



# Park Avenue, Mossley Hill Arboricultural Impact Assessment

Report Ref: TEP.4612.001  
December 2014

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**PARK AVENUE, MOSSLEY HILL  
ARBORICULTURAL IMPACT ASSESSMENT**

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## 1.0 INTRODUCTION

- 1.1 TEP has been commissioned by Redrow Homes to conduct an arboricultural survey of land off Park Avenue in Mossley Hill, Liverpool. This report details the arboricultural impact of developing the site for residential use, subsequent mitigation recommendations and protective measures.
- 1.2 The survey was carried out in June 2014 by means of inspection from ground level by a qualified Arboricultural Consultant. Trees were assessed in accordance with *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations*.
- 1.3 Under the British Standard the assessment of trees is made objectively. The categorisation method identifies the quality and value of the existing tree stock.
- 1.4 A topographical survey was used to record the position of trees and vegetation (Ref: SDL 2009/1, Survey & Design Limited). For the purposes of this report it is assumed that the detail on the drawing is accurate.
- 1.5 A total of 110 individual trees (T1-T110) were surveyed and mapped (refer to Drawing 1). All arboricultural information recorded during the survey is presented at Appendix 1.
- 1.6 The nature of the soils on site was not assessed during the survey.
- 1.7 This report provides the results of the survey and includes the following:
  - A schedule of all trees located on, or within influencing distance of the proposed development site (Appendix 1);
  - An assessment based on *BS 5837:2012*, of trees in terms of their potential value within any future development. On the basis of this assessment trees have been categorised into one of four categories: A, B, C or U (Appendices 1 & 2);
  - An assessment, based on *BS 5837:2012*, of the requirement for protection of trees during the construction phase (Section 6);
  - Advice on removal, retention and management of trees based on their current condition and interaction within the proposed development (Sections 5 & 7);
  - A Tree Constraints Plan detailing tree quality categories, canopy spreads and Root Protection Areas (**RPA**) for all trees surveyed (Drawing 1);
  - A Tree Removal Plan detailing the development proposals and trees to be retained and removed (Drawing 2); and
  - An indicative assessment of the shade cast by retained trees (Drawing 3).

## 2.0 THE SITE AND SURROUNDINGS

- 2.1 The site is situated in the Sefton district within the Liverpool City Council Ward of St Michaels. The survey area comprises two areas of open grassland divided by Park Avenue. It is bounded by the A5058 Queens Drive to the north; Aigburth Vale to the east; Carnatic Road to the south; and Mossley Hill Drive to the west.
- 2.2 Mature trees are present along all sides of both land parcels and are complimented by comparative tree planting on the opposite side of all four external boundary roads. The surrounding area has higher than average tree cover characterised by single species roadside planting, mixed mature trees within private gardens and a network of recreational open space containing a high proportion of trees, much of which dates back to the Victorian era.
- 2.3 Sefton Park lies to the immediate west of the site. The Park is designated by English Heritage at Grade I in the Register of Historic Parks and Gardens but this does not include the application site. Mossley Hill Hospital abuts Aigburth Vale to the north-east of the site.
- 2.4 Public access to both land parcels is currently available on all sides and the site is regarded and used by many as an extension of Sefton Park. The sandstone foundation blocks of former railings are present along the south-western edge of the site adjacent to Mossley Hill Drive.

**Photograph 1: View north across southern land parcel towards Park Avenue**



- 2.5 Weather conditions during the survey were fine and sunny.
- 2.6 The trees were surveyed insofar as was possible from accessible areas of the site and from the public highways on all sides.

## **Development Proposals**

- 2.7 The development will comprise 34 new detached houses with associated garden space and boundary treatments. The properties will be set behind a retained grassland verge containing the existing mature trees around the periphery of the application site.
- 2.8 Property access will be via a combination of private driveways connecting directly to Mossley Hill Drive and Park Avenue; and shared access off Aigburth Vale and Park Avenue.
- 2.9 Houses will be two and three storeys high and of a traditional brick style using red and buff coloured brick to reflect the style of Victorian Villas around the edge of Sefton Park. Roofs will be slate-grey tiles.
- 2.10 Detail of the proposals is shown on Drawing 2 and is based on the proposed site plan (Ref: GA Sefton Park AG Rev S) supplied by CalderPeel.

## **3.0 STATUTORY PROTECTION AND GUIDANCE**

### **National Planning Policy Framework (NPPF)**

- 3.1 The NPPF assumes protection of all ancient woodland and veteran trees unless it can be clearly demonstrated that the need for, or benefits of, development outweigh the loss. In this respect ancient woodland is defined as an area which has been wooded continuously since at least 1600 AD and a veteran as a tree of exceptional value for wildlife, in the landscape, or culturally because of its great age, size or condition.
- 3.2 On this site there are no ancient woodland or veteran trees.

### **Tree Preservation Orders & Conservation Area Designations**

- 3.3 Local authorities reserve the right to create Tree Preservation Orders (TPO) to protect the amenity value conferred to a location by a tree or group of trees. Where a TPO is in force, lopping, topping, felling, uprooting or wilful damage caused to a tree is prohibited and such actions may be prosecuted and incur an unlimited fine. Works to TPO protected trees must only be undertaken with the written consent of the local authority.
- 3.4 Liverpool City Council has confirmed that a Tree Preservation is in effect covering all middle-aged and mature trees on the site. The Order (Ref: 251 Land bounded by Queens Drive, Mossley Hill Drive, Aigburth Vale and Carnatic Road, Liverpool) was confirmed in February 1992 and includes all trees present at the that time; there are only two trees under 22 years of age on the site which are consequently not covered by the TPO (T38 and T40).
- 3.5 The site also lies within Sefton Park Conservation Area. Aigburth Vale to the east of the site forms the boundary between Sefton Conservation Area and Mossley Hill Conservation Area.

### **Protected Species – Bats**

- 3.6 Mature trees often contain cavities, crevices and hollows which are a potential habitat for roosting bats. Bats are afforded protection under Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended), as well as under Schedule 2 of the *Conservation of Species and Habitats Regulations 2010*, and as such causing damage to a bat roost constitutes an offence.
- 3.7 A preliminary ground level appraisal of the wildlife habitat value of each tree was undertaken as part of the arboricultural and ecological survey (TEP Ref: 4612.004) and a number of trees identified as being particularly suitable to support roosting bats were subject to further aerial inspections and emergence surveys. For full details of the results of these surveys refer to Ecological Bat Survey Report (TEP Ref: 4612.007).
- 3.8 Should the presence of a bat roost be suspected whilst undertaking works on any other trees on site, operations must be halted until a licensed bat handler or ecologist can provide advice.

### **Protected Species - Birds**

- 3.9 Trees are a potential habitat for nesting birds, which (as well as their nests and eggs) are protected under the *Wildlife and Countryside Act 1981* (as amended). This makes it an offence to intentionally or recklessly, damage or destroy an active birds nest or any part thereof.
- 3.10 Due to the suitability of the trees within the survey boundary for nesting birds, all tree work should ideally be undertaken outside the bird nesting season (British bird nesting season: March to August inclusive).
- 3.11 If this is not possible then a detailed inspection of each tree should be undertaken by a qualified ecologist immediately prior to the arboricultural works. Should an active nest be found (being built, containing eggs or chicks) then any work likely to affect the nest must be halted until the nest becomes inactive.

### **National House Building Council**

- 3.12 This report has been written in accordance with, and to satisfy the requirement of BS 5837:2012.
- 3.13 The nature of the soils on site was not assessed during the survey. The possibility of soil movement due to tree root activity cannot be discounted.
- 3.14 Any discrepancies in tree location or missing trees will require further discussion with a qualified Arboricultural Consultant.



## 4.0 TREE POPULATION

- 4.1 110 individual trees (T1-T110) were recorded within influencing distance of the site. A schedule in terms of tree species, condition, age, management recommendations and *BS 5837:2012* quality categories is provided at Appendix 1.
- 4.2 The tree stock on the site is all of planted origin and was established following the creation of Sefton Park in the late 19<sup>th</sup> century. It has been influenced by the construction of Queens Drive in the early 20<sup>th</sup> century and by the more recent removal and replacement of trees alongside Park Avenue. The oldest trees on the site are around 120 years of age and the youngest are approximately 10 years old.
- 4.3 A row of London plane trees along the south-western and southern periphery of the site (T1 to T24) are likely to be part of the original Victorian planting scheme established following the creation of Sefton Park. It is possible that trees along the southern boundary were planted slightly later than those to the west but they now form a continuous belt of trees of similar overall stature. They are characteristic of planting within and surrounding Sefton Park and have been estimated using historic maps to be around 120 years of age. All have undergone very little recent management, allowing them to develop broad, open crowns that now form a near closed canopy with trees on the western side of Mossley Hill Road. It is likely that these trees have been reduced in size in the past (indicated by a change in branch form and appearance at around 5m in height) but despite this they are in very good structural and physiological condition.

**Photograph 2: View south along the internal site boundary beneath trees T5 to T14**



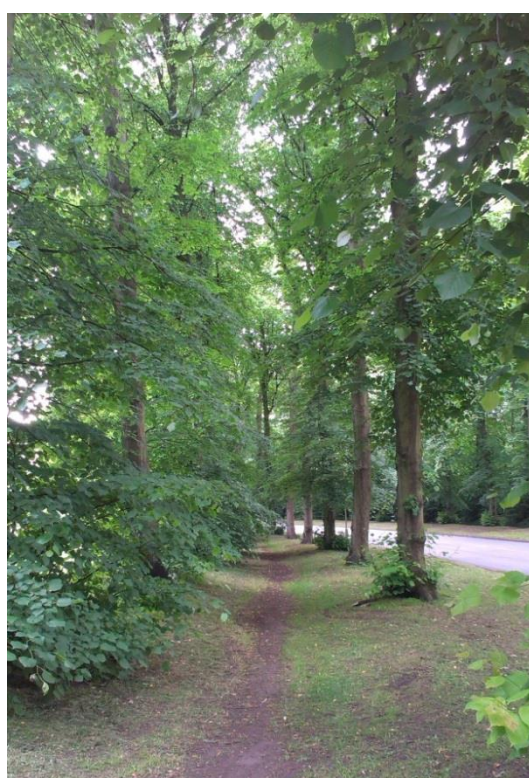


- 4.4 At the south-eastern corner of the avenue, planting changes to a mixture of horse chestnut and red horse chestnut lining Aigburth Vale (T25 to T37 and T57 to T69). They are thought to be around 80 to 100 years of age and are complimented with similar trees on the opposite side of the road. The majority have typical canopy structure formed by numerous large, upwardly sweeping branches supported by a short clean stem.
- 4.5 The red horse chestnut are typically smaller in stature than their more common counterparts; have a more regular form; and are prone to canker development as they mature. In the majority of cases this is purely aesthetic but in severe conditions it can lead to branch failure or stem girdling. On this site, there are several trees with canker development (T57, T61, T65, T67 and T698) but none were identified as at immediate risk of failure or terminal decline.

