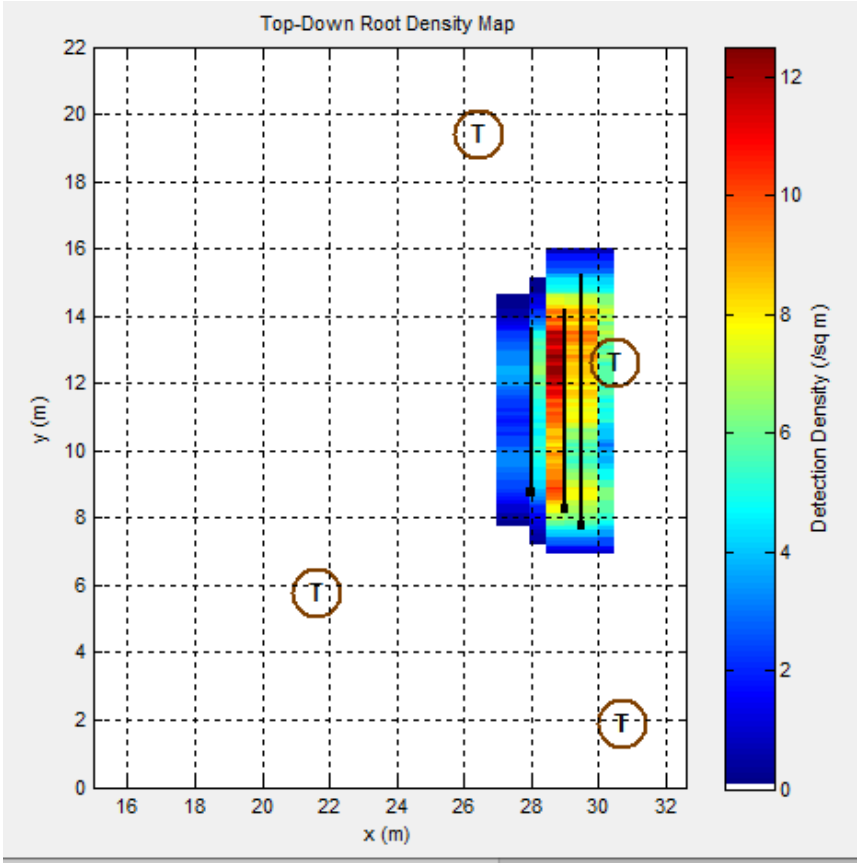
a) Top Down Root Density Map

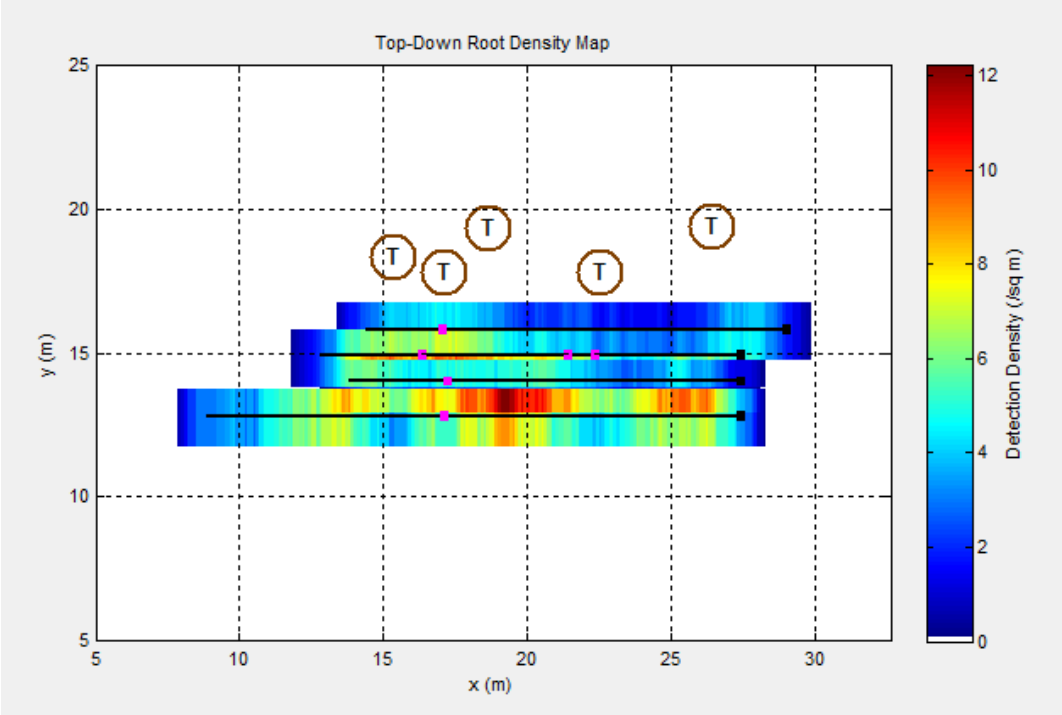
(i) Root detections located adjacent to T13, T1, T2, T3



