



# **Stag Brewery, Mortlake**

## **Aboriginal Survey Report and Impact Assessment**

For Reselton Properties

February 2018



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## Quality Assurance – Approval Status

This document has been prepared and checked in accordance with Waterman Group's IMS (BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS OHSAS 18001:2007)

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## 1. Introduction

- 1.1. This Tree Survey Report and Impact Assessment has been prepared by Waterman Infrastructure & Environment Ltd ('Waterman IE') on behalf of Reselton Properties Limited ('the Applicant') in support of three linked planning applications for the comprehensive redevelopment of the former Stag Brewery Site in Mortlake ('the Site') within the London Borough of Richmond Upon Thames ('LBRuT').
- 1.2. The former Stag Brewery Site is bounded by Lower Richmond Road to the south, the river Thames and the Thames Bank to the north, Williams Lane to the east and Bulls Alley (off Mortlake High Street) to the west. The Site is bisected by Ship Lane. The Site currently comprises a mixture of large scale industrial brewing structures, large areas of hardstanding and playing fields.
- 1.3. The redevelopment will provide homes (including affordable homes), a nursing and care home, complementary commercial uses, community facilities, a new secondary school alongside new open and green spaces throughout. Associated highway improvements are also proposed, which include works at Chalkers Corner junction.
- 1.4. The three planning applications are as follows:
  - Application A – hybrid planning application for comprehensive mixed-use redevelopment of the former Stag Brewery site consisting of:
    - Land to the east of Ship Lane applied for in detail (referred to as 'Development Area 1' throughout); and
    - Land to the west of Ship Lane (excluding the school) applied for in outline (referred to as 'Development Area 2' throughout).
  - Application B – detailed planning application for the school (on land to the west of Ship Lane).
  - Application C – detailed planning application for highways and landscape works at Chalkers Corner.
- 1.5. Full details and scope of all three planning applications are described in the submitted Planning Statement, prepared by Gerald Eve LLP.
- 1.6. This report sets out the findings of an arboricultural survey of trees on and directly adjacent to land at Stag Brewery, including the Chalkers Corner component of the Site (**Drawing 1**) and the Stag Brewery component of the Site (**Drawing 2**). The area surveyed was extended to include a portion of Mortlake Green (**Drawing 2**), located to the south of the Stag Brewery component of the Site, to provide contextual information to inform the proposed redevelopment of the Site (hereafter referred to as the 'Survey Area').
- 1.7. The survey involved collecting data relating to existing trees to assess their condition and relative merit. This report describes the findings of the survey and highlights the above and below ground constraints posed by the canopy shape and rooting area of the surveyed trees. It also considers the proposed re-development and outlines the resulting implications to trees.

### Tree Survey Methodology

- 1.8. The arboricultural survey is based upon existing topographical information relating to the Survey Area provided by APR services (Job no. 915213, dated July 2015 and 916061, dated February 2017) and was otherwise conducted in accordance with the principles outlined within BS5837:2012 Trees in Relation to Design, Demolition and Construction - Recommendations<sup>1</sup> (BS5837) (refer to **Appendix A**).

- 1.9. Fieldwork was undertaken on the Stag Brewery component of the Site on 16<sup>th</sup> and 17<sup>th</sup> February 2016, and the Chalkers Corner component of the Site and a portion of Mortlake Green on 11<sup>th</sup> April 2017. During the survey on 11<sup>th</sup> April 2017, the trees located along the southern bank of the River Thames, adjacent to the Stag Brewery component of the Site were re-surveyed to record these features in more detail. Fieldwork comprised a non-intrusive, visual survey undertaken at ground level, during which dimensional data and observational information were collected. A diameter breast height (DBH) tape measure and Leica Disto™ laser distance meter were used in the collection of data presented in this report.

### Tree Numbers

- 1.10. Individual trees surveyed were given the prefix 'T', groups of trees the prefix 'G' and hedges the prefix 'H'. Where sufficiently consistent, tree groups have been categorised and include information relating to species composition, age and condition ranges as appropriate. Within these features, principal trees have been identified, where appropriate.

### Species

- 1.11. Species are listed by their common and Latin names, both in the schedule and in the report text.