**Photograph 3: Example of red horse chestnut stem canker**



**Photograph 4: Unmetalled footpath along northern site boundary**



- 4.6 The construction of Queens Drive around 100 years ago involved a significant alteration to the established treescape. Historic maps indicate avenue planting along Mossley Hill Drive (of which T1 to T14 form a part) was punctured by the new carriageway at the junction of Mossley Hill Drive and Park Avenue. The road reduced the size of the Meadows to its current size and included the planting of a double row of common and silver lime trees on either side of the road (T71 to T110). The trees have developed at their original planting density to become an imposing feature, with the tallest trees attaining a height of 26m. All are in good condition and have received very little management. A small amount of crown lifting and the removal of basal shoots has been undertaken to provide clearance to an unmetalled footpath that runs between the full length of the double avenue.



**Photograph 5: View south-west along Queens Drive at trees T71 to T90**



- 4.7 Trees along the internal road are a mixture of lime species of varying age. Three mature small-leaved lime (T39, T41 and T56) suggest an avenue of similar species would have originally been present along the length of Park Avenue. 14 Caucasian lime of around 25 years of age (T43 to T54) have been planted to re-establish the lime avenue. Two common lime have been planted more recently as pre-emptive replacements for two of the three remaining mature limes.

**Photograph 6: View east along Park Avenue**



- 4.8 Tree and group locations, their quality categories and canopy spreads are shown on Drawing 1.

## Tree Quality Categorisation

- 4.9 Under *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations* trees and groups are objectively assigned a quality category designed to quantify their value within any future development. Table 1 presents a summary of the categories presented in the British Standard. The full table has been reproduced at Appendix 2.

**Table 1: Summary of BS 5837:2012 tree quality categorisation criteria**

<b>Category A</b>	Trees of high value including those that are particularly good examples of their species and/or those that have visual importance or significant conservation or other value
<b>Category B</b>	Trees of moderate value including those that do not qualify as Category A due to impaired condition and/or those that collectively have higher value than they would as individuals; also trees with material conservation or other value
<b>Category C</b>	Trees of low value including those with very limited merit or impaired condition; trees offering transient or temporary landscape benefits
<b>Category U</b>	Trees with irremediable defects and anticipated early loss due to collapse; dead trees or those in immediate decline and those with infection pathogens that threaten other trees

- 4.10 Table 2 provides a summary of the results of the categorisation process. Categories of individual trees are provided at Appendix 1 and illustrated on Drawing 1.

**Table 2: BS 5837:2012 Quality Categories for surveyed trees and groups**

<b>Category A</b>	<b>Category B</b>	<b>Category C</b>	<b>Category U</b>
86	21	3	0

- 4.11 Almost 80 percent of the tree population is of high value. This is primarily due to the age and heritage value of the vast majority of the trees combined with species longevity and a lack of significant defects. High value trees typically represent those that are very difficult to mitigate for through replacement planting as such values are achieved over an extended time period (on this site in excess of 70 years).
- 4.12 Younger, developing trees and those in impaired condition or with reduced longevity, attained moderate value. In most cases these are middle-aged trees with the potential to develop into high value trees as they mature. Mitigation for their loss may only be achievable in part by new tree planting or by the planting an appropriate number of very good quality trees.
- 4.13 Recently planted trees and those showing irremediable defects such as to significantly reduce their longevity or aesthetic value attained low value. They can often be replaced on a like for like basis or with trees of better quality and with greater long-term prospects than those being removed.

## 5.0 IMPACTS OF THE PROPOSED DEVELOPMENT

- 5.1 Table 3 lists the number and quality of trees that will require removal in order to facilitate the development proposals and those that can be retained. This is the result of an assessment based on the proposed site plan and discussions with the client regarding their application strategy.

**Table 3: Arboricultural implications of the proposed development**

	Tree Quality Category			
	A	B	C	U
<b>Trees that can be retained</b>	T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22, T23, T24, T26, T27, T28, T29, T30, T32, T33, T34, T35, T36, T37, T57, T59, T60, T63, T64, T68, T70, T71, T72, T73, T74, T75, T76, T77, T78, T79, T80, T81, T82, T83, T84, T85, T86, T87, T88, T89, T90, T92, T93, T94, T95, T96, T97, T98, T99, T100, T101, T102, T103, T104, T106, T107, T108, T109, T110	T47, T67, T69	-	-
<b>Total</b>	<b>80</b>	<b>3</b>	<b>0</b>	<b>0</b>
<b>Trees that require removal</b>	T31, T39, T41, T56, T62, T66	T25, T42, T43, T44, T45, T46, T48, T49, T50, T51, T52, T53, T54, T55, T61, T65, T91, T105	T38, T40, T58	-
<b>Total</b>	<b>6</b>	<b>18</b>	<b>3</b>	<b>0</b>

See Appendix 1, Arboricultural Data Sheets for subcategories

- 5.2 27 individual trees must be removed to facilitate the development proposals. The majority of these are moderate value; 6 are high value and 3 are low value. These trees will be removed to create access points into the new development and to provide adequate stand-off from final structures.
- 5.3 The Design and Access Statement produced by Calderpeel provides the rationale behind the layout with connections onto perimeter roads (as opposed to internal access off Park Avenue). Taking this premise forward, the location and uniformity of existing trees makes the creation of new access points impossible without some degree of tree loss.

- 5.4 The function of the overall tree stock as an amenity feature along the main public roads of Mossley Hill Drive, Queens Avenue and Aigburth Vale will not be significantly altered by the development due to the retention of over 90 percent of existing trees. A requirement to prune a large number, in particular those in the southern half of the site, will however change the existing character of the avenue planting in the short-term.
- 5.5 The design has sought to minimise tree loss by utilising shared access off Aigburth Vale and by the positioning of junctions equidistant between retained stems. This approach limits losses to 5 trees for access off Aigburth Vale. Surfacing in these areas must be capable of withstanding use by large vehicles and therefore the use of unconventional foundations or above ground construction to avoid tree loss is not a viable option; they must also tie-in with existing road levels.
- 5.6 Tree removal is concentrated along Park Avenue and to a lesser extent along Aigburth Vale. The combined canopy cover of trees to be removed is approximately 0.2ha, although this includes instances where these overlap.
- 5.7 The greatest impact of tree losses will be along Park Avenue where 13 Caucasian limes and 5 small leaved lime will be removed. This will dramatically alter the visual presence of trees along the road, principally due to the loss the Caucasian limes that are particularly conspicuous in the summer months due to their very dense canopies that extend to ground level. The removal of the three mature small-leaved limes (T39, T41 and T56) will also result in the loss of the last remnants of the original Victorian lime avenue.
- 5.8 The impact of tree removal along Aigburth Vale will be principally on avenue amenity. For example the removal of trees T66 and T65 will create a gap of approximately 20m in the existing closed canopy along the road; smaller gaps will also be created at 4 other locations along the avenue. There will also be a diminution of arboricultural value as 3 of the trees being removed have high value and 3 have moderate value. The effects of both these impacts will diminish over time as proposed new tree planting reduce the gaps created.
- 5.9 The retention of trees along Mossley Hill Road, where they form an avenue with those in Sefton Park, is a priority. Private driveways along the western site boundary will therefore be constructed above ground and bridge over existing tree roots leaving them intact. Proprietary modular products and installation methods exist that make this proposal feasible. A preliminary assessment of finished levels has indicated this proposal can be accommodated necessitating a small increase in the level of Mossley Hill Road and pavement. Specific detail for driveway construction will be required (refer to Section 7.0).



## **Tree Pruning**

- 5.10 Tree pruning will be required to lift canopies over gardens and to allow vehicular access to driveways and new roads. This will generally comprise a small amount of pruning to a large proportion of trees.
- 5.11 There will be a general requirement to lift the crowns of trees to a minimum of 5m over new driveways and where these overhang new access points off Aigburth Vale. Clearance requirements over new gardens may be reduced and be more irregular but a minimum of 4m clearance is generally desirable. This will result in the removal of mostly small branches from the site-side with some balancing pruning on the roadside where required.
- 5.12 Pruning points and localised clearance heights will be subject to individual tree form. The London plane trees along Mossley Hill Road and Carnatic Road have developed crowns with branches that sweep down from relatively high attachment points (refer to Photograph 2). It is therefore possible to achieve the desired crown heights via the removal of branch parts, rather than wholesale limbs.
- 5.13 The horse chestnut trees have a canopy structure formed by numerous large, upwardly sweeping branches. The removal of lower branches to lift overall crown height is therefore also likely to result in a reduction in crown width and involve the removal of larger branches than with other species on the site. Greater consideration will need to be given to individual form and the tolerance of the individuals to the level of pruning proposed.
- 5.14 Collaboration between a tree surgeon, an arboricultural consultant and the construction manager will be required during the undertaking of any pruning works. In each case the requirement must be tested against and specified in accordance with the terms of any planning permission, the needs and value of individual trees and practical construction requirements.

## **Impacts on the construction process**

- 5.15 In order to deliver the tree retention schedule shown on Drawing 2 and in Table 3, construction will need to adhere to strict tree protection methods which are likely to influence the phasing, pace and method of works as well as the acceptability of materials and specifications in some instances.
- 5.16 Where planning permission is granted, the retention schedule shown in Table 3 and Drawing 2 would normally form a part of that permission.

## Shading

- 5.17 The potential for these trees to cast shade onto proposed structures is indicated on Drawing 3. The shade cone for each tree is based on a standardised model which has been verified by publically accessible published data. No conclusions have been drawn or recommendations made regarding the acceptability or otherwise of the level of anticipated shading. Minor variations from the model will occur due to geographical location, topography and altitude but within the current context these can be considered to be acceptably small.
- 5.18 For simplicity the shade cones shown of Drawing 3 are based on trees of equal width and height, and do not take account of local topographical variation or differences in species canopy density. They are representative of shade cast in the primary summer and winter months between the hours of 10 am and 2 pm, and on the noon elevation of the sun half way between the midsummer and midwinter extremes.
- 5.19 The results of this assessment indicate that a majority of the proposed properties will not be in shade for any significant part of the day during the primary summer months. In winter just over half the properties will be in shade for parts of the day.
- 5.20 It is not within the remit of this report to comment on acceptable levels of shading or residential amenity.