(ii) Root detections located adjacent to T4, T5, T6



(iii) Root detections located adjacent to T6, T7, T21, T8, T12



The Top Down Root Density Map details areas of the scan that show the most root detections across the whole scan area. Areas of higher density (12 detections per M^2) appear in red, with areas of lower root density (0-2 detections per M^2) appearing in blue. Detections refer to individual root detections and do not relate to root size or amount of root biomass, therefore it is typically expected to see higher densities further away from the tree.

7) Data Summary

Scan Line Number	Scan Line Length	Number of Detection Points
1	8.7m	60
2	8.8m	65
4	5.6m	45
5	4.9m	30
6	4.4m	31
8	11.6m	47
9	4.2m	28
10	7.5m	41
12	14.6m	91
13	11.7m	46
14	3.5m	25
15	5.9m	28
16	14.6m	42
17	12.8m	48
18	18m	19
19	4.9m	30
20	13.6m	67
21	11.8m	80
23	18.6m	119
	Total Detections	942
	Average Detections Per M	5.7

8) Report Summary

Throughout the scanned area root detections were found at all depths from near surface level to 90cm depth.

Most of the rooting was detected between 10 - 50cm depth.

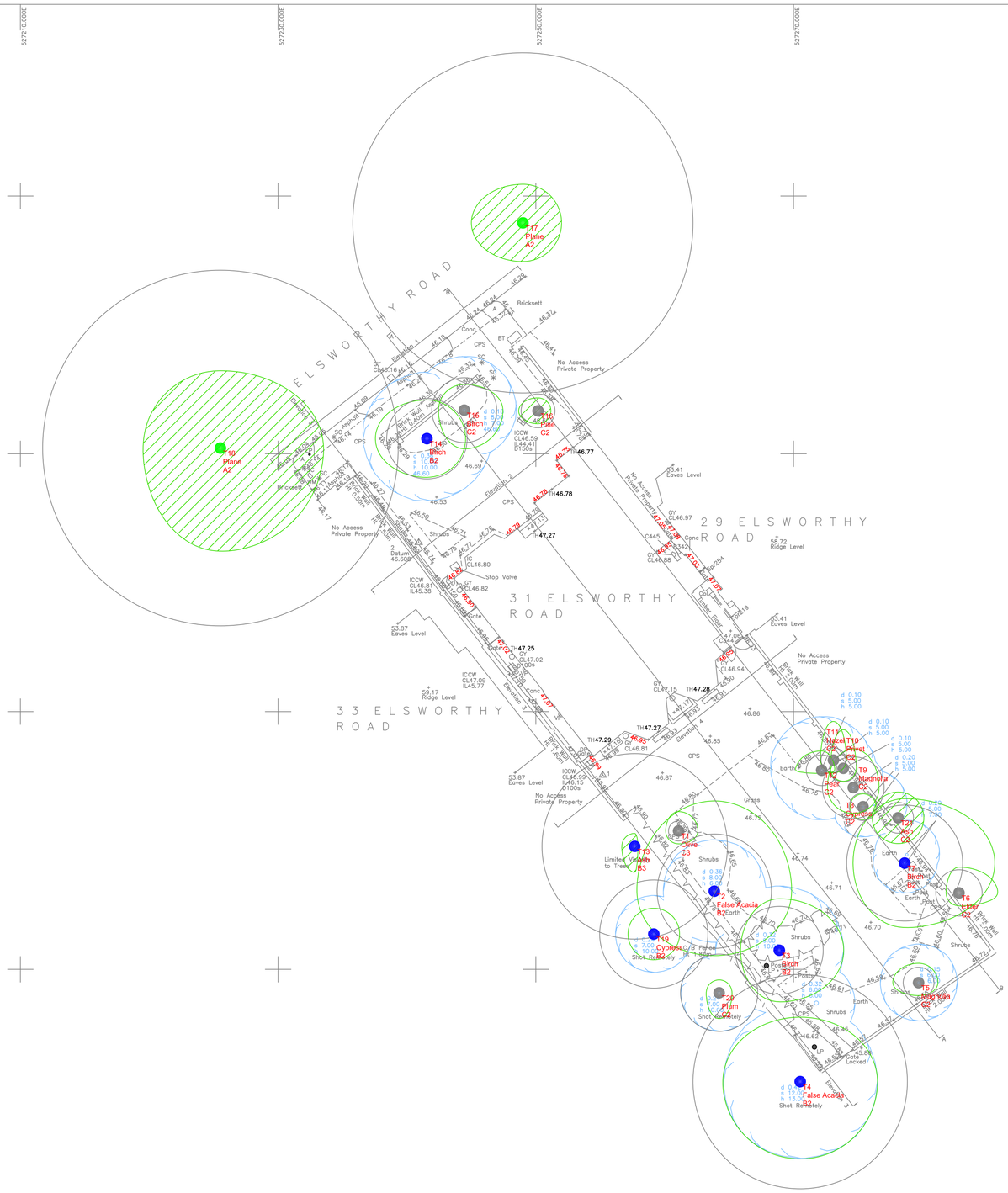
Large roots (those greater than 25mm) were detected out on the furthest scan lines from the trees (scan lines 8.21 and 8.23).

Landmark Trees

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).

Landmark Trees

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Tel: 0207 851 4544 Mobile: 07812 989928
e-mail: info@landmarktrees.co.uk Web: www.landmarktrees.co.uk

Site: 31 Elsworthy Road	1:200@ A1
Drawing Title: Tree Constraints Plan	December 2020

Key:

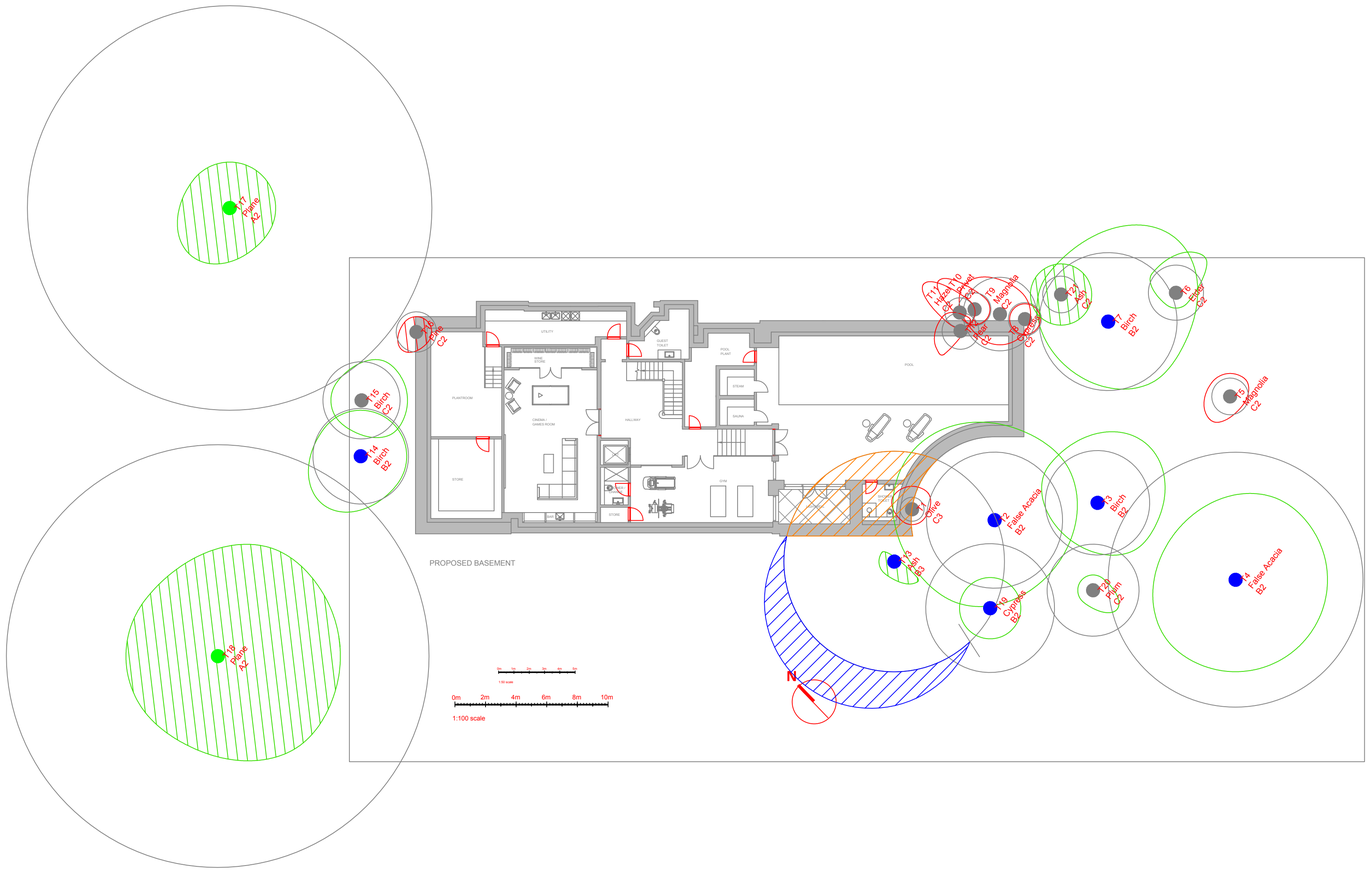
- Category A High Quality
- Category B Moderate Quality
- Category C Low Quality
- Category U Trees Unsuitable for Retention

Category
Crown Spread
T3 Birch B2
Tree Number
Species
Category
Root Protection Area
Tree Position Approximate (not shown on original survey)

PLAN 2

ARBORICULTURAL IMPACT ASSESSMENT PLAN (S)

i. Basement
ii. Ground Floor



Proposed Basement Plan

Area displaced from RPA
Area from RPA redistributed

NOTE:

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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: 31 Elsworthy Road	1:200@ A1
Drawing Title: Arboricultural Impacts Assessment	March 2021

Key:

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

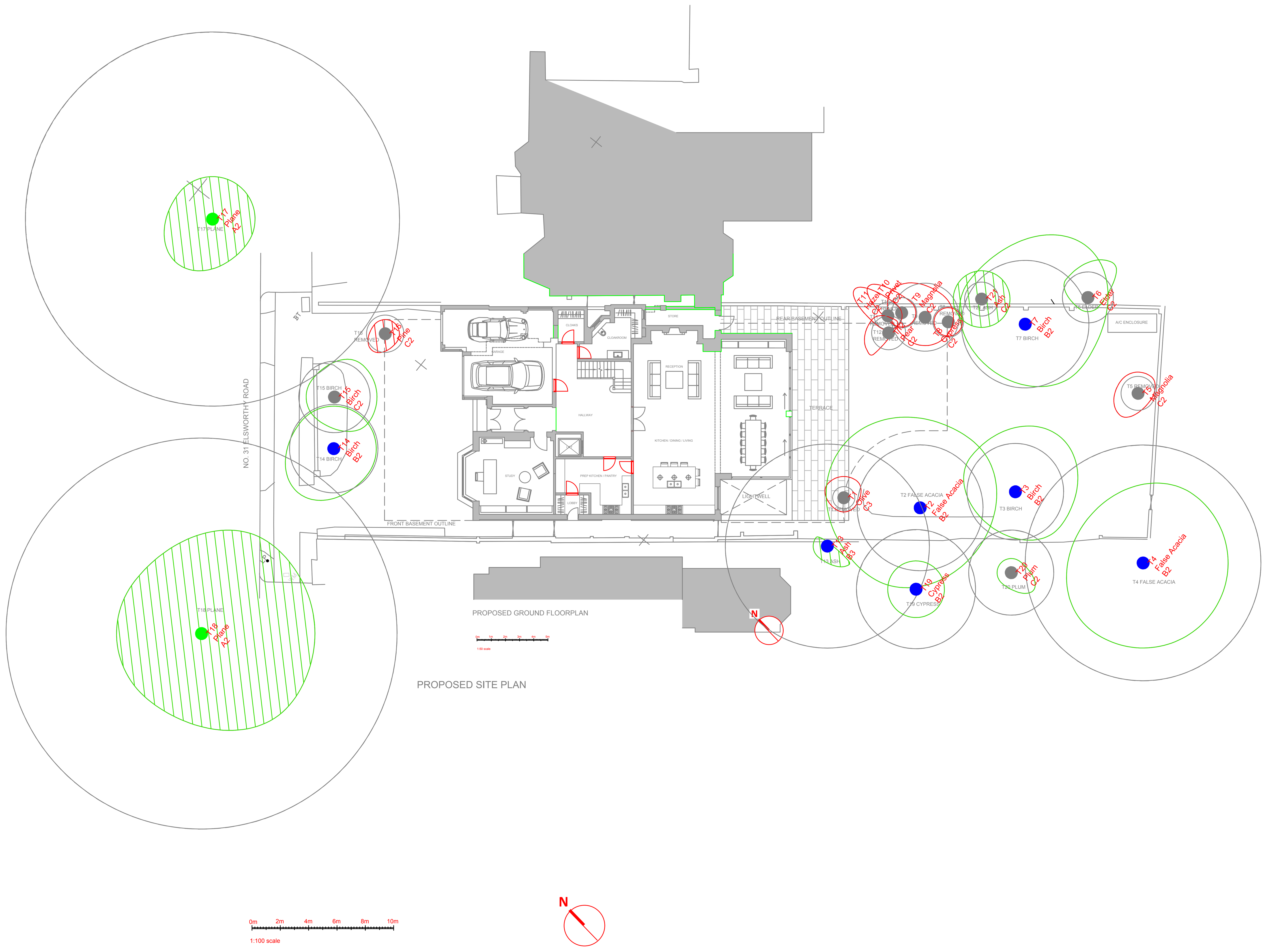
Category, Crown Spread, Tree Number, Species, Root Protection Area, Category (T3 Birch B2)

Tree Position Approximate (not shown on original survey)

Tree Felled To Facilitate Development

N

0 2 4



Proposed Site 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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e-mail: info@landmarktrees.co.uk Web: www.landmarktrees.co.uk

Site: 31 Elsworthy Road	1:200@ A1
Drawing Title: Arboricultural Impacts Assessment	March 2021

Key:

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

Category — Crown Spread — Root Protection Area — Tree Number — Species — Category (example: 13 Birch B2)

Tree Position Approximate (not shown on original survey)

