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BS5837:2012 Arboricultural Report

28 Harley Road, London NW3

Produced for:

Mr Scott Wells



LYSANDER ASSOCIATES

November 2019

Document Amendment History

| Version | Status | Date | Amendment to this version |
|---------|--------|----------|---------------------------|
| 1.0 | Issue | 11.11.19 | n/a |
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Document Approval

| | Name | Title | Signature | Date |
|-----------|----------------|-----------------------------|--|----------|
| Author: | Luke Allwright | Arboricultural Consultant |  | 11.11.19 |
| Reviewer: | Jon Collins | Senior Landscape Consultant |  | 11.11.19 |

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1. Introduction

1.1 Terms of Reference

Maydencroft Limited was commissioned by Mr Scott Wells of Lysander Associates to produce a BS5837:2012 Arboricultural Report for all trees in the vicinity of a proposed development project at 28 Harley Road, London, NW3 3BN.

The report has been produced in accordance with British Standard 5837:2012 *Trees in relation to Design, Demolition and Construction – Recommendations* to inform the resurfacing of an existing driveway and the design and layout of a new vehicular access. The aim of this report is to provide information on the location, quality and condition of trees in order to ensure that the proposed scheme complies with the requirements of both BS5837:2012 and the Local Planning Authority with regards to minimising or where possible avoiding impact on the above and below ground parts of any retained trees, in particular those with existing statutory protection. It is also the aim of the survey and assessment to give pragmatic advice about the removal of trees or particular surgery works where deemed necessary to the successful delivery of the scheme.

1.2 Scope of Works

A survey of the land at 28 Harley Road, London was carried out on Wednesday 16th October 2019 by Luke Allwright, Arboricultural Consultant. Luke holds the Lantra Professional Tree Inspection qualification, a Level 4 qualification in Arboriculture, is a Technician member of the Arboricultural Association, and is a highly skilled tree surgeon with experience in carrying out both grounds based, aerial tree safety inspections and producing BS5837:2012 related tree planning work.

All of the trees on and adjacent to the proposed development site were inspected using the Visual Tree Assessment (VTA) methodology, detailed in “The Body Language of Trees” (Mattheck & Breloer, HMSO, 1994). This level of inspection does not involve any climbing. Each individual tree was inspected separately and an assessment made of its condition. Any problems with individual trees were noted and remedial work is recommended here only where it is deemed necessary.

Details of all trees are listed in the schedule below with quantitative and qualitative information included as required by BS 5837:2012 sections 4.4 to 4.6. The information has been used to create a Tree Survey Plan (Appendix B) showing the location of the trees, their crown spread and their BS categorisation. A Tree Constraints Plan (Appendix C) indicates the Root Protection Areas (RPAs) for each of the trees and all other constraints that may impact on the design of the development.

1.3 Site Description

No. 28 (the development site) is located on the western side of the southern end of Harley Road, London, NW3 3BN. The road is moderately busy with parking available on either side. On both sides of the road there are large residential properties, all of varying

architectural styles. The property is bordered on the north, west and south sides by residential properties and gardens.

At present the site consists of a three story house, rear garden and single entrance front driveway. The existing driveway is surfaced and there is a retaining wall surrounding a grassy area at the front of the property containing four trees. There is also a small retaining wall separating a narrow planting area with two trees from the southern edge of the driveway.

1.4 Soils

The Soilsmap of the United Kingdom (developed and hosted by Cranfield University) shows that the site is located within *Soilsmap 18* which is described as slowly permeable, seasonally wet, slightly acidic but base-rich loamy and clayey soils. It should be noted that a site-based soil assessment was not carried out as a part of this survey.

Tree roots can be a problem on soils with high clay content which have the ability to swell and shrink as a result of water retention and uptake, potentially affecting building foundations through subsidence and heave. Where it is thought that soils could be affected by tree roots, and therefore where they have the potential to cause heave or subsidence to buildings, it is recommended that the specification for foundation design takes this fully into account.

2. Tree Survey

This chapter is supported by the plans included in Appendix B and C of this report.

2.1 Designations

The whole property falls within the Elsworthy Conservation area as designated by the London Borough of Camden. This means that the Local Planning Authority (LPA) must be notified of any tree work at least 6 weeks before the work commences. Within this 6 week period the LPA may wish to apply a Tree Preservation Order upon one or all of the trees on site making it a criminal offence to cut down, top, lop, uproot, wilfully damage or wilfully destroy that tree or to cause or permit such actions, without the authority's permission.

2.2 Tree Categories

All trees on the property in close proximity to the development area have been assessed and categorised in accordance with the guidelines in BS5837:2012. The following table includes a brief summary of the categories with more details provided in Table 1 of the British Standard (included in Appendix D).

| Trees to be considered for retention | |
|--------------------------------------|---|
| Category A | Trees of high quality with an estimated remaining life expectancy of at least 40 years. |
| Category B | Trees of moderate quality with an estimated remaining life expectancy of at least 20 years. |
| Category C | Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm. |
| Trees unsuitable for retention | |
| Category U | Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years. |

2.3 Root Protection Areas (RPAs)

The RPAs for the trees recorded by the tree survey have been calculated in accordance with the guidance in chapter 4.6 of BS5837:2012. For single stem trees, the RPA is equivalent to a circle with radius 12 times the stem diameter. For veteran and ancient trees, the RPA is equivalent to a circle with radius 15 times the stem diameter.

For trees with between two to five stems, the combined stem diameter is calculated by finding the square root of the sum of the stem diameters². For trees with more than five stems, the combined stem diameter is calculated by finding the square root of the sum of the mean stem diameter² multiplied by the number of stems.