## Impacts on proposed hedgerows

- 5.21 New hedgerows are proposed around the external frontages of the new properties; these will be located in some instances, underneath the existing canopies of retained trees. The following paragraphs consider in general terms the potential influence the three main existing tree species (London plane, lime and horse chestnut) may have on the establishment and long-term growth of new hedges. This includes abiotic and biotic factors.

### *Shading*

- 5.22 London plane trees have a broad but airy crown structure. Their leaves are large but are relatively thin resulting in a lighter level of shading that can cover a large area. In comparison lime trees have a denser branch structure, a higher number of individual leaves that are smaller but more opaque than that of London plane. Consequently they typically cast a deeper level of shade, particularly underneath and in the region of their inner canopy which can become dense with prolific shoot growth. Horse chestnut have the potential to cast the deepest shade and over a large area due to their large, thick leaves that grow to a near closed crown over thick supporting branches.

*Irrigation*

- 5.23 All trees, regardless of their species, reduce the quantity and rate at which rainfall reaches the ground beneath their canopies. Leaf size and density will affect overall permeability of the canopy, with the outer canopy edge 'drip-line' effect being amplified in larger leaved species and where individual leaves overlap. Precipitation levels are therefore likely to be lower underneath London plane and horse chestnut trees compared to lime, where smaller leaves increase permeability.

*Pests and diseases*

- 5.24 There are no common invertebrate pests or diseases of London plane, lime or horse chestnut that pose a significant threat to common hedging species (e.g. privet, holly, beech, yew, hawthorn).
- 5.25 Pests such as horse chestnut leaf minor (*Cameraria ohridella*) and horse chestnut leaf blotch (*Guignardia aesculi*) which are present on trees on the site cause no ill-effects to other species (i.e. they are species dependent). Scale insect (*Pulvinaria regalis*) frequently colonises horse chestnuts, limes and various other broadleaved species but its presence does not cause serious damage and it is unlikely to spread to common hedging species.

*Suppression*

- 5.26 The suppressing influence of one tree over another is the result of the interaction of shading, competition for water and soil nutrients, physical space and genetic fitness. In selecting a suitable hedge species, their tolerability of any applicable factors will need to be considered. For example, hedges planted beneath horse chestnuts will need to be more shade tolerant than those planted beneath London planes trees.
- 5.27 Some plant species are also capable of influencing others through the use of biochemicals. In trees, this most commonly takes the form of a soil leachate from the roots. Horse chestnut is known to produce moderately inhibitive biochemicals to give it a competitive advantage but there is no published evidence to demonstrate how successful this can be against other woody vegetation. Given the frequent examples of healthy garden vegetation beneath horse chestnut trees it is not considered a major consideration in hedge plant selection. London plane and lime are species that have low or negligible biochemical secretion levels.

## 6.0 TREE PROTECTION CONSIDERATIONS

- 6.1 The following information sets out primary considerations in determining the requirement for tree protective measures.

### Root Protection Areas

- 6.2 According to BS 5837:2012, a precautionary ‘easement’ should be established around each tree to protect its roots. The size of this Root Protection Area (RPA) is determined on the basis of stem diameter, or in the case of multistemmed trees – an adjusted ‘single stem equivalent’ figure.
- 6.3 The RPA does not represent a tree’s entire root system but the proportion of the root system that is the most physiologically significant to the tree and would be sufficient to ensure continued tree health, should all distal roots be lost (i.e. those beyond the RPA). This definition implicitly accepts that some root loss is acceptable within the context of development since all soils outside the RPA could be stripped within the parameters of tolerability set by BS 5837:2012.
- 6.4 Within the RPA, the distribution of roots is not expected to be homogenous; variations in the number and physiological significance of roots would normally be expected according to variations in ground conditions, topography and other edaphic factors (those relating to soil). This variation is often called ‘root architecture’.
- 6.5 The root architecture of trees on the site is influenced by a range of factors:
- a) Beneath the public highways, root growth will tend to be inhibited but not absent; due to the size and age of the trees which will have exploited the subsoil beneath the roads and will draw on the “reservoir” of water held in pore spaces of such subsoils;
  - b) Roots that have been redirected by kerbs will tend to increase the density of root distribution adjacent to the kerb (generally in the spaces between trees);
  - c) The chronic pedestrian compaction of soils and existing grass covering will tend to make rooting more shallow than would be expected in a healthy and unaltered natural soil;
  - d) Root architecture will be biased towards unsurfaced areas by preference over hard surfaces.
- 6.6 The RPA is presented as a circle on the tree survey drawings. Adjacent circles tend to overlap and thereby form a corridor of RPA along the boundary. It was not considered expedient to amend the shape of RPAs to more accurately reflect the anticipated longer spread of roots parallel to the roads for three reasons:

- a) Adjacent trees along the boundaries and the resultant 'RPA corridor' give ample protection to each tree because of shared protection of areas between neighbouring trees;
- b) Stretching the RPA longitudinally might have the effect in some cases of reducing the extent of radial protection into the site, which could reduce the level of tree protection;
- c) The size and maturity of trees means that some tree roots would be anticipated beneath the pavement and road which would be relatively close to the parent tree and therefore worthy of robust protection, particularly in respect of utilities and new surface creation.

6.7 The British Standard describes the RPA as a 'tool' rather than a prescriptive requirement. It states at paragraph 5.3.1 that,

*The default position should be that structures [TEP note: including roads, paths, earthworks and excavations] are located outside the RPAs of trees to be retained. However, where there is an overriding justification for construction within the RPA, technical solutions might be available that prevent damage to the tree(s). If operations within the RPA are proposed, the project arboriculturist should:*

- a) demonstrate that the tree(s) can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA;*
- b) propose a series of mitigation measures to improve the soil environment that is used by the tree for growth.*

6.8 RPAs are capped at 707m<sup>2</sup>, which equates to a circle with a radius of 15m. On this site, 4 trees are large enough to require the maximum RPA (T5, T7, T8 and T9). All RPAs have been calculated according to the prescribed formula and the resultant RPAs are included in Appendix 1, both as an area and an equivalent radius.

6.9 The RPAs shown on Drawing 1 are at this stage illustrative, and the placement of protective fencing will be decided at a later stage to define a **Construction Exclusion Zone (CEZ)**.

### **Ground Contamination**

- 6.10 Storage areas for liquids such as fuels, oil or paint should not be located within 10m of any trees on or within proximity to the site due to the risk of soil contamination caused by accidental spillage.
- 6.11 Particular care must be taken when working on or close to sloping ground to avoid unintentional runoff into the rooting area of retained trees.



### **Underground Utility Issues**

- 6.12 No utility drawings were provided and no assessment has been made of the juxtaposition of tree roots and the likely location of new services. It has been presumed for the purposes of this report that all utilities will be installed outside of the Root Protection Areas (RPA) shown on Drawings 1 and 2.
- 6.13 Where the installation of services within the RPA of retained trees is unavoidable, appropriate work methods will be required to ensure the safe long-term survival of those trees. This process will require additional consultation with a qualified Arboricultural Consultant and is likely to be more expensive than conventional trench installation.
- 6.14 All installation proposals within the RPA must be accompanied by an Arboricultural Method Statement.

### **Ground Level Changes**

- 6.15 A rise or reduction in soil level can have major implications on the longevity and health of the trees. Minor changes (up to 100mm) can be tolerated in some cases but is heavily dependent on tree species, condition and growing environment.
- 6.16 Existing ground levels within the RPA should be respected as far as is reasonably practicable. The advice of a qualified Arboricultural Consultant should be sought if level changes are required.

### **Drainage & Storm Water Run-off Issues**

- 6.17 Drainage and storm water run-off requires due consideration and construction requirements (e.g. permeable surfacing) to prevent excessive and/or polluted run-off into the rooting area of trees to be retained.

## 7.0 RECOMMENDATIONS

### Tree Work

- 7.1 Retained trees around the site boundaries will generally need to be pruned and crown-lifted to increase the vertical clearance to the lowest branches where they overhang the site. The scale of this pruning will vary by tree but clearance for private driveways and new access routes into the site will be required.
- 7.2 The full extent of all tree pruning should be detailed in an Arboricultural Method Statement and will require collaboration between a tree surgeon, an arboricultural consultant and the construction manager. As the trees are covered by a Tree Preservation Order, it is advised the works are discussed with the local authorities Tree Officer prior to their undertaking.
- 7.3 All tree surgery work should be carried out by a qualified contractor in accordance with *BS 3998:2010 Tree work – Recommendations*.
- 7.4 The cutting of trees should ideally be undertaken outside of bird nesting season (March to August). Works during this period can be undertaken with appropriate supervision, although they may be more likely to be halted by the presence of active nests.
- 7.5 The advice of an ecologist should be sought prior to undertaking tree works with regards for nesting birds and bat potential.

### Tree Protection Scheme and Arboricultural Method Statements

- 7.6 Site-wide physical and procedural tree protection measures will be required during construction. Due to the complexities of working around such an extensive and mature treestock, early consideration regarding the timing and conduct of certain activities is paramount.
- 7.7 Physical protection will include temporary protective barrier fencing and ground protection around retained trees. This must be put in place prior to the commencement of any development works, including bringing machinery or materials onto site, the erection of site huts.
- 7.8 An Arboricultural Method Statement (AMS) will be required where construction activities are proposed within the Root Protection Areas of retained trees.
- 7.9 The purpose of an AMS is to demonstrate how the proposed operations can be undertaken with minimal risk of adverse impact on trees to be retained. It will set the parameters within which construction will need to be undertaken and will guide the actions of site operatives.

- 7.10 Construction methods presented in an AMS are likely to be the result of collaboration between an Arboricultural Consultant and other project specialists. This process may result in the use of un-conventional building techniques and those allowing more control over soil and root disturbance.
- 7.11 All construction elements listed on the heads of terms below can be delivered without alteration to the tree removal and retention schedule shown on Drawing 2.
- 7.12 An Arboricultural Method Statement should be prepared to provide working detail on:
- Specification of temporary physical protection measures;
  - Marking of individual trees for removal;
  - A full pruning specification;
  - Methods for level changes and earth works;
  - Road resurfacing methods and design of surfaces;
  - New surface construction and design of surfaces;
  - Installation of boundary treatments;
  - Root pruning;
  - Kerb and drainage design;
  - Utility installation;
  - Phasing, timing and supervision of works; and
  - An auditable system of monitoring of compliance (watching brief).