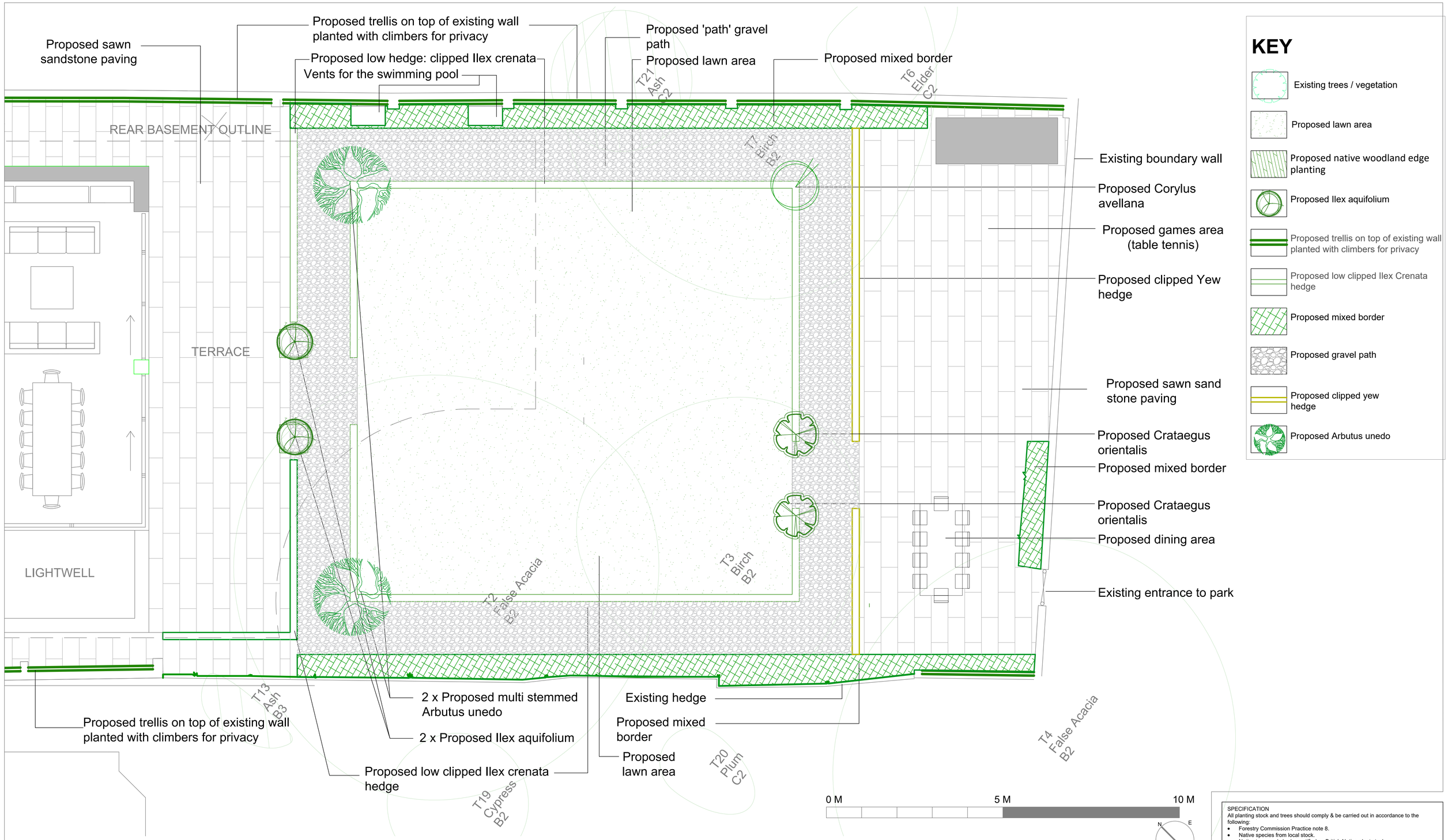
Tree Felled To Facilitate Development

0 2 4

PLAN 3

LANDSCAPE PLANS

i. Plan
ii. Planting Table



Proposed Back Garden Plan

Outline Specification Notes

General

Plant material all plants shall conform to the relevant british standards: BS 3936 and BS 5326. All plants shall be true to form, type, size, healthy, vigorous, pest and weed free. No substitutes in size or type shall be made without written consent of the landscape architect.