2.4 Limitations

Tree locations were recorded by taking a GPS reading using a Trimble TDC100 Series handheld data collector with accuracy between 1-3m. Locations were then referenced

against the topographic survey of the site to ensure accuracy. Tree heights and crown spreads were measured using a TruPulse 200 Laser Rangefinder.

2.5 Schedule of Trees

The table below summarises the trees surveyed within the vicinity of the proposed development site at 28 Harley Road, London. Please refer to Appendix A for a *Description of Terms*.

| Tree No. | Common Name | Scientific Name | Age Class | Height (m) | Stems | Stem Ø at 1.5m (mm) | RPA (m) | Crown Spread (m) | | | | Crown Height (m) | | | | Condition | | BS Cat | General Observations |
|----------|-----------------------|-------------------------------|--------------|------------|-------|---------------------|---------|------------------|-----|-----|-----|------------------|-----|-----|-----|------------|---------------|-------------|--|
| | | | | | | | | N | E | S | W | N | E | S | W | Structural | Physiological | | |
| T1 | Common horse chestnut | <i>Aesculus hippocastanum</i> | Mature | 17.5 | 1 | 630 | 7.6 | 6.4 | 8.2 | 7.8 | 6.7 | 3 | 4.5 | 5 | 4.5 | Fair | Fair | B1,2 | Crown appears slightly sparse from to seasonal defoliation aided by leaf miner; some dieback and minor deadwood in upper crown; some branches on eastern side of crown are interfering with street light; tree is front and centre of driveway of property and is highly visible to surrounding properties; significant size and age given location and surrounding trees. |
| T2 | Boxelder maple | <i>Acer negundo</i> | Semi-mature | 6.3 | 1 | 250 | 3.0 | 1.4 | 2.2 | 1.7 | 2 | 2 | 4 | 2.5 | 3 | Poor | Poor | U | Unoccluded wounds on stem in 5 places between base and 1.5m height on all cardinal points; decay present in old pruning wound on west side of stem at 1.6m height; overall condition is poor; evidence of dieback and deadwood in crown with main leaders all being dead for the top 1 to 2m. |
| T3 | Boxelder maple | <i>Acer negundo</i> | Semi-mature | 10.6 | 1 | 300 | 3.6 | 2.4 | 2.8 | 4.9 | 5.8 | 3.5 | 2 | 2.5 | 3 | Fair | Fair | C2 | 3 screws drilled into west side of stem between 0.5m and 1.25m height; cavity in stem at 1.7m height from pruning wound with small palm growing out of cavity; crown appears slightly sparse; southern limb at 1.7m height has large wound with decay and fungal fruiting bodies present from limb failure or poor pruning. |
| GLL T4 | Palm | <i>Cordyline australis</i> | Semi-mature | 6.8 | 1 | 200 | 2.4 | 1.4 | 1.2 | 1.3 | 1.5 | 2.5 | 3 | 2 | 1.5 | Fair | Fair | B2 | Evidence of minor wounding on stem in multiple places from base up to 1.5m height; 1 leader is dead and there are many hanging dead fronds impeding inspection. |
| T5 | Cherry laurel | <i>Prunus laurocerasus</i> | Early-mature | 5.8 | 5 | 160 | 1.9 | 3 | 2.1 | 1.3 | 2.1 | 1.7 | 1.5 | 1.5 | 1.7 | Fair | Fair | C2 | Slightly suppressed form; multiple stems from base; leans north over wall encroaching on neighbouring property. |

| Tree No. | Common Name | Scientific Name | Age Class | Height (m) | Stems | Stem Ø at 1.5m (mm) | RPA (m) | Crown Spread (m) | | | | Crown Height (m) | | | | Condition | | BS Cat | General Observations |
|----------|---------------------|-----------------------------|--------------|------------|-------|---------------------|---------|------------------|------|-----|-----|------------------|------|------|------|------------|---------------|--------|---|
| | | | | | | | | N | E | S | W | N | E | S | W | Structural | Physiological | | |
| T6 | Prunus spp. | <i>n/a</i> | Semi-mature | 6.8 | 3 | 380 | 4.6 | 3 | 2.3 | 2.8 | 3.3 | 1.7 | 0 | 0 | 1 | Poor | Fair | U | Tree is heavily clad in ivy from base up stems and in to crown impeding inspection; steel cable connects 2 stems at 0.25m height; crown is encroaching on neighbouring property. |
| T7 | Hybrid black poplar | <i>Populus x canadensis</i> | Mature | 31.9 | 1 | 1450 | 17.4 | 12.2 | 12.5 | 8.4 | 8 | 12 | 12 | 12 | 10 | Ivy | Fair | B2 | Very large spreading tree at rear of back garden; base of tree is 1.6m east of boundary wall; stem is very heavily clad with ivy impeding inspection; some significant deadwood present in crown and evidence of previous limb failure. |
| T8 | Cherry laurel | <i>Prunus laurocerasus</i> | Semi-mature | 4.7 | 2 | 200 | 2.4 | 2.2 | 2 | 1.8 | 1.5 | 0.25 | 0.25 | 0.25 | 0.25 | Fair | Fair | C2 | Slightly suppressed form; tree leans north away from wall; some evidence of dieback in crown. |
| T9 | Fig | <i>Ficus carica</i> | Early-mature | 4.5 | 1 | 150 | 1.8 | 1.5 | 4.7 | 3.6 | 0.1 | 2 | 1.5 | 2 | 1.5 | Fair | Fair | B3 | Slightly suppressed form; tree leans south east and crown is growing through neighbouring shrubs. |
| T10 | Common lime | <i>Tilia europaea</i> | Semi-mature | 13.7 | 1 | 400 | 4.8 | 3 | 3 | 3 | 3 | 5 | 5 | 4.5 | 2.5 | Fair | Fair | B2 | Growing in corner of neighbouring property; some measurements have been estimated due to location of tree; no significant defects recorded. |
| T11 | Sycamore | <i>Acer pseudoplatanus</i> | Semi-mature | 13 | 1 | 370 | 4.4 | 4 | 3 | 2.5 | 3 | 2.5 | 5 | 5 | 3 | Fair | Fair | B2 | Tree is located in neighbouring property; some measurements have been estimated due to location of tree; no significant defects recorded. |
| T12 | Common hawthorn | <i>Crataegus monogyna</i> | Semi-mature | 4.5 | 1 | 280 | 3.4 | 1 | 2.5 | 2.1 | 1.5 | 3.5 | 4 | 3.5 | 3 | Poor | Poor | U | Significant wound on east side of stem at 1m up to 1.5m height, evidence of decay; crown in heavy decline; ivy growing from wall up stem and impeding inspection. |