### **Mitigation for the removal of trees**

- 7.13 27 trees require removal to facilitate the development proposals. Mitigation for their loss and associated habitat may be required in the form of replacement tree planting.
- 7.14 The National Planning Policy Framework (NPPF) is a material consideration in the planning process and promotes a presumption in favour of sustainable development. In terms of the natural environment, development should minimise impacts on biodiversity and provide a net gain in biodiversity where possible.
- 7.15 In respect of trees, a sustainable development will be one whereby the total number, value or function provided by trees is maintained or increased or where the long-term prospects of the existing tree stock can be substantially improved. Net gains in biodiversity may be demonstrated where the number of tree species, variety of tree ages or range of niche habitats can be increased. Native, old, large or dead trees are likely to have a relatively significant impact on a scheme's environmental credentials, as will the connectivity of trees, hedges and woodland.
- 7.16 The proposals indicate that extensive new tree planting will take place throughout the site within gardens. It is therefore the recommendation of this report that development has the potential to result in a net-increase in tree cover (estimated at 40 years post-construction). This is wholly dependent on appropriate species selection and placement, tree quality and high establishment rates.

- 7.17 The advice of a qualified Arboricultural Consultant should be sought during the planting plan preparation to ensure this opportunity is realised through appropriate species selection and placement. This is likely to include a mixture of native species to ensure landscape continuity and exotic species chosen for their variance in form, autumn colour and leaf shape.
- 7.18 The extent of mitigation planting will ultimately be determined in agreement with Liverpool City Council

#### **Post Construction Tree Care**

- 7.19 Hazard recommendations are based on observations at the time of survey. Trees are dynamic living organisms whose structure is constantly changing. Even those in good condition can suffer from damage or stress. Following site development, regular (annual or biennial) inspections of all retained trees should be undertaken by a qualified Arboricultural Consultant.

## 8.0 SUMMARY

- 8.1 The tree stock on the site is all of planted origin and was established following the creation of Sefton Park in the late 19th century. It has been influenced by the construction of Queens Drive in the early 20th century and by the more recent removal and replacement of trees alongside Park Avenue. The oldest trees on the site are around 120 years of age and the youngest are approximately 10 years old.
- 8.2 Based on an objective assessment made in accordance with *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations*, there are 86 Category A, 21 Category B and 3 Category C tree features and groups on or within influencing distance of the site.
- 8.3 Liverpool City Council has confirmed that an Area Tree Preservation is in effect covering all middle-aged and mature trees on the site. The Order (Ref: 251 Land bounded by Queens Drive, Mossley Hill Drive, Aigburth Vale and Carnatic Road, Liverpool) was confirmed in February 1992 and includes all trees present at the that time; there are only two trees under 22 years of age on the site which are consequently not covered by the TPO (T38 and T40). The site also lies within Sefton Park Conservation Area.
- 8.4 27 individual trees require removal to facilitate the development proposals. 18 of these are moderate value, 6 are high value and 3 are low value trees. The function of the overall tree stock as an amenity feature along the main public roads of Mossley Hill Drive, Queens Avenue and Aigburth Vale will not be significantly altered by the development due to the retention of over 90 percent of existing trees.
- 8.5 Pruning will be required to retained trees to lift canopies over gardens and to allow vehicular access to driveways and new roads. This will generally comprise a small amount of pruning to a large proportion of trees but will change the existing character of the avenue planting in the short-term.
- 8.6 Site-wide physical and procedural tree protection measures will be required during construction. Due to the complexities of working around such an extensive and mature treestock, early consideration regarding the timing and conduct of certain activities is paramount.
- 8.7 An Arboricultural Method Statement will be required to inform the construction activities that are proposed in proximity to trees that will be retained. This should include a method for pruning, surface construction design and monitoring. A heads of terms is provided in Sub-section 7.12. These matters could be determined and secured by planning condition, which will not affect the arboricultural impact of the development as described in this report.
- 8.8 The proposals indicate that extensive new tree planting will take place throughout the site within gardens. It is therefore the recommendation of this report that development has the potential to result in a net-increase in tree cover (estimated at 40 years post-construction). This is wholly dependent on appropriate species selection and placement, tree quality and high establishment rates.



## **APPENDIX 1**

### **ARBORICULTURAL SURVEY DATA SHEETS**

# APPENDIX 1: Arboricultural Survey Data Sheets



Surveyor Jonathan Smith/Mark Levitt  
Date 17.06.2014  
Town Liverpool  
Site Park Avenue, Mossley Hill  
Dwg Ref D4612

Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contributing	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
<b>Trees</b>																			
T1	London plane	15.0	1050.0	1.0	8.0	7.0	8.0	8.0	5.0	E	Mature	Good	Linear planting along Mossley Hill Drive. Tarmac footpath up to stem on all sides. Crown lifted over road to 8m.	A,1,2	12.6	498.8		Long	*
T2	London plane	19.0	1000.0	1.0	6.0	6.0	8.0	10.0	4.5	S	Mature	Good	Linear planting along Mossley Hill Drive. Roots lifting stone plinth on western side. Canopy to near ground level to east and lifted over road to west.	A,1,2	12.0	452.4		Long	*
T3	London plane	21.0	1170.0	1.0	7.0	6.0	9.0	9.0	4.0	NE	Mature	Good	Linear planting along Mossley Hill Drive. Young sycamore growing at base. Canopy to near ground level to east and lifted over road to west.	A,1,2	14.0	619.3		Long	*
T4	London plane	20.0	1180.0	1.0	5.0	9.0	14.0	13.0	5.0	SE	Mature	Good	Linear planting along Mossley Hill Drive. Young wych elm growing at base. Canopy to near ground level to east and lifted over road to west.	A,1,2	14.2	629.9		Long	*
T5	London plane	20.0	1400.0	1.0	5.0	7.0	11.0	10.0	4.0	NE	Mature	Good	Linear planting along Mossley Hill Drive. Small hanging dead branch in central crown. Canopy to near ground level to east and lifted over road to west.	A,1,2	15.0	707.0		Long	*
T6	London plane	19.0	1136.0	1.0	6.0	7.0	9.0	13.0	4.5	NW	Mature	Good	Linear planting along Mossley Hill Drive. Canopy to near ground level to east and lifted over road to west.	A,1,2	13.6	583.8		Long	*
T7	London plane	22.0	1270.0	1.0	5.0	8.0	12.0	10.0	5.0	E	Mature	Good	Linear planting along Mossley Hill Drive. Roots lifting stone plinth on western side. Canopy to near ground level to east and lifted over road to west.	A,1,2	15.0	707.0		Long	*
T8	London plane	17.0	1350.0	1.0	11.0	10.0	12.0	5.0	3.0	W	Mature	Good	Linear planting along Mossley Hill Drive. Small dead branch stub in central crown. Canopy to near ground level to east and lifted over road to west.	A,1,2	15.0	707.0		Long	*
T9	London plane	17.0	1320.0	1.0	7.0	7.0	10.0	12.0	3.5	SE	Mature	Good	Linear planting along Mossley Hill Drive. Canopy to near ground level to east and lifted over road to west.	A,1,2	15.0	707.0		Long	*
T10	London plane	15.0	1150.0	1.0	7.0	9.0	11.0	8.0	4.5	S	Mature	Good	Linear planting along Mossley Hill Drive. Rooted on slightly raised soil mound. Small crossing branches in central crown. Canopy to near ground level to east and lifted over road to west.	A,1,2	13.8	598.3		Long	*

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Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T11	London plane	15.0	1140.0	1.0	6.0	7.0	9.0	8.0	4.5	E	Mature	Good	Linear planting along Mossley Hill Drive. Two large burrs on main stem at 3m. Canopy to near ground level to east and lifted over road to west.	A,1,2	13.7	587.9		Long	*
T12	London plane	15.0	1170.0	1.0	8.0	6.0	10.0	12.0	4.5	N	Mature	Good	Linear planting along Mossley Hill Drive. Canopy to near ground level to east and lifted over road to west.	A,1,2	14.0	619.3		Long	*
T13	London plane	15.0	1260.0	1.0	6.5	7.0	12.0	9.0	4.0	S	Mature	Good	Linear planting along Mossley Hill Drive. Small crossing branches and minor deadwood in crown (<50mm diameter). Canopy to near ground level to east and lifted over road to west.	A,1,2	15.0	707.0	Remove dead wood.	Long	*
T14	London plane	15.0	1140.0	1.0	8.0	11.0	11.0	8.0	4.5	SE	Mature	Good	Linear planting along Mossley Hill Drive. Canopy to near ground level to east and lifted over road to west.	A,1,2	13.7	587.9		Long	*
T15	London plane	16.0	820.0	1.0	3.5	10.0	6.5	2.0	5.0	N	Mature	Good	Linear planting along Carnatic Road. Heavily asymmetric form due to close spacing to other trees. Dead stub in lower crown.	A,1,2	9.8	304.2		Long	*
T16	London plane	16.0	970.0	1.0	9.5	9.0	7.0	4.0	4.0	S	Mature	Good	Linear planting along Carnatic Road. Asymmetric form due to close spacing to other trees. Small hanging dead branches in central crown. Canopy to near ground level on north side and lifted over road to south.	A,1,2	11.6	425.7		Long	*
T17	London plane	16.0	955.0	1.0	12.0	10.0	5.0	4.0	5.5	NE	Mature	Good	Linear planting along Carnatic Road. Asymmetric form due to close spacing to other trees. Canopy to near ground level on north side and lifted over road to south.	A,1,2	11.5	412.6		Long	*
T18	London plane	16.0	1000.0	1.0	12.0	10.0	4.5	4.0	5.5	S	Mature	Good	Linear planting along Carnatic Road. Asymmetric form due to close spacing to other trees. Canopy to near ground level on north side and lifted over road to south.	A,1,2	12.0	452.4		Long	*
T19	London plane	16.0	900.0	1.0	9.0	10.0	4.5	7.0	4.0	NW	Mature	Good	Linear planting along Carnatic Road. Asymmetric form due to close spacing to other trees. Minor dead wood throughout. Canopy to near ground level on north side and lifted over road to south.	A,1,2	10.8	366.4		Long	*
T20	London plane	17.0	1010.0	1.0	11.0	8.5	5.0	5.0	5.0	N	Mature	Good	Linear planting along Carnatic Road. Asymmetric form due to close spacing to other trees. Dead stub in lower crown. Large girdling root on north side of stem. Canopy to near ground level on north side and lifted over road to south.	A,1,2	12.1	461.5		Long	*