### Height

- 1.12. Tree heights are approximate and estimated in metres.

### Stem Diameter

- 1.13. The stem diameter of single stemmed trees is measured at 1.5m above ground level and given in millimetres. The diameter measurement of multi-stemmed trees is taken as a combined measurement of all the major stems. Where stems fork or swell the measurement is taken at the narrowest point below the fork or swelling. Where access to the trunk of a tree is not available, an estimation of the stem diameter is made and identified by '\*' on the accompanying tree survey table.

### Crown Spread

- 1.14. Radial crown spread is measured in metres to the nearest decimal (rounded up). These are recorded for each of the four cardinal points where access allows. Where access is not available the spread is estimated and identified by '\*' on the accompanying tree survey table. The canopy shape for surveyed trees depicted on the accompanying plans accurately represents the canopy spread as measured on Site.

### Height of Crown Clearance and Canopy

- 1.15. The height of crown clearance is the height above ground in metres of the first significant branch and the direction of growth. The height of canopy is the height above ground in metres of the main canopy. These are measured to the nearest decimal point (rounded up) for dimensions up to 10m and the nearest whole metre for dimensions over 10m.

### Age Class

- 1.16. The age of each tree is defined as follows:

<sup>1</sup> BS5837:2012 Trees in relation to design, demolition and construction – Recommendations, 2012, British Standards Institution.

- Young (Y): Within the first 1/4 of useful life expectancy.
- Semi-mature (SM): Within the second 1/4 of useful life expectancy.
- Early Mature (EM): Within the third 1/4 of useful life expectancy.
- Mature (M): Within the fourth 1/4 of useful life expectancy.
- Over Mature (OM): Tree in decline.

### **Physiological and Structural Condition**

- 1.17. The physiological or structural condition of each tree group is described, highlighting specific features. The survey involved ground level examination of the external features of the trees. Crown density is noted together with the presence of dead branch wood, small branch die back and fungal fruiting bodies.
- 1.18. Unless otherwise stated, trees were found to be displaying 'normal' characteristics for their species. The structural or physiological condition for each tree is described as Good (G), Fair (F) or Poor (P). Where appropriate, notes on the structural integrity are provided on form, taper, forking habit, storm damage, decay, fungi, pests, etc. No invasive investigations or climbing inspections were carried out to confirm visual or audible signs of defect or debility and no tissue or soil samples were taken for laboratory analysis. Where identified, signs of substantial defects or debility have been recorded. Where access to a tree was not possible, an estimation of physiological and structural condition has been made.

### **Estimated Remaining Contribution (ERC) in Years**

- 1.19. The Estimated Remaining Contribution (ERC) for each tree is based on species and existing physiological and structural condition of the tree. The ERC may affect proposed development layout because the longer the tree is likely to live, the greater the contribution it will make and the greater the need for retention.

### **Category Grading**

- 1.20. Each individual tree was given a Category Grading in accordance with BS5837: 2012 to reflect the overall arboricultural value and retention category. The Category Gradings are defined according to the following criteria, which are further divided into sub-categories based on arboriculture, landscape and/or historic value, as defined within BS5837:2012, contained at **Appendix A**:
- **Category Grading A:** Trees of high quality and value, (with a suggested remaining life expectancy exceeding 40 years);
  - **Category Grading B:** Trees of moderate quality and value, (with a suggested remaining life expectancy of at least 20 years);
  - **Category Grading C:** Trees of low quality and value, (with a suggested remaining life expectancy exceeding 10 years or young / immature trees which may have the potential to attract a higher Grade as they mature); and
  - **Category Grading U:** Trees which are in such a condition that they are unsuitable for retention in the context of the current land use for longer than 10 years.



## Preliminary Management Recommendations

- 1.21. Any recommendations made for management of the existing tree stock, (for example, tree surgery) are not a 'specification' for tree work. These recommendations are instead intended as a preliminary guide to inform future management of tree stock in the current context which should be formalised as a separate management plan. References to habitat value should be taken as comparative observations compared with a baseline situation with no tree present.
- 1.22. Proposed tree surgery or inspection works should be undertaken by a suitably qualified arboricultural contractor, such as those listed in the Arboricultural Association's Approved Contractors Directory (Ref. [www.trees.org.uk](http://www.trees.org.uk)). Any work undertaken by the contractor should be in accordance with best practice, such as the European Tree Pruning Guide<sup>2</sup> or required by BS3998: 2010 Tree Work - Recommendations<sup>3</sup>.