| Tree No. | Common Name | Scientific Name | Age Class | Height (m) | Stems | Stem Ø at 1.5m (mm) | RPA (m) | Crown Spread (m) | | | | Crown Height (m) | | | | Condition | | BS Cat | General Observations |
|----------|--------------------|------------------------------|--------------|------------|-------|---------------------|---------|------------------|-----|-----|-----|------------------|------|-----|---|------------|---------------|--------|---|
| | | | | | | | | N | E | S | W | N | E | S | W | Structural | Physiological | | |
| T13 | Field maple | <i>Acer campestre</i> | Early-mature | 10.8 | 1 | 190 | 2.3 | 3.4 | 3.6 | 2.2 | 1 | 2.5 | 2 | 5 | 5 | Fair | Fair | C2 | Slightly suppressed form; central leader has hose pipe and steel cable wrapped around, this has been engulfed by the tree and caused leader to die. |
| T14 | Common holly | <i>Ilex aquifolium</i> | Semi-mature | 10.3 | 2 | 270 | 3.2 | 2.3 | 2 | 2.1 | 1.7 | 2.5 | 1 | 2 | 4 | Fair | Fair | B2 | Slightly suppressed form. |
| T15 | New Zealand privet | <i>Griselinia littoralis</i> | Semi-mature | 8.5 | 3 | 220 | 2.6 | 4 | 2.5 | 2 | 2.4 | 0 | 0.25 | 1.5 | 1 | Fair | Fair | C2 | Dense lower crown restricting access and impeding inspection; some wounding and decay evident on stem between base and 1.5m height. |
| G1 | Mixed broadleaf | n/a | Early-mature | 4.5 | 6 | 100 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Fair | Fair | B2 | Mixed ornamental species, some privet, one robinia and one small self-set poplar along boundary wall. |
| G2 | London plane | <i>Platanus x hispanica</i> | Mature | 21 | 4 | 350 | - | 9.1 | 5 | 4 | 4 | 5.5 | 5 | 5 | 5 | Ivy | Fair | B1,2 | Row of trees in neighbouring property, hard up against boundary wall; due to location some measurements have been estimated; ivy growing up stairs impeding inspection. |

3. Proposed Development

3.1 Outline Development Proposal

The development will see the construction of a new 'drive in, drive out' driveway making use of the existing entrance but requiring the creation of a new entrance/exit point. This will require a section of existing landscaping to be removed. The entire tarmac surface will be reinstated with granite setts, including three parking spaces along the north west boundary.

3.2 Access

The property will continue to use the existing vehicular access from Harley Road. This entrance and existing surfaced driveway will be used for both construction and demolition, in addition to eventual operational use.

3.3 Demolition

A section of the existing wall and fence at the north end of the front of the property will be demolished to create the new entrance/exit for the driveway. The existing tarmac surface will be removed to enable the new surfacing to be installed.