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Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T21	London plane	19.0	1035.0	1.0	10.0	8.0	3.5	7.0	5.0	N	Mature	Good	Linear planting along Carnatic Road. Asymmetric form due to close spacing to other trees. Canopy to near ground level on north side and lifted over road to south.	A,1,2	12.4	484.6		Long	*
T22	London plane	19.0	1100.0	1.0	11.0	8.0	5.0	3.0	4.5	N	Mature	Good	Linear planting along Carnatic Road. Asymmetric form due to close spacing to other trees. Canopy to near ground level on north side and lifted over road to south.	A,1,2	13.2	547.4		Long	*
T23	London plane	17.0	1200.0	1.0	10.0	10.0	9.0	5.0	3.5	E	Mature	Good	Linear planting along Carnatic Road. Asymmetric form due to close spacing to other trees. Canopy to near ground level on north side and lifted over road to south.	A,1,2	14.4	651.4		Long	*
T24	Horse chestnut	11.0	780.0	1.0	7.5	12.0	7.0	6.5	3.5	N	Mature	Good	Located at junction of Carnatic Road and Aigburth Vale. Broad spreading form with several large, end-weighted limbs extending south. Basal stem wound displaying good occlusion growth.	A,1,2	9.4	275.2		Long	*
T25	Red horse chestnut	13.0	620.0	1.0	3.0	3.5	4.0	4.5	4.0	N	Middle Age	Good	Linear planting along Aigburth Vale. Typical compact, rounded form for species. Dead branch in lower canopy. Light compaction on east side due to car parking.	B,1,2	7.4	173.9	Remove dead branch from lower canopy.	Long	*
T26	Horse chestnut	17.0	1100.0	1.0	5.0	6.0	6.0	8.0	3.5	NW	Mature	Good	Linear planting along Aigburth Vale. Bark wound on lower stem (500m in height x 200 wide). Bacterial wet wood exudation. Canopy to within 2.5m of ground on west side and lifted over road to east.	A,1,2	13.2	547.4		Long	*
T27	Horse chestnut	18.0	820.0	1.0	5.5	5.0	7.0	8.0	4.0	NW	Mature	Good	Linear planting along Aigburth Vale. Minor exposed/damaged surface roots. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	9.8	304.2		Long	*
T28	Horse chestnut	18.0	940.0	1.0	5.0	5.5	7.0	8.0	5.0	W	Mature	Good	Linear planting along Aigburth Vale. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	11.3	399.7		Long	*

# APPENDIX 1: Arboricultural Survey Data Sheets

Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T29	Horse chestnut	17.0	850.0	1.0	5.5	6.0	6.0	8.0	4.5	W	Mature	Good	Linear planting along Aigburth Vale. Large end-weighted limb extending west. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	10.2	326.9		Long	*
T30	Horse chestnut	16.0	700.0	1.0	5.5	5.5	6.0	7.0	3.5	W	Mature	Good	Linear planting along Aigburth Vale. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	8.4	221.7		Long	*
T31	Horse chestnut	16.0	740.0	1.0	6.0	5.0	6.0	6.5	4.0	W	Mature	Good	Linear planting along Aigburth Vale. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	8.9	247.7		Long	*
T32	Horse chestnut	15.0	730.0	1.0	6.0	7.5	6.0	8.0	4.0	W	Mature	Good	Linear planting along Aigburth Vale. Small exposed surface roots on east side. Two small spots of dark exudation on main stem. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	8.8	241.1		Long	*
T33	Horse chestnut	18.0	820.0	1.0	5.5	5.5	6.5	7.0	4.0	NW	Mature	Good	Linear planting along Aigburth Vale. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	9.8	304.2		Long	*
T34	Horse chestnut	16.0	760.0	1.0	4.5	6.5	5.0	7.5	4.0	SW	Mature	Good	Linear planting along Aigburth Vale. Large end-weighted limb extending west. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	9.1	261.3		Long	*
T35	Horse chestnut	18.0	810.0	1.0	6.0	6.0	7.0	8.0	4.0	SW	Mature	Good	Linear planting along Aigburth Vale. Small exposed surface roots on east side. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	9.7	296.8		Long	*
T36	Horse chestnut	16.0	700.0	1.0	4.5	6.5	5.0	7.5	4.0	SW	Mature	Good	Linear planting along Aigburth Vale. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	8.4	221.7		Long	*

# APPENDIX 1: Arboricultural Survey Data Sheets

Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T37	Horse chestnut	15.0	710.0	1.0	8.0	5.0	5.5	7.5	4.5	SW	Mature	Good	Linear planting along Aigburth Vale. Canopy to within 2.5m of ground on west side and lifted over road to east. Light compaction on east side due to car parking.	A,1,2	8.5	228.0		Long	*
T38	Common lime	5.0	220.5	6.0	2.5	2.5	2.5	2.0	0.5	E	Young	Good	Basally multi-stemmed with central decaying stub. Crossing stems with scale insect.	C,1	2.6	22.0		Long	*
T39	Small-leaved lime	23.0	820.0	1.0	7.0	9.5	9.0	5.5	4.5	SE	Mature	Good	Dominant tree in locality due to size and maturity. Twiggy dieback in upper crown typical for species. Small decay pockets at old pruning points. Basal shoot growth.	A,1	9.8	304.2		Long	*
T40	Common lime	3.0	120.0	1.0	1.5	1.5	1.5	1.5	2.0	S	Young	Good	Young planting with basal shoot growth.	C,1	1.4	6.5		Long	*
T41	Small-leaved lime	25.0	900.0	1.0	7.0	8.0	6.5	6.0	5.5	SW	Mature	Good	Dominant tree in locality due to size and maturity. Large twin-stem union at 2.5m (strong 'U' shape). Twiggy dieback in upper crown typical for species. Small decay pockets at old pruning points. Basal shoot growth.	A,1	10.8	366.4		Long	*
T42	Caucasian lime	9.0	240.0	1.0	4.0	2.5	3.0	4.0	4.0	S	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth.	B,1	2.9	26.1		Long	*
T43	Caucasian lime	7.0	290.0	1.0	4.0	3.5	3.5	4.0	2.5	NE	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth.	B,1	3.5	38.0		Long	*
T44	Caucasian lime	7.0	260.0	1.0	4.5	4.0	3.5	2.5	3.0	SE	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense crown with foliage to ground level.	B,1	3.1	30.6		Long	*
T45	Caucasian lime	11.0	370.0	1.0	4.0	4.0	3.5	5.0	3.5	S	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense crown with foliage to ground level.	B,1	4.4	61.9		Long	*
T46	Caucasian lime	10.0	330.0	1.0	4.0	3.0	4.0	4.0	4.0	W	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense, pendulous crown with foliage to ground level.	B,1	4.0	49.3		Long	*

# APPENDIX 1: Arboricultural Survey Data Sheets

Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T47	Caucasian lime	10.0	330.0	1.0	5.0	5.5	4.0	6.0	4.5	N	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense, pendulous crown with foliage to ground level.	B,1	4.0	49.3		Long	*
T48	Caucasian lime	9.0	290.0	1.0	5.0	3.5	5.0	4.5	3.0	NE	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense, pendulous crown with foliage to ground level.	B,1	3.5	38.0		Long	*
T49	Caucasian lime	9.0	300.0	1.0	3.5	2.5	4.5	4.0	3.5	E	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense, pendulous crown with foliage to ground level.	B,1	3.6	40.7		Long	*
T50	Caucasian lime	8.0	310.0	1.0	4.5	4.0	3.5	4.5	3.5	S	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense, pendulous crown with foliage to ground level.	B,1	3.7	43.5		Long	*
T51	Caucasian lime	10.0	320.0	1.0	4.5	4.5	4.0	4.0	4.5	S	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense, pendulous crown with foliage to ground level.	B,1,2	3.8	46.3		Long	*
T52	Caucasian lime	7.0	290.0	1.0	3.0	3.0	2.5	2.5	1.0	W	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense, pendulous crown with foliage to ground level.	B,1,2	3.5	38.0		Long	*
T53	Caucasian lime	9.0	300.0	1.0	4.0	3.5	4.0	3.0	4.0	S	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense, pendulous crown. Compaction to south due to car parking.	B,1,2	3.6	40.7		Long	*
T54	Caucasian lime	9.0	310.0	1.0	4.0	4.0	4.5	3.5	4.0	S	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense, pendulous crown and slight stem lean. Compaction to south due to car parking.	B,1,2	3.7	43.5		Long	*



# APPENDIX 1: Arboricultural Survey Data Sheets

Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T55	Caucasian lime	8.0	315.0	1.0	3.5	4.0	4.5	3.5	4.0	S	Middle Age	Good	Vigorous planting alongside Park Avenue. Basal graft union with common lime root-stock and typical epicormic shoot growth. Dense, pendulous crown.	B,1,2	3.8	44.9		Long	*
T56	Small-leaved lime	20.0	700.0	1.0	6.5	6.0	6.0	6.5	4.5	E	Mature	Good	Good form and condition, 15 degree stem lean east. Twiggy dieback in upper crown typical for species. Basal shoot growth.	A,1	8.4	221.7		Long	*
T57	Red horse chestnut	12.0	660.0	1.0	4.0	5.5	4.5	5.0	3.5	N	Mature	Good	Linear planting along Aigburth Vale. Typical compact, rounded form for species. Moderate stem wound on southern side (dimensions 1000mm x 300mm). Canker on main stem. Small amount of bacterial wet wood exudation on lower stem.	A,1	7.9	197.1		Long	*
T58	Horse chestnut	6.0	740.0	1.0	1.0	1.0	2.0	1.5	3.0	E	Mature	Fair	Linear planting along Aigburth Vale. Recently reduced to 6m pole, now with vigorous shoot regrowth. Large stem cavity at 4.5m possibly resulting from a large branch 'socket' failure. Several small spots of bleeding on main stem along with bark cracks and fissures.	C,1	8.9	247.7		Long	*
T59	Red horse chestnut	10.0	450.0	1.0	3.5	4.0	4.0	4.5	4.0	E	Mature	Good	Linear planting along Aigburth Vale. Reasonable form but slight asymmetry due to large limb extending west.	A,1,2	5.4	91.6		Long	*
T60	Horse chestnut	14.0	690.0	1.0	7.0	5.0	6.0	7.0	3.5	N	Mature	Good	Linear planting along Aigburth Vale. Minor exposed/damaged roots close to stem base. Bark cracks, fissures and small spots of exudation on south side of main stem. Crown lifted over the road.	A,1,2	8.3	215.4		Long	*
T61	Red horse chestnut	10.0	460.0	1.0	3.5	3.0	5.0	4.0	3.5	W	Mature	Fair	Linear planting along Aigburth Vale. Large canker on west side of main stem. Crown lifted over the road.	B,1	5.5	95.7		Long	*
T62	Horse chestnut	12.0	720.0	1.0	8.0	7.0	7.0	8.0	4.0	N	Mature	Fair	Linear planting along Aigburth Vale. Longitudinal fissure on west side of stem from ground to 2.5m, partly occluded. Bark cracks, fissures and bacterial wet wood exudation on southwest side of main stem. Crown lifted over the road.	A,1,2	8.6	234.5		Long	*
T63	Red horse chestnut	10.0	450.0	1.0	4.0	3.0	4.0	5.0	3.5	SW	Mature	Good	Linear planting along Aigburth Vale. Canker on main stem. Minor cavity development at old pruning points. Crown lifted over the road.	A,1,2	5.4	91.6		Long	*