## Limitations

- 1.23. All trees were visually inspected from ground level with no climbing, boring or sampling undertaken. All measurements are metric and where qualified, approximate. The comments made were based on the conditions and observable factors present at the time of inspection, including weather, seasonality and access.
- 1.24. This report is intended to assist with the planning and management of construction, refurbishment and / or demolition operations under current best practice.
- 1.25. The Arboricultural Survey and this report does not constitute a tree risk assessment. This report is not intended to confirm the safety, (or otherwise) of surveyed trees or tree groups. References to defects or potential safety issues are not exhaustive and are intended as a guide only to inform the provision of further resources / more detailed investigations. The person(s) responsible for the management of the trees surveyed within this report are recommended to commission a separate tree condition survey by a suitably qualified and experienced person to manage the Health and Safety aspects of trees under their control, and discharge their reasonable Duty of Care under the 'Duty of Care' owed under the Occupiers' Liability Act 1984<sup>4</sup>.

## Un-assessable Risks

- 1.26. Owing to the changing nature of trees and other Site circumstances, this report and any recommendations made remains valid for a period of 18 months between authorisation of this report and commencement of the Works. Any alteration to the Site or development proposals could change the current circumstances, and may invalidate this report and any recommendations made. An updated survey would therefore be required.
- 1.27. Unless otherwise stated, trees should be re-inspected regularly to satisfy the 'Duty of Care' owed under the Occupiers' Liability Act 1984, or directly proceeding heavy storms (i.e. force 6-7 and above on the Beaufort scale). It is recommended that advice from an ecologist is sought prior to carrying out any works to trees, in order to ensure these are carried out in accordance with (in particular) the protection afforded to wild birds and bats under The Wildlife and Countryside Act<sup>5</sup> and The Conservation of Habitats and Species Regulations<sup>6</sup>.

<sup>2</sup> European Tree Pruning Guide (2001); 'Arboricultural Association'.

<sup>3</sup> British Standards Institution (2010; 'BS3998:2010 'Treework - Recommendations', 2010, BSI.

<sup>4</sup> HMSO (1984); 'Occupiers' Liability Acts 1957 and 1984'. HMSO.

<sup>5</sup> The Wildlife and Countryside Act 1981 (as amended), OPSI

<sup>6</sup> The Conservation of Habitats and Species Regulations 2010, OPSI

## Root Protection Area

- 1.28. The Root Protection Area (RPA) defines the approximate underground area occupied by the tree roots based on a calculation relating to the girth of the tree, point above ground at which the trunk begins to branch out and the number of stems. BS5837 outlines the calculation of RPA as follows:

$$\text{RPA(m}^2\text{)} = \left( \frac{\text{stem diameter (mm) @ 1.5 m} \times 12}{1\ 000} \right)^2 \times \pi \text{ (3.142)}$$

- 1.29. Trees with more than one stem below 1.5m above ground level are given an aggregate stem diameter using either of the following two calculations as outlined in BS5837. This diameter is then used in the above calculation to estimate RPA:

- a) For trees with two to five stems:

$$\sqrt{(\text{stem diameter 1})^2 + (\text{stem diameter 2})^2 \dots + (\text{stem diameter 5})^2}$$

- b) For trees with more than five stems:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

- 1.30. The RPA of existing tree stock is an important material consideration when considering site constraints and planning development activities.
- 1.31. Construction activities, materials storage or changes in level should generally be avoided within the RPA of a tree to be retained. This is because these operations have the potential to damage or kill the tree, the safe retention of which may be a condition of planning permission. This is significant when considering construction in proximity to off-Site / third party land. Special construction techniques, i.e. no-dig construction / permeable surfacing may be considered for light loadings, e.g. pedestrian footpaths etc., within the RPA.
- 1.32. The RPA often varies in size to the physical area occupied by the canopy spread (due to particular tree species or management practices to artificially alter the canopy size). This is of particular importance when integrating new development in proximity of existing trees. Similarly, the canopy heights (as identified in the schedule of existing trees in **Appendix B**) should be considered as the usable space below a low branching tree, which will be severely restricted without specific arboricultural works to raise the canopy (which may not always be appropriate).
- 1.33. It should also be noted that BS5837 states that although RPAs should be plotted as a circle centred on the base of the stem, pre-existing site conditions or other factors may indicate that rooting has occurred asymmetrically and so RPAs may instead be represented as a polygon of equivalent area.