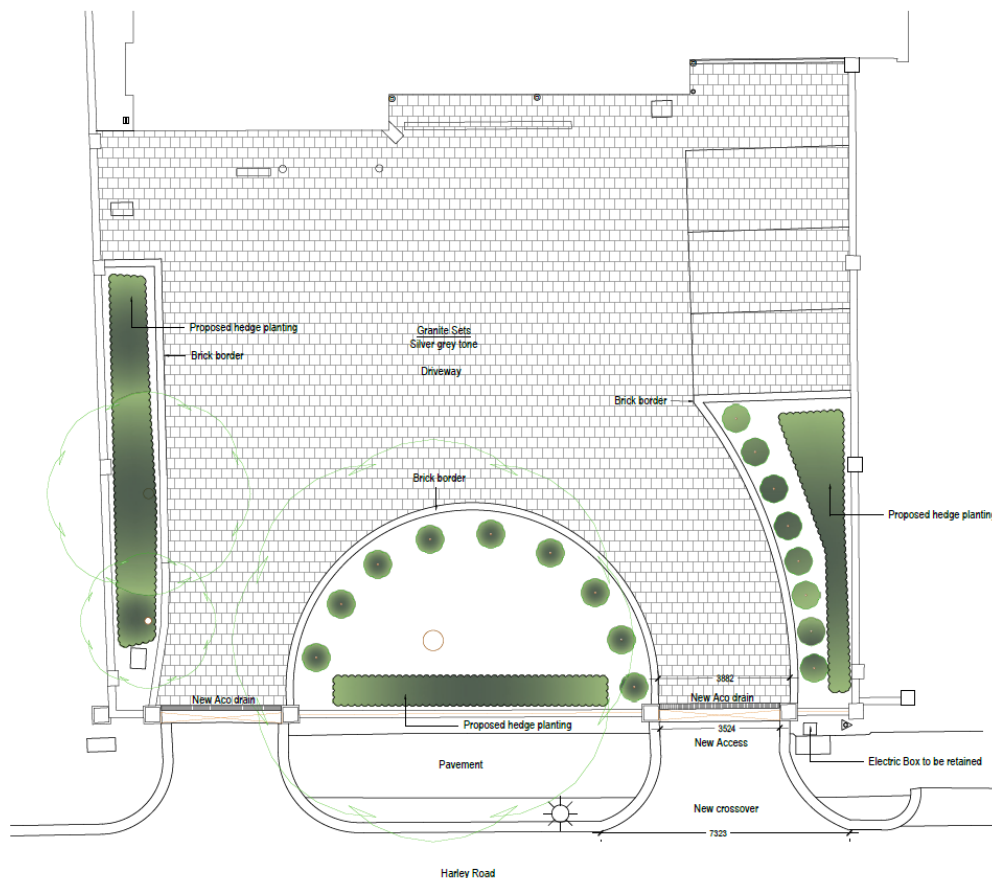


Fig 1 1163-211A_Proposed Driveway and Entrance Plans

4. Arboricultural Impact Assessment

4.1 Introduction

The following chapter assesses the existing condition, quality and location of trees in context with the development proposal. It identifies where trees will need to be removed and how this will be mitigated, and where retained trees have the potential to be affected by the development and how these are to be protected.

4.2 Trees to be removed

The table below includes a list of all the trees and groups that are to be removed as part of the development project, and the reason for their removal. The table should be read in conjunction with drawing *MH7269-003 Tree Protection Plan*.

| No. | Species | BS Cat | Location | Reason for removal |
|-----|----------------|--------|--|---|
| T2 | Boxelder maple | U | South side of existing entrance way in garden bed | Tree to be removed due to its poor condition. |
| T4 | Palm | B2 | Northern side of grassy area at front of driveway, near to neighbouring boundary wall. | Trees to be removed to facilitate proposed new vehicular site entrance. |
| T5 | Cherry laurel | C2 | | |
| T6 | Prunus spp. | U | | |

4.3 Evaluation of impact of tree losses

T2

Tree recommended for removal due to its poor condition.

There is no particular requirement for landscape mitigation, although its loss will be mitigated by proposed hedgerow planting in this location.

T4, T5 & T6

The proposed route of the new site access will require removal of T6 and T4 due to their location. It would be possible to retain T5 if needed, but it is recommended for removal to enable an improved landscaping scheme to be planted. The loss of these trees will have a minor negative impact on the local landscape and conservation area due to a reduction in ornamental 'garden' vegetation forming part of the streetscene along Harley Road.

Removal of these trees is considered acceptable but with a requirement for landscape mitigation.

4.4 Mitigation of tree losses

It is proposed that a new area of landscaping is included in the scheme to replace trees and shrubs lost along the north-west site boundary. The planting can be ornamental in nature, but should look to incorporate smaller trees and/or larger shrubs that will contribute to the landscape of Harley Road.

4.5 Trees to be retained

The following table identifies the trees that are to be retained as part of the development and suggests whether they are at risk from activities related to demolition, construction, or eventual operational use of the site.

| No. | Species | BS Cat | Location | Demolition, Construction, and/or Operation | Description |
|------------|-----------------------|-------------|---|--|--|
| T1 | Common horse chestnut | B1,2 | Centre of grass area at front drive | Demolition & Construction | The proposed development will see the loss of 11.8 m ² of unsurfaced RPA to the new site access, and a gain of 7 m ² reinstated unsurfaced RPA, currently forming part of the tarmac drive. Root Protection Area (RPA) and above ground parts of tree are at risk from movement of plant and machinery undertaking construction and demolition operations, and due to the resurfacing of the drive. |
| T3 | Boxelder maple | C2 | South-east boundary within a narrow planting bed. | Demolition & Construction | Unsurfaced RPA extends beneath existing tarmac surface; risk due to the resurfacing of the drive. |
| T7 | Hybrid black poplar | B2 | Rear garden | None | No risk to trees. |
| T8 | Cherry laurel | C2 | | | |
| T9 | Fig | B3 | | | |
| T10 | Common lime | B2 | | | |
| T11 | Sycamore | B2 | | | |
| T12 | Common hawthorn | U | | | |
| T13 | Field maple | C2 | | | |
| T14 | Common holly | B2 | | | |
| T15 | New Zealand Privet | C2 | | | |
| G1 | Mixed broadleaf | B2 | | | |
| G2 | London plane | B1,2 | | | |

4.6 Protection of Retained Trees

The following paragraphs detail how the trees and tree groups identified as a concern above will be protected at the critical stages.

T1 Horse chestnut

The layout of the new site access will incur into the area of unsurfaced RPA by 11.8 m², which equates to a 22% loss. Surface construction in this area will need to follow a No-Dig Construction methodology with no allowance for excavation into soils to ensure that roots are retained undamaged. Further detail of this methodology is included in the Arboricultural Method Statement.