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Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T64	Horse chestnut	15.0	745.0	1.0	8.0	6.0	7.0	6.0	3.5	S	Mature	Good	Linear planting along Aigburth Vale. Epicormic shoot growth in central crown. Light compaction on east side from vehicle parking. Crown lifted over the road.	A,1,2	8.9	251.1		Long	*
T65	Red horse chestnut	10.0	450.0	1.0	4.0	5.0	6.0	5.0	4.0	W	Mature	Fair	Linear planting along Aigburth Vale. Bark damage on underside of lower branches. Heavy canker on main stem. Suppressed on northeast side by neighbouring tree. Crown lifted over the road.	B,1,2	5.4	91.6		Long	*
T66	Horse chestnut	14.0	830.0	1.0	10.0	9.0	10.0	11.0	3.5	NW	Mature	Good	Linear planting along Aigburth Vale. Dominant tree in avenue due to broad spreading crown. Crossing branches in central crown. Rooted on 0.25m raised soil mound. Crown lifted over the road.	A,1,2	10.0	311.7		Long	*
T67	Red horse chestnut	13.0	470.0	1.0	4.0	3.0	3.0	6.5	4.0	W	Mature	Fair	Linear planting along Aigburth Vale. Canker present on main stem and scaffold branches. Suppressed by neighbouring trees. Crown lifted over the road.	B,1,2	5.6	99.9		Long	*
T68	Horse chestnut	16.0	910.0	1.0	11.0	10.0	7.0	12.0	4.5	W	Mature	Good	Linear planting along Aigburth Vale. Dominant tree in avenue due to broad spreading crown. Crossing branches in central crown. Crown lifted over the road.	A,1,2	10.9	374.6		Long	*
T69	Red horse chestnut	11.0	590.0	1.0	3.5	5.0	4.0	5.0	5.0	S	Mature	Fair	Linear planting along Aigburth Vale. Heavy canker/burring on main stem and scaffold branches. Crown lifted over the road.	B,1,2	7.1	157.5		Long	*
T70	Common lime	23.0	570.0	1.0	3.5	4.0	4.0	4.5	3.0	S	Mature	Good	Part of a double row of trees alongside Queens Drive. Basal epicormic shoot growth typical for species.	A,1,2	6.8	147.0		Long	*
T71	Common lime	24.0	540.0	1.0	6.0	4.0	6.0	4.0	5.5	SW	Mature	Good	Part of a double row of trees alongside Queens Drive. Basal epicormic shoot growth typical for species.	A,1,2	6.5	131.9		Long	*
T72	Common lime	24.0	535.0	1.0	6.0	4.0	4.0	5.0	5.5	W	Mature	Good	Part of a double row of trees alongside Queens Drive. Basal epicormic shoot growth typical for species.	A,1,2	6.4	129.5		Long	*
T73	Common lime	25.0	655.0	1.0	5.0	6.5	5.0	4.0	5.5	W	Mature	Good	Part of a double row of trees alongside Queens Drive. Basal epicormic shoot growth typical for species.	A,1,2	7.9	194.1		Long	*
T74	Common lime	25.0	590.0	1.0	7.0	6.0	5.0	5.0	8.0	W	Mature	Good	Part of a double row of trees alongside Queens Drive. Basal epicormic shoot growth typical for species.	A,1,2	7.1	157.5		Long	*

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Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T75	Common lime	25.0	600.0	1.0	4.0	5.0	4.5	5.0	3.5	S	Mature	Good	Part of a double row of trees alongside Queens Drive. Foliage to ground level. Basal epicormic shoot growth typical for species.	A,1,2	7.2	162.9		Long	*
T76	Common lime	25.0	470.0	1.0	5.0	5.0	7.0	3.0	3.5	NE	Mature	Good	Part of a double row of trees alongside Queens Drive. Basal epicormic shoot growth typical for species.	A,1,2	5.6	99.9		Long	*
T77	Common lime	25.0	600.0	1.0	2.5	5.5	3.5	4.0	6.5	SW	Mature	Good	Part of a double row of trees alongside Queens Drive. Foliage to ground level. Basal epicormic shoot growth typical for species.	A,1,2	7.2	162.9		Long	*
T78	Common lime	25.0	550.0	1.0	8.5	3.0	6.0	3.0	3.0	W	Mature	Good	Part of a double row of trees alongside Queens Drive. Stem lean to northeast.	A,1,2	6.6	136.8		Long	*
T79	Common lime	27.0	640.0	1.0	4.0	9.0	5.0	4.0	1.0	S	Mature	Good	Part of a double row of trees alongside Queens Drive. Minor deadwood in upper crown.	A,1,2	7.7	185.3		Long	*
T80	Common lime	26.0	600.0	1.0	7.5	3.0	5.0	6.0	3.5	SW	Mature	Good	Part of a double row of trees alongside Queens Drive. Foliage to ground level. Basal epicormic shoot growth typical for species.	A,1,2	7.2	162.9		Long	*
T81	Common lime	25.0	580.0	1.0	4.0	7.0	4.0	5.0	2.5	SE	Mature	Good	Part of a double row of trees alongside Queens Drive. Foliage to ground level. Basal epicormic shoot growth typical for species.	A,1,2	7.0	152.2		Long	*
T82	Common lime	25.0	490.0	1.0	6.0	5.0	6.0	4.0	2.5	SE	Mature	Good	Part of a double row of trees alongside Queens Drive. Basal epicormic shoot growth typical for species.	A,1,2	5.9	108.6		Long	*
T83	Common lime	25.0	580.0	1.0	3.0	6.0	4.0	4.0	0.5	S	Mature	Good	Part of a double row of trees alongside Queens Drive. Foliage to ground level. Basal epicormic shoot growth typical for species.	A,1,2	7.0	152.2		Long	*
T84	Common lime	25.0	570.0	1.0	7.0	3.0	5.0	3.0	2.5	W	Mature	Good	Part of a double row of trees alongside Queens Drive. Slight stem lean to east.	A,1,2	6.8	147.0		Long	*
T85	Common lime	25.0	560.0	1.0	4.0	6.0	4.0	3.0	2.5	S	Mature	Good	Part of a double row of trees alongside Queens Drive. Foliage to ground level. Basal epicormic shoot growth typical for species.	A,1,2	6.7	141.9		Long	*
T86	Common lime	25.0	580.0	1.0	6.0	4.0	4.0	4.5	3.0	NW	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	7.0	152.2		Long	*
T87	Common lime	22.0	540.0	1.0	4.0	6.0	4.0	3.0	3.0	S	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	6.5	131.9		Long	*
T88	Common lime	22.0	490.0	1.0	7.0	3.0	4.0	4.0	3.0	W	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	5.9	108.6		Long	*
T89	Common lime	22.0	500.0	1.0	3.0	6.0	5.0	3.0	3.0	SW	Mature	Good	Part of a double row of trees alongside Queens Drive. Good form.	A,1,2	6.0	113.1		Long	*

# APPENDIX 1: Arboricultural Survey Data Sheets

Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T90	Common lime	22.0	530.0	1.0	7.0	4.0	4.0	3.0	3.0	N	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	6.4	127.1		Long	*
T91	Ash	16.0	550.0	1.0	1.0	11.0	8.0	4.0	4.5	NE	Middle Age	Fair	Heavily asymmetric crown due to suppression form neighbouring lime trees to north. Old Inonotus hispidus fungal bracket growing from old pruning point on main stem. Minor dead wood in lower crown (up to 100mm diameter), attributed to shading.	B,1	6.6	136.8	Remove dead wood and perform aerial inspection of scaffold limbs for signs of cavity development.	Long	*
T92	Common lime	23.0	520.0	1.0	3.0	5.0	6.0	3.0	2.5	E	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	6.2	122.3		Long	*
T93	Common lime	23.0	550.0	1.0	6.5	2.5	3.5	4.0	3.0	SW	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	6.6	136.8		Long	*
T94	Common lime	26.0	590.0	1.0	4.0	6.0	3.0	3.0	3.0	SW	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	7.1	157.5		Long	*
T95	Common lime	26.0	580.0	1.0	8.0	4.0	3.0	3.5	3.0	SW	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	7.0	152.2		Long	*
T96	Common lime	26.0	600.0	1.0	3.0	7.0	7.0	4.0	3.0	S	Mature	Good	Part of a double row of trees alongside Queens Drive. Minor cavity mid-stem.	A,1,2	7.2	162.9		Long	*
T97	Common lime	26.0	590.0	1.0	6.0	4.0	4.0	4.0	3.5	S	Mature	Good	Part of a double row of trees alongside Queens Drive. Minor dead wood.	A,1,2	7.1	157.5		Long	*
T98	Common lime	26.0	530.0	1.0	3.0	4.0	4.0	3.5	3.5	E	Mature	Good	Part of a double row of trees alongside Queens Drive. Small basal stem wound.	A,1,2	6.4	127.1		Long	*
T99	Common lime	24.0	550.0	1.0	6.0	3.0	4.0	5.0	3.5	W	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	6.6	136.8		Long	*
T100	Common lime	24.0	630.0	1.0	3.0	4.0	5.0	2.0	3.5	S	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	7.6	179.6		Long	*
T101	Common lime	26.0	530.0	1.0	6.0	3.0	3.0	3.0	3.0	NE	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	6.4	127.1		Long	*
T102	Silver lime	25.0	750.0	1.0	3.0	8.0	9.0	4.0	5.0	SW	Mature	Good	Part of a double row of trees alongside Queens Drive. Larger individual within collective. Stem lean southeast.	A,1,2	9.0	254.5		Long	*
T103	Silver lime	25.0	640.0	1.0	6.0	5.0	4.0	5.0	10.0	W	Mature	Good	Part of a double row of trees alongside Queens Drive. Clear bole to 10m. Large stub extending west at 7m.	A,1,2	7.7	185.3		Long	*
T104	Silver lime	25.0	630.0	1.0	4.0	5.0	6.0	4.0	4.5	W	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	7.6	179.6		Long	*
T105	Ash	15.0	470.0	1.0	1.0	7.0	9.0	1.0	4.5	E	Middle Age	Good	Heavily asymmetric crown due to suppression form neighbouring lime trees to north. Minor dead wood in lower crown attributed to shading.	A,1,2	5.6	99.9		Long	*
T106	Silver lime	25.0	570.0	1.0	7.0	5.0	3.0	4.0	5.0	NW	Mature	Good	Part of a double row of trees alongside Queens Drive. Largely clean bole to 10m, small shoot growth at 5m.	A,1,2	6.8	147.0		Long	*
T107	Silver lime	26.0	490.0	1.0	3.0	4.5	4.0	2.0	3.0	S	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	5.9	108.6		Long	*
T108	Silver lime	24.0	620.0	1.0	6.0	4.0	3.5	7.0	9.0	W	Mature	Good	Part of a double row of trees alongside Queens Drive.	A,1,2	7.4	173.9		Long	*