Tree planting (refer to detail)

Trees shall be planted into prepared pits 900 x 900 x 750mm to the positions shown on the layout drawing. Break up the bases of all pits to a further depth of 150mm and ensure that the sides of the pits are not glazed. Backfill with imported topsoil and mix with an approved tree planting compost. Allow for 2no. peeled and treated tree stakes, 1.8m long overall with a mean top diameter of 65mm to be used to secure each tree with 2no. 600mm rubber ties at a height of 600mm above ground level. Ensure that the trees are finished at their original soil level. Water-in thoroughly immediately after planting. Allow for amendment to the fertilizer specification, as indicated by the topsoil analysis. All trees planted into new/existing grass shall have a 1.0m clear area around the base of the trunk, covered with 50mm composted bark mulch which shall be kept weed free throughout the maintenance period.

Shrub Planting

Shrubs shall be planted into 450mm of topsoil. Apply a slow release fertilizer such as Enmag at 70g/sq.m or similar approved and work into the topsoil. Plant material shall be planted into pits 75mm wider than the root spread. The pits shall be backfilled gently, firming-in around the roots, ensuring that all plants are finished at their original soil levels. All plants shall be watered-in thoroughly, immediately after planting. Allow for an amendment to the fertilizer specification as inidicated by the topsoil analysis. Shrub beds shall be mulched with a minimum 50mm layer of composted bark, with the depth topped up at end of maintenance period.

- All reused existing or imported topsoil shall be tested by approved Topsoil Analyst to conform to BS 3882:2007 'Specification for Topsoil and Requirements for Use'. Any required amelioration or soil improvement to be carried out in line with Analyst's report.
- Topsoil storage mounds shall be in accordance with NBS landscape specification - locations are to be confirmed with Contractor.

- All fertilizers are to be applied or supervised by qualified staff to avoid the action of plasmolysis.

Maintenance Notes - Overview

All landscaped areas are to be maintained for 24 months following practical completion of the phase or until the plants have established, all tree planting to be maintained for 36 months.

Planting to be protected from mammal and human damage by stock proof fencing.

All planted areas to be kept clear of weeds at all times throughout maintenance period.

Planted areas to be forked through regularly to keep soil loose and aerated.

All litter and debris to be removed from landscaped areas and carted off site.

Plants pruned as instructed by the Landscape Architect to promote healthy growth and to remove dead and diseased wood.

Watering as required to maintain healthy growth. (allow for 12No. watering minimum).

Any species that dies or fails to establish in the first five years should be replaced by an identical species, or alternative species as agreed otherwise.

SPECIFICATION

All planting stock and trees should comply & be carried out in accordance to the following:

- Forestry Commission Practice note 8.
- Native species from local stock.
- Native trees and shrubs certified as British Native plant stock.
- Horticultural Trade Association National Plant specification.
- Planting preparation, handling, planting & maintenance to the CPSE Code for Handling and Establishing plants.
- BS 3936 Part 1 1992.
- Planted to BS 4428:1989.
- Imported topsoil to b mounded towards the centre of each bed to allow for settlement.
- On completion of planting, shrub beds mulched with 75mm consolidated thickness of medium textured decorative grade natural pine bark (see accompanying notes for preparation details).
- Existing trees and hedges to be protected in accordance with BS5837:2005 for the duration of the construction period.
- Tree distances to be in accordance with engineers specification.

For more details on the spec see the accompanying notes.

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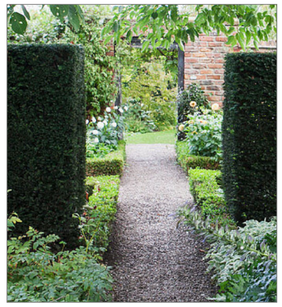
Site: 31 Elsworthy	1:50 @ A1
Drawing Title: Landscape Plan	March 2021