To help mitigate for this loss of unsurfaced RPA, a 7 m² area of existing surfaced drive will be reclaimed to form part of the open ground around the tree. This will reduce the net overall loss of unsurfaced RPA to 4.8 m², or 9%. This is acceptable under paragraph 7.4.2.3 of BS5837:2012 which states *“New permanent hard surfacing should not exceed 20% of any existing unsurfaced ground within the RPA”*.

The entire area of unsurfaced RPA will be established as a Construction Exclusion Zone for the duration of the works. Details of temporary protective fencing is set out in both the Arboricultural Method Statement and Tree Protection Plan.

The remaining areas of surfaced RPA associated with T1 are at risk due to the construction of the new granite sett surface. It is important that the removal of existing tarmac surfacing does not penetrate beneath the existing sub-base into the soils which could cause damage to roots, but instead uses the existing sub-base. Where not possible, it will be necessary to follow a no-dig construction methodology and potentially to incorporate a geocell sub-base, as described above.

T3 Boxelder maple

The area of surfaced RPA to the north west of T3 is at risk due to the construction of the new granite sett surface. It is important that the removal of existing tarmac surfacing does not penetrate beneath the existing sub-base into the soils which could cause damage to roots, but instead uses the existing sub-base. Where not possible, it will be necessary to follow a no-dig construction methodology and potentially to incorporate a geocell sub-base, as described above.

4.7 Preparatory tree works

No preparatory tree works other than the removal of trees identified in section 4.2 are required to facilitate the development.

4.8 Conclusions

The construction of a new vehicular access into the site will require the removal of three trees and incursion into the unsurfaced RPA of T1. It will be possible to mitigate these impacts through following a no-dig construction methodology, reclaiming a new area of unsurfaced RPA in the vicinity of T1, establishing a Construction Exclusion Zone using tree protection fencing, and including a scheme of landscape planting to mitigate for tree losses.

Re-surfacing the existing tarmac surfaced driveway has the potential to impact on the RPAs of T1 and T3. This can be avoided by ensuring that breaking out the surface does not penetrate into the soils beneath the existing surface, and that installation of granite sett surfacing uses the existing sub-base.

5. Arboricultural Method Statement

This chapter is supported by drawing *MH7269-003 Tree Protection Plan* included in Appendix E of this report.

5.1 Roles and Responsibilities

It is the responsibility of all contractors and sub-contractors involved in the project to be aware of this method statement and to use it when setting out the site and carrying out any operations in the vicinity of retained trees.

Prior to the commencement of works, all site personnel should be briefed by the Site Manager or appointed Arboricultural Consultant on the importance of the retained trees and the significance, rules and restrictions around protective measures implemented. All minutes from these 'Toolbox Talks' should be retained by the Site Manager for future reference.

5.2 Timing and Order of Operations

Operations on the development site related to trees should commence in the following order to ensure that retained trees receive an appropriate level of protection from potentially harmful activities. Monitoring will take place throughout these stages in accordance with paragraph 5.9 below.

1. Removal of trees (as set out in paragraph 4.2);
2. Breaking out by hand an area of existing surfacing to create a larger unsurfaced RPA in the vicinity of T1;
3. Establishment of Construction Exclusion Zones with fencing (in accordance with the specific directions in the *Tree Protection Plan*);
4. Establishment of working site including storage of plant and materials outside of Construction Exclusion Zones;
5. Full demolition and construction commences;
6. Undertaking no-dig construction of hard surfacing.
7. Construction completed; removal of all plant and materials from site;
8. Removal of tree protection fencing;
9. Landscape mitigation.

5.3 Tree Works

The table in paragraph 4.2 lists all trees to be felled/removed prior to the commencement of construction. All tree works should be carried out by competent Tree Surgeons in accordance with BS3998:2010 Tree Work – Recommendations. All works must take place

outside of bird nesting season and in accordance with any specific ecological recommendations included in the report/s that accompany this plan.

5.4 Setting out Barriers and Construction Exclusion Zone

Setting out of tree protection fencing should take place prior to the commencement of any demolition or construction activities, including the storage of materials on site. The setting out should take place under the guidance of the project Arboricultural Consultant.

Tree Protection Barriers should be supplied and erected in accordance with chapter 6.2.2 of BS5837:2012. This states that the default specification for protective fencing should comprise a scaffold framework with vertical tubes at maximum 3m intervals secured firmly into the ground and fixed with weldmesh panels, as set out on figure 2 below. An alternative specification which would likely be acceptable would be a free standing scaffold support framework (I.e. Heras fencing) in accordance with figure 3 below.