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Ref	Species	Height	Stem Dia.	No. of stems/ individuals	Crown Spread North	Crown Spread South	Crown Spread East	Crown Spread West	Height of Lowest Branch	Direction of Lowest Branch	Maturity	Condition	Comments on form, condition, health and significant defects	BS5837 Tree Quality Assess.	Radius of RPA guide circle	BS5837 RPA Area	Management Recommendations	Estimated Remaining Contribution	TPO
		(m)	(mm)	arising below 1.5m	(m)	(m)	(m)	(m)	(m)	(m)	Young, Middle Age, Mature	Good, Fair, Poor, Veteran		A,B,C,R (1,2,3)	(m)	(m2)		Long, Medium, Short	(*)
T109	Silver lime	24.0	920.0	1.0	3.0	9.0	9.0	3.0	3.0	SW	Mature	Good	Part of a double row of trees alongside Queens Drive. Growth striations visible on buttresses.	A,1,2	11.0	382.9		Long	*
T110	Silver lime	24.0	720.0	1.0	3.0	8.5	3.0	8.0	6.5	S	Mature	Good	Part of a double row of trees alongside Queens Drive. Crossing, fused branches in lower southern crown. Minor shade dead wood. Asymmetric form due to suppression by neighbouring trees.	A,1,2	8.6	234.5		Long	*

## **APPENDIX 2**

### **SURVEY METHOD**

## APPENDIX 2: SURVEY METHOD

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The survey of trees is conducted from ground level only. The nature of the soils on site is not assessed.

Trees are dynamic living organisms with a constantly changing structure; even trees in good condition can suffer from damage or stress. The information recorded is presented as being correct at the time of survey.

The following features of each tree, group of trees or wood may have been recorded in the Arboricultural Survey Data Sheets at Appendix 1.

<b>Species</b>	The common name is given. The Latin name may also be given if further clarification is required.	
<b>Height</b>	Top height of tree recorded in metres.	
<b>Stem Diameter</b>	For single-stemmed trees the measurement is taken at 1.5 metres above ground level and recorded in millimetres. For multi-stemmed trees an average all stems measured at 1.5m above ground level is used. For tree groups a range from minimum to maximum diameters is provided based on measurements taken using one of the aforementioned methods.	
<b>No. of Stems</b>	A count of stems arising below a height of 1.5 metres.	
<b>Crown Spread</b>	The N, S, E and W branch spreads are recorded in metres to provide a representative crown shape.	
<b>Height of Lowest Branch</b>	Crown clearance above ground level recorded in metres.	
<b>Direction of Lowest Branch</b>	The direction of growth of the first significant branch from the point of attachment.	
<b>Maturity</b>	<b>Young</b>	Trees that can reasonably be relocated or replaced like for like, without undue cost;
	<b>Middle Age</b>	Trees in the established growth stage of their life with the potential to continue increasing in size;
	<b>Mature</b>	Trees that have reached their ultimate size, given their location and surroundings;
<b>Condition</b>	<b>Good, Fair, Poor.</b> An overall assessment of a tree's physiological and structural state in which factors that may increase its susceptibility to the effects of development are taken into account.  <b>Veteran.</b> Trees that are in such a condition as to significantly increase their biological, cultural or aesthetic value. This is characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.	
<b>Comments</b>	A brief evaluation and description of the tree with comments on form, vitality, health and any significant defects or symptoms of ill-health.	

### BS 5837 Tree Quality Assessment

The tree quality assessment is based on Table 1 of BS 5837:2012 (See below). Four categories (A, B, C and U) are used to denote tree quality (A= High, B = Moderate, C = Low, U= Unsuitable for retention). Subcategories (1-3) denote the specific function value of the trees and the reasoning behind the allocation of a specific category (the subcategories may be used in combination but do not accumulate collective weight).

### Root Protection Area (RPA)

The RPA is allocated to ensure that a sufficient area is left undisturbed during development. It is provided as an area (m<sup>2</sup>) and as the radius of a circle (m) typically plotted from the centre of the stem.

The RPA is calculated using a mathematical equation included in BS 5837:2012 (Section 4.6 and Table D.1) and is based on a tree's stem diameter. In some cases the RPA may need to be adapted to best reflect the likely area and position of roots required to ensure survival; this may be based on criteria such as the tree's condition, species, crown spread and any barriers to growth. Any alteration must be justifiable but is made at the Arboricultural Consultants discretion.

### Recommendations

Recommendations for arboricultural works, etc. are based on the **current** land use, and take into account the tree or group attributes without bias to the proposed development.

### Estimated Remaining Contribution

An estimation of the life expectancy as healthy functioning tree. This will be influenced by species and the condition of the tree at the time of survey.

<b>Long</b>	> 40 years
<b>Medium</b>	20 – 40 years
<b>Short</b>	less than 20 years



## APPENDIX 2: SURVEY METHOD

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)				
<b>Category U</b> 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"><li>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)</li><li>Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline</li><li>Trees 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</li></ul> <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>			See Table 2
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
<b>Category A</b> 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
<b>Category B</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
<b>Category C</b> 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

**British Standards Institute (2012) BS5837:2012 Trees in relation to design, demolition and construction – Recommendations.**  
p.9

### NOTES:

All young trees are assessed as quality category 'C' but this does not preclude their retention within a development.

For hedges the height, canopy spread and number of stems is recorded but they are not assigned a quality category.

**DRAWING 1**

**TREE CONSTRAINTS PLAN**

KEY

[This drawing must be reproduced in colour]

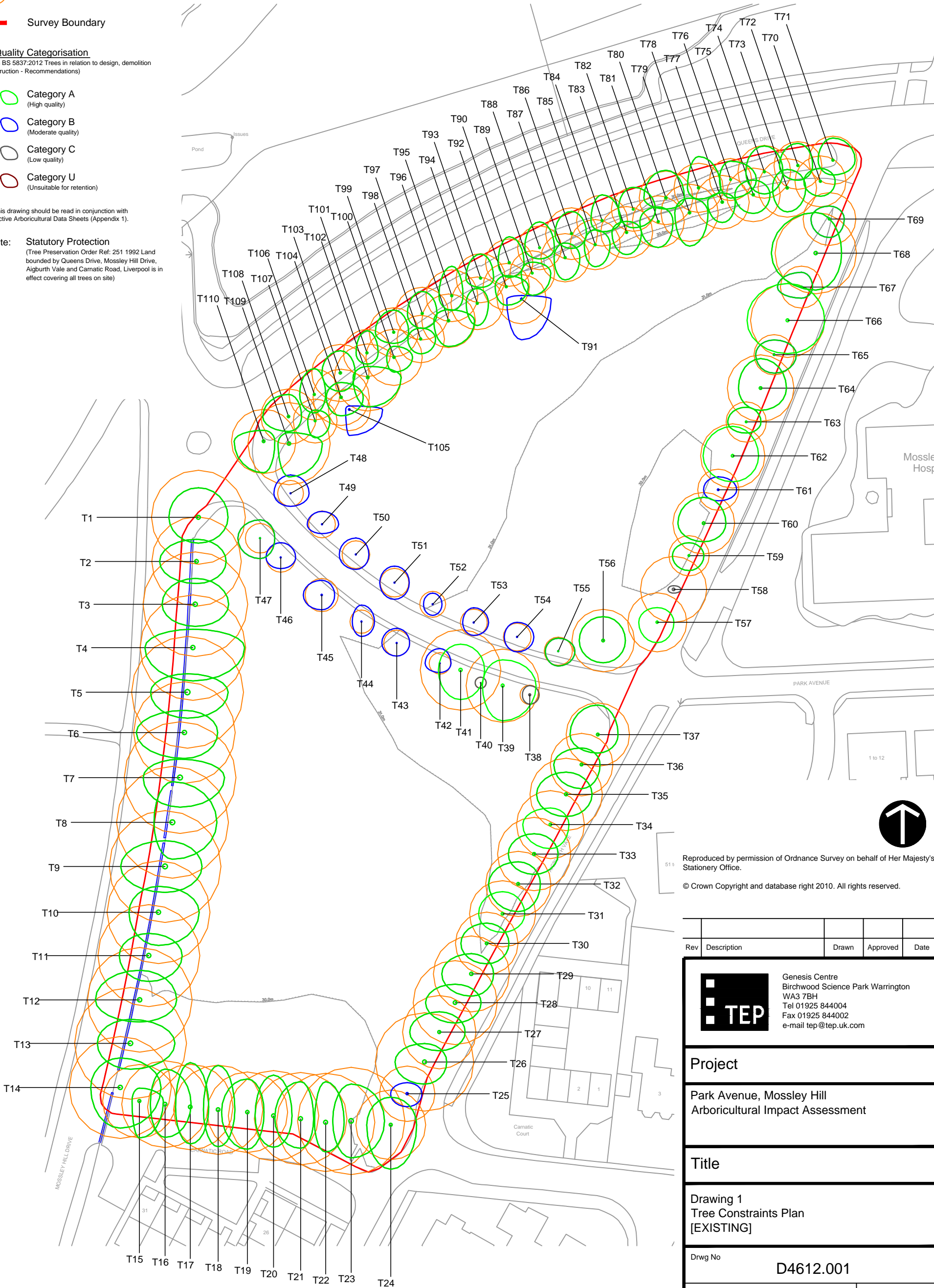
- T1 Individual trees
- Root Protection Area (RPA)
- Survey Boundary

Tree Quality Categorisation  
(based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)

- Category A (High quality)
- Category B (Moderate quality)
- Category C (Low quality)
- Category U (Unsuitable for retention)

NOTE: This drawing should be read in conjunction with the respective Arboricultural Data Sheets (Appendix 1).