## 2. Fieldwork Observations

- 2.1. A total of 163 individual trees, 36 tree groups and 1 hedgerow were recorded within the Survey Area, as shown in **Drawings 1 and 2**.
- 2.2. Trees present within the Stag Brewery component of the Site are located both adjacent to its boundaries and within the centre of the Site (**Photographs 1 and 2**). Trees present with the Chalkers Corner component of the Site are primarily located adjacent to carriageways (**Photograph 3**) or within open green space (**Photograph 4**). Off-Site trees surveyed include those located within a portion of Mortlake Green (**Photograph 5**), trees located along Mortlake High Street, a group bounding the north-eastern boundary of Development Area 2 (G101) and trees adjacent to the Chalkers Corner component of the Site. The tree stock present within the Survey Area comprises a high proportion of amenity species with London Plane (*Platanus x hispanica*) being common. This species is well-suited to the challenging urban growing conditions including those locally found within the Survey Area.



Photograph 1 (T67 - T82)



Photograph 2 (T8-T11)



Photograph 3 (T103 - T105)



Photograph 4 (Chalkers corner)

- 2.3. The majority of trees within the Stag Brewery component of the Site are of broadly similar in age, and are considered likely to date from the construction of the brewing facilities (circa late 19<sup>th</sup> and early 20<sup>th</sup> centuries). Trees within the Chalkers Corner component of the Site are also broadly similar in age, and are considered likely to date from the development of this road junction. Many of