Figure 2 Default specification for protective barrier

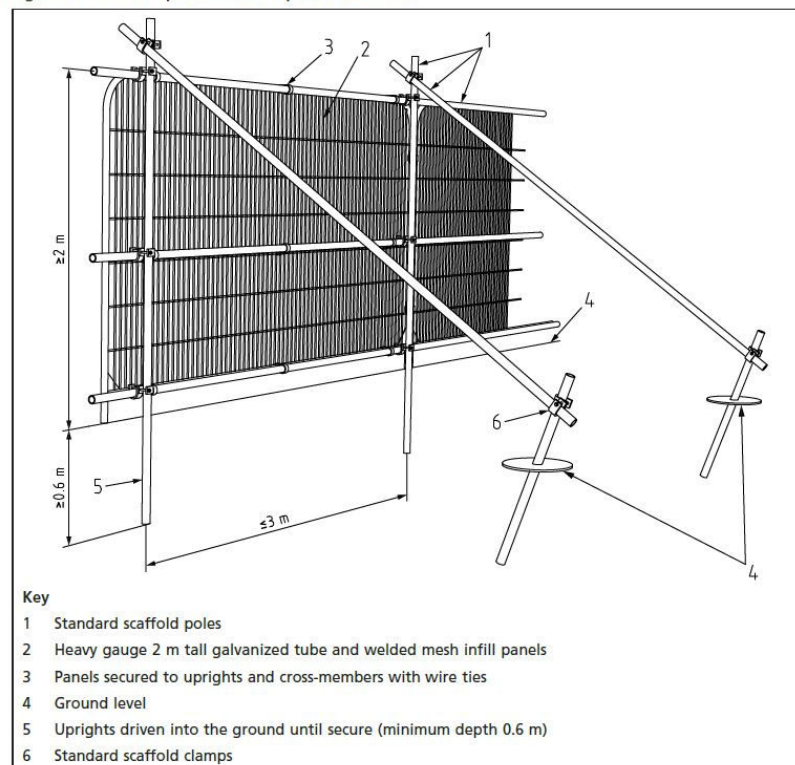
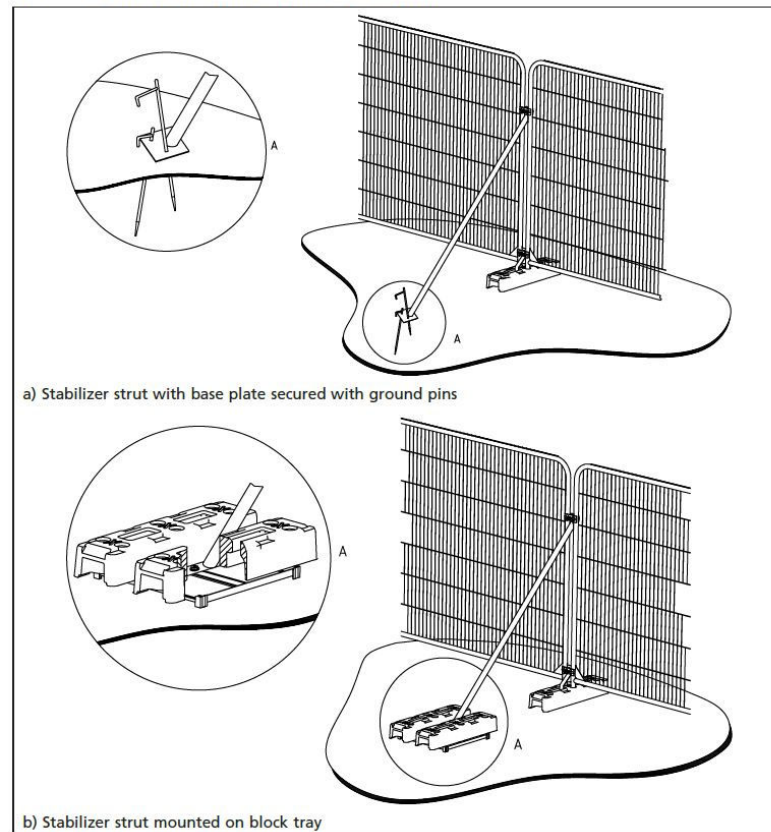


Figure 3 Examples of above-ground stabilizing systems



The barriers should be fitted with all-weather notices containing the words “Construction Exclusion Zone – No Access” and should remain intact for the entirety of the development project. It is not anticipated that there will be any need to access the Construction Exclusion Zones during demolition or construction phases. If access is required for any reason then this should be discussed with the Arboricultural Consultant.

5.5 Demolition & Construction

The development will require breaking out of existing tarmac surfacing. All demolition and construction activities must take place only once all protective barriers have been erected - this is to ensure that retained trees on site are not adversely affected due to lack of clear restrictions to movement and storage. The exception to this will be the breaking out by hand of a 7m² section of surfacing in the vicinity of T1, prior to the installation of tree protection fencing.

All plant and vehicles engaged in demolition works must use existing hard surfacing for all access, storage and operations where possible. Vehicular access to grass and landscaped areas should be minimised and incorporate ground protection where compaction and rutting is likely.

Plant operators must be made fully aware of the protection that surrounds retained trees and take due care with their machinery so as not to cause any damage to their crowns or

stems. The line of protective fencing should be seen to extend vertically so that no plant accesses the aerial regions of the Construction Exclusion Zone.

5.6 No-Dig Construction

The development includes for a re-aligned drive way and new vehicular access that will encroach into the RPA of retained tree T1. It will not be possible to excavate into the soils in these areas so the surfacing will need to be built proud of the surface following a no-dig methodology.

The no-dig methodology will not allow for any excavation into the soil other than the careful removal of vegetation using a hand lawnmower and/or strimmer. It will not be possible to carry out any rolling/compaction of the surface so instead any notable changes in levels will need to be filled using MOT Type 1 aggregate. The sub base of the surfacing should be set out with Terram geotextile membrane to aid with weed suppression. The surface should then be created using an appropriate three-dimensional cellular confinement system, such as Terram Geocell 25/15, to help spread the load of vehicular use. This will be backfilled with MOT Type 1 aggregate or equivalent angular reduced-fines sub base material, top dressed with a permeable surface such as block pavers with infiltration spaces.

Wherever possible, construction of the new surfacing should utilise the existing sub-base beneath the tarmac surfacing.

5.7 Tree Roots

If during any excavation works on site the tree roots of a retained tree are exposed, these should be immediately wrapped or covered in hessian to prevent desiccation and to protect them from temperature changes. The Arboricultural Consultant should be contacted for advice. Roots smaller than 25mm diameter may be pruned back using a clean, sharp cutting tool. Prior to backfilling, retained roots should be unwrapped and surrounded with top soil or sharp builders' sand.