Note: Statutory Protection  
(Tree Preservation Order Ref: 251 1992 Land bounded by Queens Drive, Mossley Hill Drive, Aigburth Vale and Carnatic Road, Liverpool is in effect covering all trees on site)



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Rev	Description	Drawn	Approved	Date
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Project  
Park Avenue, Mossley Hill  
Arboricultural Impact Assessment

Title  
Drawing 1  
Tree Constraints Plan  
[EXISTING]

Drwg No  
D4612.001

Scale  
1:1000 @ A3

Date  
18/06/14

Drawn  
ML

Checked  
JGS

Approved  
FBH

**DRAWING 2**

**TREE REMOVAL PLAN**



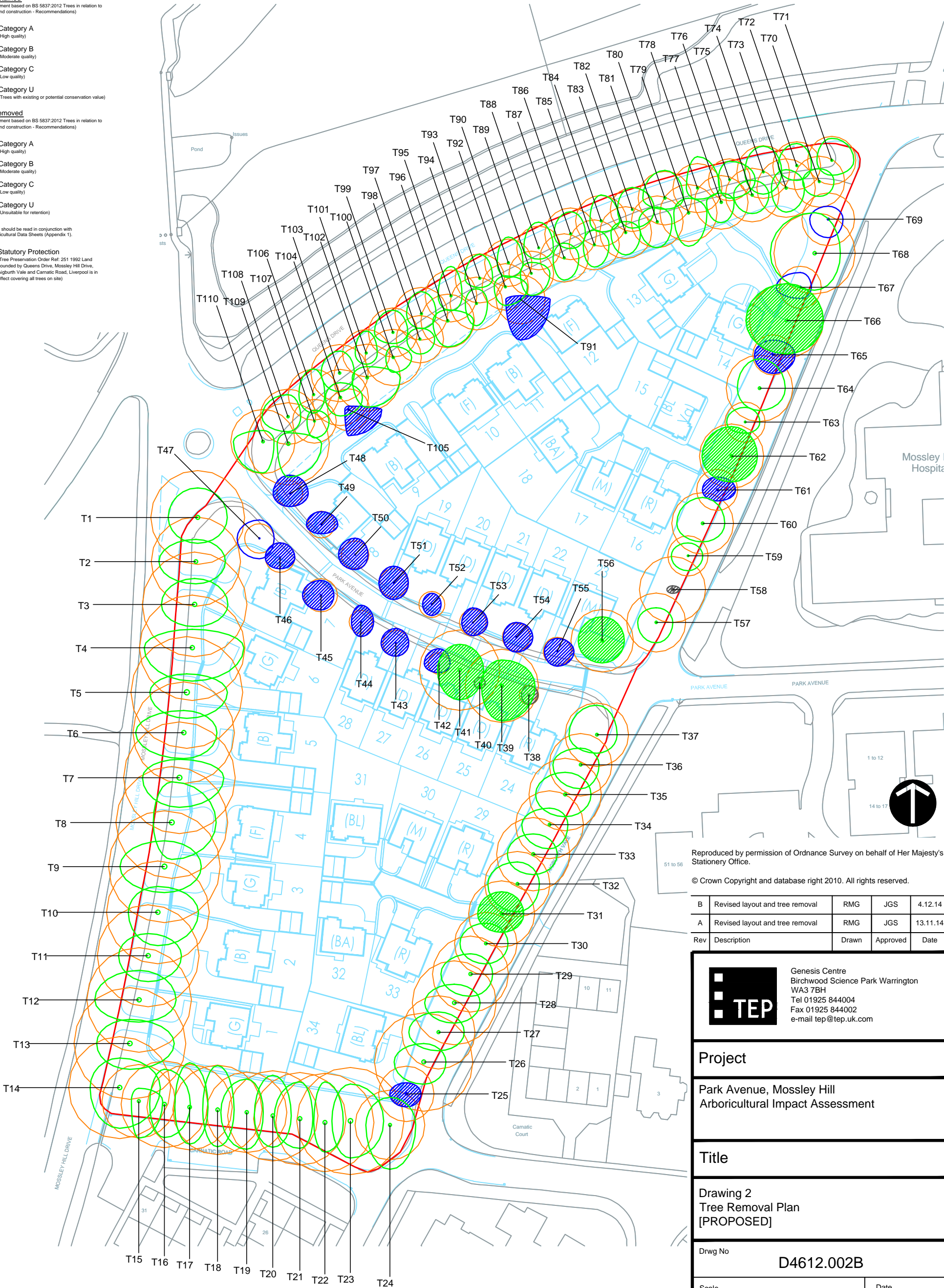
KEY  
[This drawing must be reproduced in colour]

- T1 Individual trees
- Root Protection Area (RPA)
- Trees to be retained**  
(Tree quality assessment based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)
- Category A (High quality)
  - Category B (Moderate quality)
  - Category C (Low quality)
  - Category U (Trees with existing or potential conservation value)

- Trees to be removed**  
(Tree quality assessment based on BS 5837:2012 Trees in relation to design, demolition and construction - Recommendations)
- Category A (High quality)
  - Category B (Moderate quality)
  - Category C (Low quality)
  - Category U (Unsuitable for retention)

NOTE: This drawing should be read in conjunction with the respective Arboricultural Data Sheets (Appendix 1).

Note: Statutory Protection  
(Tree Preservation Order Ref: 251 1992 Land bounded by Queens Drive, Mossley Hill Drive, Aigburth Vale and Carnatic Road, Liverpool is in effect covering all trees on site)



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B	Revised layout and tree removal	RMG	JGS	4.12.14
A	Revised layout and tree removal	RMG	JGS	13.11.14
Rev	Description	Drawn	Approved	Date



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**Project**

Park Avenue, Mossley Hill  
Arboricultural Impact Assessment

**Title**

Drawing 2  
Tree Removal Plan  
[PROPOSED]

Drwg No		D4612.002B	
Scale	1:1000 @ A3	Date	18/09/14
Drawn	RMG	Checked	JGS
		Approved	JGS

## **DRAWING 3**

### **INDICATIVE TREE SHADOW ANALYSIS**

KEY

[This drawing must be reproduced in colour]

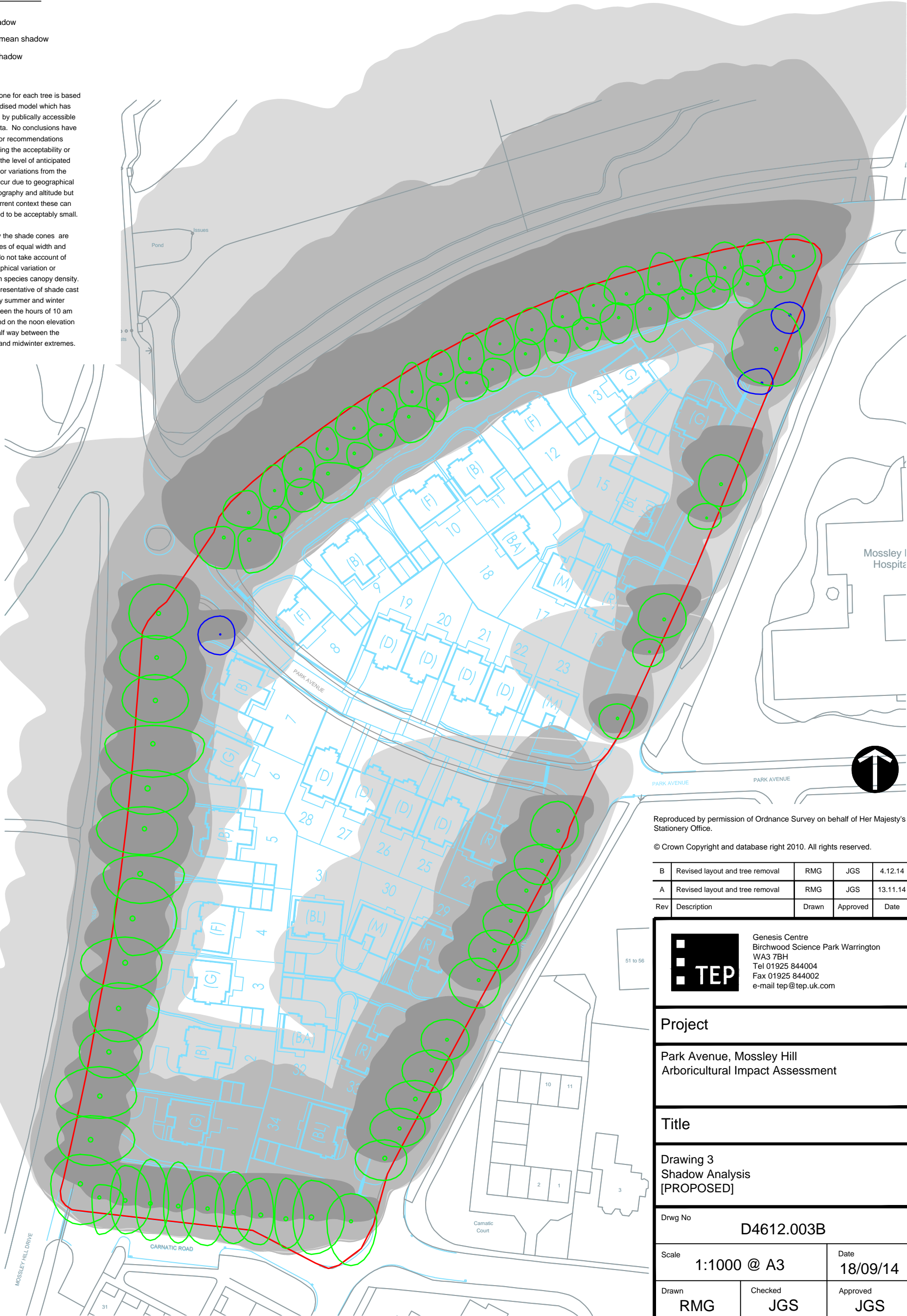
- T1 Individual trees to retain
- Survey Boundary
- Proposed development

Indicative shadow assessment

- Winter shadow
- Indicative mean shadow
- Summer shadow

Note: The shade cone for each tree is based on a standardised model which has been verified by publically accessible published data. No conclusions have been drawn or recommendations made regarding the acceptability or otherwise of the level of anticipated shading. Minor variations from the model will occur due to geographical location, topography and altitude but within the current context these can be considered to be acceptably small.

For simplicity the shade cones are based on trees of equal width and height, and do not take account of local topographical variation or differences in species canopy density. They are representative of shade cast in the primary summer and winter months between the hours of 10 am and 2 pm, and on the noon elevation of the sun half way between the midsummer and midwinter extremes.



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B	Revised layout and tree removal	RMG	JGS	4.12.14
A	Revised layout and tree removal	RMG	JGS	13.11.14
Rev	Description	Drawn	Approved	Date

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Project

Park Avenue, Mossley Hill  
Arboricultural Impact Assessment

Title

Drawing 3  
Shadow Analysis  
[PROPOSED]

Drwg No		D4612.003B	
Scale		1:1000 @ A3	Date 18/09/14
Drawn	Checked	Approved	
RMG	JGS	JGS	