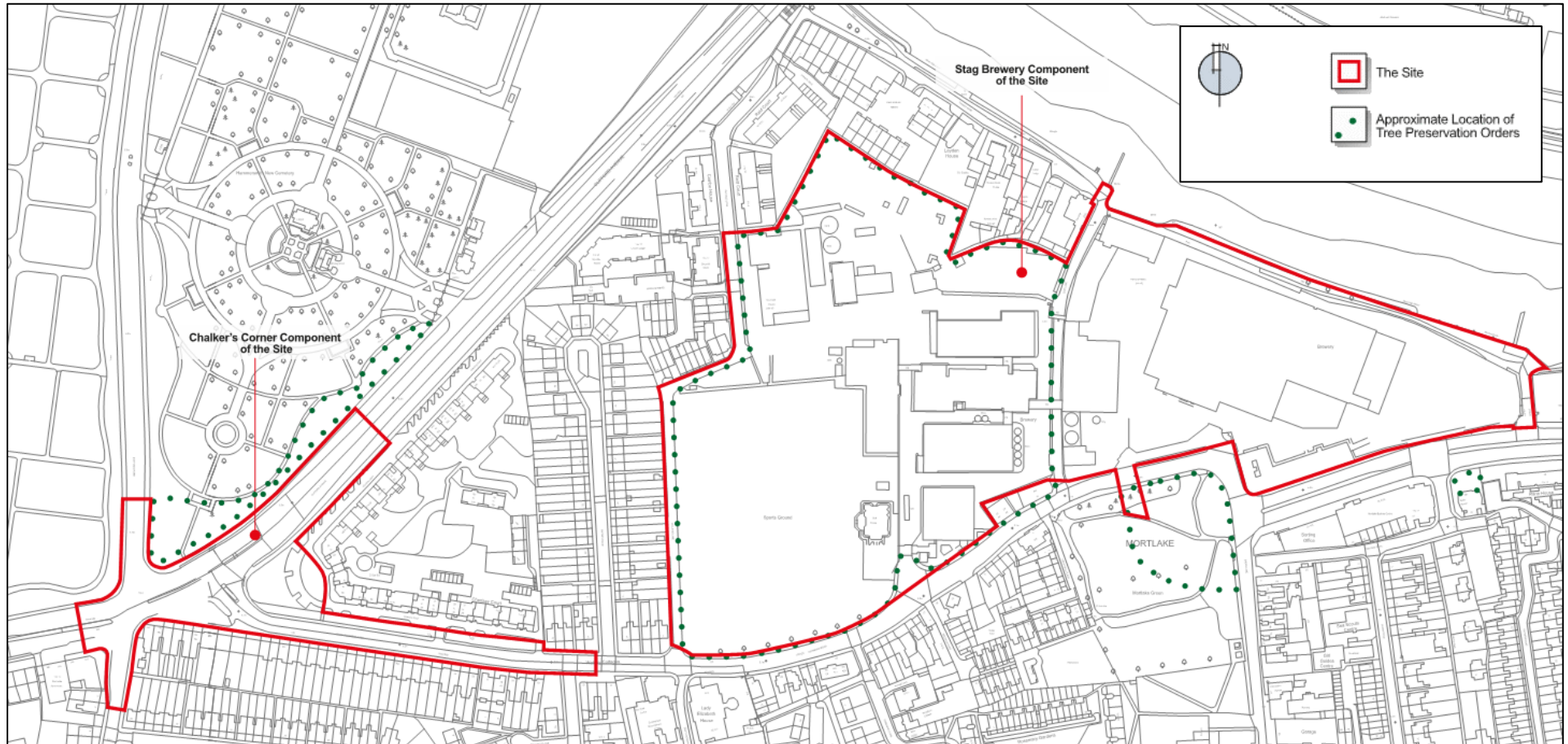
these trees have the potential to become substantial, long lived trees, to the extent that some thinning out may be required in the medium to longer term to allow natural development of the best specimens. Three trees within the Stag Brewery Component of the Site (T13, T18, both Small-leaved Lime (*Tilia cordata*) and T41 London Plane (*Platanus x hispanica*)), which appear to have been felled approximately 3-5 years ago, are significantly more mature and have since thrown up significant new growth as if these trees have been suddenly coppiced. A review of historical mapping, suggests these trees may have originated from the residential garden boundaries of Fairfax and Cromwell House, dating back to the late 19<sup>th</sup> Century. Within **Drawing 2**, the RPAs of these three trees have been calculated using the stem diameter of the remaining stumps.



Photograph 5 – Trees within Mortlake Green (view looking north)

- 2.4. The western portion of the Stag Brewery component of the Site (i.e. to the west of Ship Lane) is covered by an area Tree Preservation Order (TPO) (ref. T0880 dated March 2016). 29 trees / tree groups (G58a-w inclusive, T59, T60, T145, G146, G147 and T152) are also afforded protection due to their location within Mortlake Conservation Area. The location of the TPOs within the Site and surrounding area are shown in **Figure 1** below.

Figure 1: Tree Preservation Orders within the Site and Surrounding Area





2.5. Historic management appeared to include general pruning / canopy lifting operations, recent felling of the two mature Small Leaved Lime and one London Plane (approximately 3-5 years ago, with good regeneration) (**Photograph 6**), lopping and pollarding. Several instances of mechanical damage were noted, likely from vehicular impact (**Photograph 7**), mowing and strimmer damage. Variable degrees of wound wood development were noted, from minimal to complete occlusion which infers a degree of variability in overall tree stock vigour across the Survey Area. Fallen deadwood and occasional torn branch stubs on some specimens however suggests that management within the Survey Area may have lapsed in recent years. It is understood that G58a-w growing adjacent to the Stag Brewery component of the Site on the south bank of the River Thames (**Photograph 8**) is subject to management by the Port of London Authority (**Photograph 9**). The Port of London Authority publicised planned works to this group in spring 2016 which included increasing canopy heights, removing overhanging limbs and felling or poisoning of trees which are either diseased or have an impact on the safety of river users, footpath users or are growing in inappropriate locations and causing damage to the adjacent flood defence retaining walls. Several instances of such management (including removal of diseased Elms) was noted during the April 2017 survey.