5.8 Prohibited Activities

No plant, machinery, or materials should be stored within the Construction Exclusion Zones as described above and marked out on site. This also applies to any ancillary facilities associated with the construction such as welfare units.

Care must be taken when planning site operations to ensure that wide or tall loads, plant with booms, jibs and counterweights can operate without coming into contact with any of the retained trees. Where possible, plant and machinery with zero tail swing should be used when in close proximity to retained trees.

Any transit or transverse of plant in close proximity to the retained trees should be conducted under the supervision of a banksman to ensure that adequate clearance from the trees is maintained at all times.

The project Arboricultural Consultant should be consulted prior to any otherwise not approved operations within the Construction Exclusion Zones.

5.9 Monitoring

It is a requirement of BS5837:2012 that activities related to or in the vicinity of retained trees are monitored by the project Arboricultural Consultant. It is recommended that the following monitoring visitations take place:

1. Felling of trees;
2. Breaking out existing surfacing to extend unsurfaced RPA of T1;
3. Setting out and installation of Tree Protection Fencing and Construction Exclusion Zones;
4. No-dig construction methodology for the drive way in vicinity of T1, and removal of tarmac surface in the vicinity of T1 and T3;
5. Removal of tree protection fencing;
6. Post-development monitoring visit (see 5.10 below).

It is recommended that on each monitoring visit a Works Recording Form is completed by the project Arboricultural Consultant to enable an auditable trail of visits, findings and recommendations. A form template is included in Appendix F of this report.

5.10 Incident Procedure

In the instance of any problems discovered on site or incidences affecting and/or causing harm to retained trees, the project Arboricultural Consultant should be consulted at the earliest opportunity to provide advice about rectifying issues. Any such occurrences should be recorded in an auditable incident register.

5.11 Post-Development

It is recommended that following completion of the development, a monitoring visit is carried out by the project Arboricultural Consultant in order to carry out a thorough assessment of the retained trees and any remedial works that may be required as a result of changes to the site and the potential indirect effects of construction.

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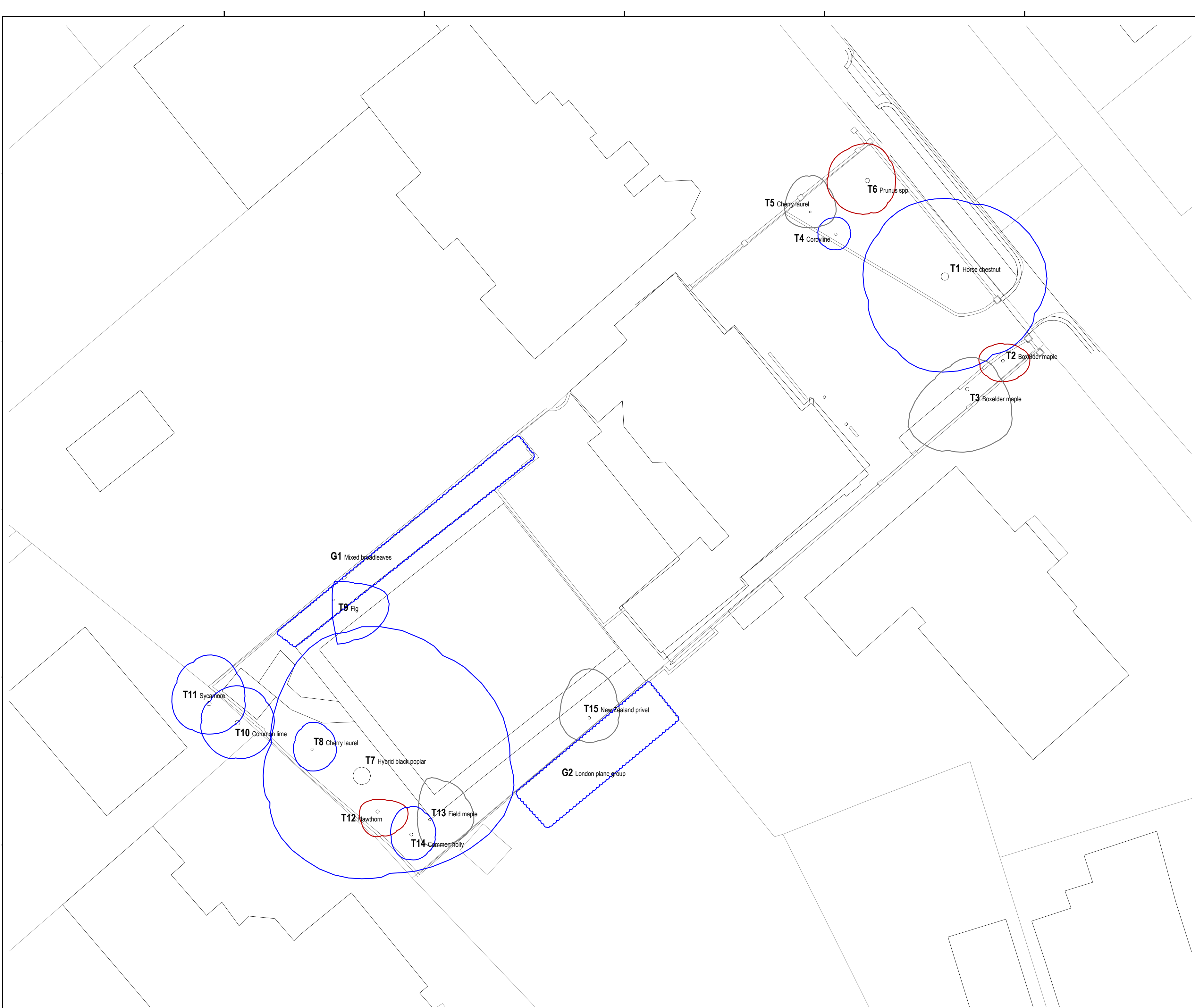
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8th November 2019