Hydrangea petiolaris

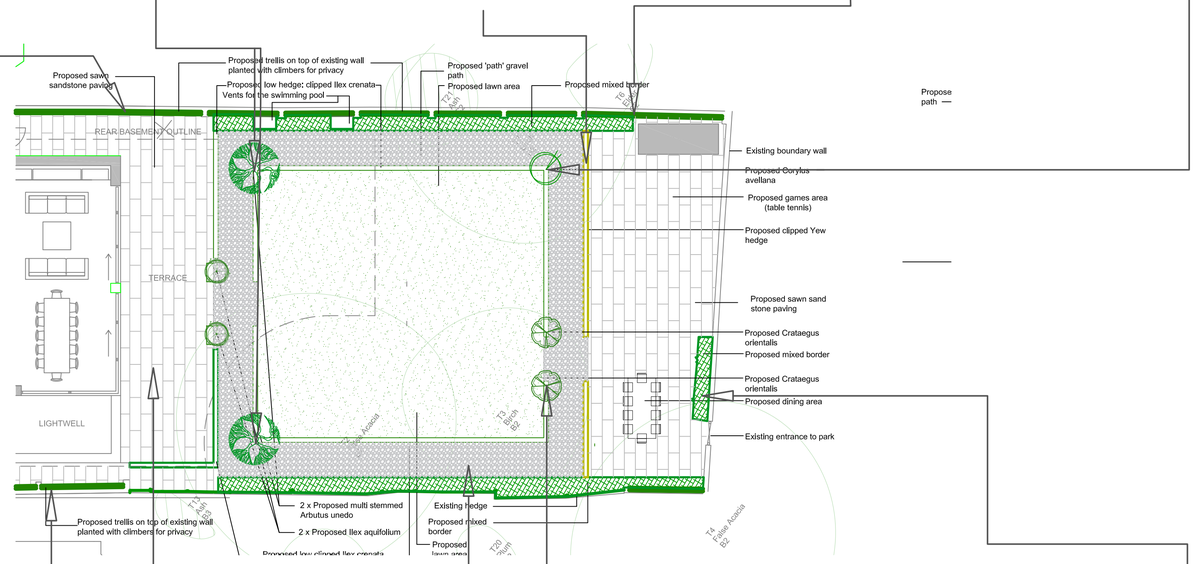
Arbutus unedo



Yew hedge

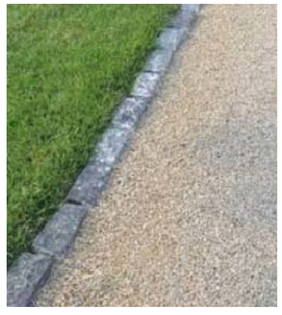
Euphorbia to Euphorbia characins subspecies. wulfenii

Corylus avellana



Trellis

Grey sawn sand stone paving



Tumbled granite setts bordering the gravel

Crataegus oreintalis

Cornus sanguinea

	Number	Density	Height	Girth	Pot Size
Statement Trees					
Arbutus unedo	2		3m		290lt
Woodland trees					
Corylus avellana	2		1-5		30lt
Crataegus orientalis	4		2-3		120lt
Ilex aquifelium	2		1.5		40lt
Mixed scented border					
Shrubs	Planted toward the back of the border				
Philadelphus coronarius	3	1/m^2			3lt
Syringa vulgaris	3	1/m^2			3lt
Chimonanthus praecox	3	1/m^2			3lt
Lonicerafragrantissima	3	1/m^2			3lt
Lavendula augustifera little lady	3	1/m^2			
Perennials					
Euphorbia to Euphorbia characins subspecies. wulfenii	12	3/m^2			2lt
Geranium 'Ann Folkard'	12	3/m^2			2lt
Digitalis purpuea	12	3/m^2			2lt
Lunaria annua	12	3/m^2			2lt
Iris pallida	12	3/m^2			2lt
Achillea millefolium	12	3/m^2			2lt
Bulbs					
Fritillaria imperialis	30	1/m^2			
Tulip 'White Triumphater'	30	1/m^2			
Low Clipped Hedge					
Ilex crenata	225	3/m			2lt

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Site: 31 Elsworthy

Drawing Title: Planting Table

March 2021