Photograph 6 (T18)



Photograph 7 (T36)



Photograph 8 (G58a-k)



Photograph 9 (signage pertaining to G58a-w)

- 2.6. Deflection was locally noted to some areas of macadam surfacing and boundary and retaining walls within the Survey Area through natural root development (**Photograph 10**). Shallow / exposed surface roots were also recorded in several specimens located within areas of mown grass (**Photograph 11**) suggesting challenging below ground rooting conditions.



Photograph 10 (T86)



Photograph 11 (T85)

- 2.7. Recorded pests and diseases of trees within the Survey Area included Bleeding Canker of Horse Chestnut (BCHC) *Pseudomonas syringae* pv *aesculi* (**Photograph 12**), specifically within the Horse Chestnut trees adjacent to Lower Richmond Road and within Mortlake Green. BCHC can pose significant health risks to the trees in addition to safety risks where infected trees are located in proximity to persons, property or highways. Birch polypore (*Piptoporus betulinus*) was also noted within the Stag Brewery component of the Site, with further fungi and bracket fungi noted within the Chalkers Corner component of the Site. Dutch Elm Disease (*Ophiostoma novo-ulmi*) was also noted within G58a-w adjacent to the Stag Brewery component of the Site during the 2016 survey, however tree works by the Port of London Authority as mentioned above appear to have included the removal of infected trees, as these were not visible during the 2017 survey. Symptoms of ash dieback (*Hymenoscyphus fraxineus*) were not recorded within the Survey Area, but this species should be closely monitored to allow prompt recording and management since this pathogen is known to be active and spreading within the local area<sup>7</sup>. Instances of leaf miners, likely the Zeller's midget moth (*Phyllonorycter messaniella*), were recorded within Holm Oak (*Quercus ilex*) trees within the Chalkers Corner component of the Site (**Photograph 13**), however these pose no real significance to the health of affected trees.

<sup>7</sup> Forestry Commission. Available online at <http://www.forestry.gov.uk/chalara>





Photograph 12 (T67)



Photograph 13 (from T113)



### 3. Arboricultural Impact Assessment

#### Development Proposals

- 3.1. The Development scheme is to be brought forward in three separate applications – a hybrid application for the main portion of the Stag Brewery component of the Site to provide a comprehensive redevelopment of the former Stag brewery site comprising a mix of uses (Application A), a separate detailed application for a new school within the Stag Brewery component of the Site (Application B), and a separate application for highways and landscaping works to the Chalkers Corner component of the Site (Application C) (collectively referred to as the ‘Development’). The Development scheme is presented in **Drawing 3 – Site Wide Landscape Plan** and **Drawing 4 – Chalkers Corner Landscape GA Plan**.

#### Trees to be Removed

- 3.2. Based on the Development layout shown in **Drawing 3 and 4**, a number of trees/groups will currently need to be removed, as shown within **Drawings 5 and 6** and detailed within **Table 1** below. These trees require removal either to facilitate construction of the Development layout and / or proposed hard and soft landscape design. The Development proposals have sought to retain trees wherever possible, but due to the nature of the proposals and location of trees, some will need to be removed. Where trees will be removed, the design team has tried to keep this to lower quality trees wherever possible and protect high quality and value ‘A’ grade trees.

Table 1: Trees to be removed

Category Grading	Tree/Group
A	T29*
B	T5*, T6*, T7*, T8*, T9*, T10*, T11*, T14*, T15*, T25*, T26*, T27*, T45*, T46*, T64*, T88*, T90*, T93*, T94*, T95*, T96*, T97*, T98*, T99*, T100*, T111, part G117, T121, T122, T133, T134, T136 and T137
C	T1*, T2*, T13*, T16*, T17*, T18*, T22*, T23*, T24*, T31*, T32*, T33*, T34*, T35*, T36*, T37*, part G47, T59**, T60**, T62*, T63*, T65*, T66*, T87*, T89*, T91*, T92*, G112, T120, T125, T126, and G147**
U	T12*, T28*, T30*, T119, T135, G138 and G139.

\* Indicates trees covered by area TPO designation T0880/2016. \*\* Indicates trees covered by Mortlake Conservation Area.