Appendix A

TREE SCHEDULE TERMS

| | | | |
|----------------------|--|-------------|---|
| TREE NO. | Code used to identify each tree on the Tree Survey Plan | | |
| SPECIES | The common name for each tree. | | |
| HEIGHT | The height of the tree in metres. | | |
| AGE | The age of the tree recorded as follows: | | |
| | Y | Young | Recently planted or establishing tree; |
| | SM | Semi-mature | Established tree which has yet to reach its full growing height; |
| | M | Mature | A tree which has reached its likely maximum size; |
| | OM | Over-mature | A mature tree which has ceased to grow or is in decline; |
| | V | Veteran | An over-mature tree of high value due to age, size and other factors. |
| STEMS | Number of stems present (i.e. is the tree a multi-stemmed specimen). | | |
| STEM DIAMETER | Diameter of tree stem in millimetres, recorded at 1.5m above ground level; this figure is used to calculate the RPA. | | |
| RPA RADIUS | The radius of the tree's Root Protection Area in metres. | | |
| CROWN SPREAD | The extent of the tree's crown to the north, south, east and west, in metres. | | |
| CROWN HEIGHT | The height of the crown as measured from the ground to the north, south, east and west, in metres. | | |
| CONDITION | A general assessment of the tree's condition as either good, fair, poor or dead. | | |
| BS CAT | The BS 5837:2012 Category for the tree, in accordance with the table in paragraph 2.3 of this report and Appendix D. | | |
| GENERAL OBSERVATIONS | Any significant defects or other observations recorded as part of the survey. | | |



KEY

Tree categories based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations

Category A Tree

Trees of High Quality with an estimated remaining life expectancy of at least 40 years.

Category B Tree

Trees of Moderate Quality with an estimated remaining life expectancy of at least 20 years.

Category C Tree

Trees of Low Quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.

Category U Tree

Trees in such condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.

Client

Lysander Associates (Mr Scott Wells)

Project

28 Harley Road, London

Title

BS5837:2012 Tree Survey

Drawn

LA

Checked

JC

Date

23.10.19

Drawing No.

MH7269-001

Revision

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KEY

Tree categories based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations

Category A Tree

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Category U Tree

Trees in such condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.

Root Protection Area

Hatched area shows current unsurfaced RPA

Client

Lysander Associates (Mr Scott Wells)

Project

28 Harley Road, London

Title

BS5837:2012 Tree Constraints Plan

Drawn

LA

Checked

JC

Date

23.10.19

Drawing No.

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Table 1 Cascade chart for tree quality assessment

| Category and definition | Criteria (including subcategories where appropriate) | | | Identification on plan |
|---|--|---|---|------------------------|
| Trees unsuitable for retention (see Note) | | | | |
| Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years | <ul style="list-style-type: none">Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)Trees that are dead or are showing signs of significant, immediate, and irreversible overall declineTrees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality <p><i>NOTE</i> Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</p> | | | See Table 2 |
| | 1 Mainly arboricultural qualities | 2 Mainly landscape qualities | 3 Mainly cultural values, including conservation | |
| Trees to be considered for retention | | | | |
| Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years | Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue) | Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features | Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture) | See Table 2 |
| Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years | Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation | Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality | Trees with material conservation or other cultural value | See Table 2 |
| Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm | Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories | Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits | Trees with no material conservation or other cultural value | See Table 2 |



KEY

Tree categories based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations

Category A Tree

Trees of High Quality with an estimated remaining life expectancy of at least 40 years.

Category B Tree

Trees of Moderate Quality with an estimated remaining life expectancy of at least 20 years.

Category C Tree

Trees of Low Quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.

Category U Tree

Trees in such condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.

Root Protection Area

Hatched area shows current unsurfaced RPA

Tree to be removed

Tree Protection Fencing

Reclaimed unsurfaced RPA

No-dig construction within RPA

Client

Lysander Associates (Mr Scott Wells)

Project

28 Harley Road, London

Title

BS5837:2012 Tree Protection Plan

Drawn

LA

Checked

JC

Date

23.10.19

Drawing No.

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| | | | |
|---|--|----------|--|
| Site: | | Date: | |
| Client: | | Time: | |
| Inspector: | | Weather: | |
| Brief description of location and reason for visit: | | | |

| GENERAL OBSERVATIONS | Yes | No | COMMENTS |
|---|-----|----|----------|
| Tree Protection Fencing installed and accurate? | | | |
| Ground Protection installed and accurate? | | | |
| Construction Exclusion Zone (CEZ) signs in place? | | | |
| Any evidence of misuse and unauthorised access into CEZs? | | | |
| Any new visible damage to retained trees or significant decline in condition? | | | |
| Any scheduled works taking place within the CEZs? | | | |
| If yes, have these been approved in writing by the LPA? | | | |

| RECOMMENDATIONS AND NOTES | | | |
|--|--|-----------------------|--|
| Recommendations for follow up actions: | | | |
| Priority: | | Next Inspection Date: | |

| | | | |
|---------------|------------|-------------|-------|
| Completed by: | Signature: | Print name: | Date: |
| Checked by: | Signature: | Print name: | Date: |