- 3.3. The removal of T29, an ‘A’ Category tree is due to an unavoidable direct conflict with proposed built form in this location.
- 3.4. The removal of ‘B’ and ‘C’ Category trees to facilitate the Development is not considered to be significant to the general amenity and screening of the Site and adjacent land uses. The majority of trees to be removed within the Stag Brewery component of the Site are internal trees which will be removed due to direct conflicts with built form. However, valuable boundary features including the London Plane trees along Ship Lane (T48-T57), trees along Lower Richmond Road (T67-T82) and the off-Site trees bordering the River Thames (G58a-G58w) would be retained as detailed below.

- 3.5. The removal of the 7 'U' category trees is considered insignificant, due to their poor quality and short remaining life expectancy (i.e. <10years in their current context). Furthermore, several of these trees are to be removed on the basis of their poor condition as opposed to conflicts with proposed built form / the proposed Development.
- 3.6. Several trees proposed for removal are afforded protection by TPO T0880/2016 or Mortlake Conservation Area as indicated within **Table 1** above. These designations prevent pre-emptive works to or removal of these trees without prior permission from LBRuT. In addition, the status of the TPO and Conservation Area are material considerations in planning terms although these need not preclude the removal of these features if this can be negotiated as part of a Planning Application approval.
- 3.7. The exact number of trees to be removed (currently indicated in Table 1 above) would be confirmed at the next detailed design stage of development where detailed analysis of existing tree positions relative to proposed buildings, walls, pavements and other elements of hard and soft landscape would be undertaken.

### Proposed New Tree Planting

- 3.8. New tree planting will be provided as an integrated part of the Development as shown within the Site Wide Landscape Plan and Chalkers Corner Landscape GA Plan in **Drawings 3 and 4**.
- 3.9. Details on species and exact numbers are not available at this stage, however it is understood that there will be a mix of evergreen and deciduous trees, with up to 163 new trees proposed. It is recommended species choice is influenced by those found within the local area in addition to those which grow well in challenging urban environments. New tree planting will include specimen trees, native ornamentals, fruit / nut / berry producing trees, hardy native columnar street trees and courtyard ornamentals. Further details can be found within the Landscape Design and Access Statement prepared by Gillespies LLP submitted with Planning Application A.
- 3.10. The further diversification of species mix and age (light standards to semi-mature trees are proposed) across the Site would enhance the Site with regards to general environmental resilience and would be of assistance in longer term management. Tree planting will add diversification of age / species and support longer term biosecurity and disease resilience on Site.

### Trees to be Retained

- 3.11. All remaining trees are currently retained and integrated within the landscape masterplan as part of the Development (135 trees/groups in total). This includes the retention of several significant features, including the linear avenue of London Plane trees along Ship Lane (T48-T58), the avenue of trees along Lower Richmond Road (T67-T82), the off-Site trees bordering the River Thames (G58a-G58w) and a number of those along the north-western boundary of the Stag Brewery component of the Site, as discussed below.
- 3.12. T48-T58 along Ship Lane potentially have a long life expectancy in this location (perhaps 50-100 years+) and their retention within the Development will maintain the amenity, landscape and screening value these trees offer to this location. The Development will also provide the opportunity to improve both the growing conditions and public amenity value of these trees. This is likely to include the careful removal of some / all of the concrete hardstanding surrounding them and carefully demolishing and removing the existing boundary wall to the east of this line of trees.

- 3.13. The retention of trees along Lower Richmond Road (T67-T82) will filter views of the proposed built form within the Stag Brewery component of the Site. These trees would benefit from ongoing management including a gradual programme of replacement planting to ensure the integrity of this tree line is maintained.
- 3.14. The location of the proposed crossing between Mortlake Green and the Stag Brewery component of the Site has been carefully considered to ensure the retention of G155, two 'A' Category trees located within Mortlake Green and at the head of Mortlake High Street (designated as a Conservation Area). Here, the crossing has been re-located further away from its initial position near this corner to avoid the removal of these trees to facilitate the visibility that would have been required to implement a crossing in this location.

### Protection of Existing Trees to be Retained

- 3.15. Where existing trees are retained in proximity to construction work, tree protection would be required to mitigate for potential above and below ground impacts and ensure these trees are retained successfully. The factors which most commonly result in below ground damage affecting oxygen diffusion and availability of water (and which therefore must be avoided) include:
- Compaction of the ground;
  - Any change in soil levels (even if temporary), including ground excavation and soil stripping;
  - Covering the root zone with impervious surfaces;
  - A rise in the water table level or ground saturation; and
  - Damage by the direct toxicity of some materials (e.g. petrol, oil and lime in cement can kill underlying roots).
- 3.16. Tree protection should generally accord with the recommendations contained within BS5837:2012. Ideally the area occupied by the canopy spread or RPA, (whichever is the greater) should be secured as a Construction Exclusion Zone (CEZ) where no unauthorised access or construction operations (including Site compounds / facilities / storage of materials) are permitted, in order to protect the ground from compaction or excavation and canopies from physical damage. This should be secured by means of temporary protective fencing as shown in **Drawings 5 and 6** with weatherproof signage as per the examples provided within **Appendices C, D and E**. Given the urbanised nature of the Site, traditional tree protection fencing will not be a practical solution with regards to certain trees. Instead, temporary tree protection boxes would be installed with weatherproof signage as per the examples provided within **Appendix F** and as shown on **Drawings 5 and 6**. Where construction or soft landscape works are required within the RPA of retained trees, the area within the canopy spread and / or RPA of these trees, (whichever is the greater) would become a **Construction Working Area (CWA)**. All demolition and construction works affecting the CWA would be carefully planned and executed via a Site specific Arboricultural Method Statement to manage and minimise damage to the retained trees. Most tree roots can be expected to be found within the upper soil horizons (usually the top 600mm of field soil) and soft landscape operations within the CWA should have regard to the potential presence and protection of tree roots within this location.
- 3.17. Tree protection systems have not been illustrated on the Stag Brewery Component of the Site (excluding the School Application B) as these will be confirmed at the detailed design stage.

- 3.18. The location / extent of individual CWAs should be identified and marked on Site prior to the commencement of any construction operations. In addition to the principles outlined within BS5837:2012, it is therefore recommended that the Works within the CWAs are planned and developed using the following method statement which includes the following principles;
- Select site access routes and construction plant that can safely access the Site given the physical constraints imposed by the height of the existing retained tree canopies;
  - For construction purposes, systems for the control and suppression of dust, hydrocarbons, cementitious and other phytotoxic elements should be employed to prevent damage to the adjacent trees;
  - Do not store materials or construction plant within the canopy spread or RPA of trees to be retained;
  - In order to minimise damage to shallow tree roots, it is recommended that the depth of any excavation work within the CWA is minimised to reduce the potential to expose and/or damage shallow tree roots;
  - Where any existing surface within the CWA is removed, this area should be protected from excessive compaction from people/plant. This should include the use of temporary ground protection and selection of light, tracked plant over heavier, wheeled alternatives;
  - Consideration should be given to the use of permeable paving/surfacing systems within the RPA of retained trees in order to assist with the long-term passive infiltration of air and water into the rootzone. The use of Cellweb TRP systems or similar 3D cellular confinement systems is also recommended;
  - Where new underground services cannot be routed outside the CWA, excavation for these should be undertaken by hand or air-spade to prevent damage to retained tree roots;
  - Where tree roots are encountered during essential ground intrusive works, roots exceeding 25mm diameter should remain undamaged, intact and protected by damp hessian/straw to prevent desiccation prior to backfilling with arisings from the original excavation; and
  - Where tree roots below 25mm diameter are encountered, and cannot be retained, these can be cut with a single, sharp saw to minimise the cut area and potential for ingress of pathogens or diseases. Any torn/damaged roots should similarly be cut back to sound wood with a clean cut.
- 3.19. Should any tree surgery be proposed to retained trees to facilitate construction access, this would be undertaken by an Arboricultural Association Approved Contractor with works compliant with BS3998:2010 and BS5837:2012. Trees to be felled or vegetation to be removed should be clearly marked. Tree work should be timed to avoid the bird nesting season and other potential ecological constraints (e.g. bats), subject to consultation with an ecologist. If required, tree surgery work on trees with deadwood, cavities, split / lifted bark and dense ivy should be carried out under an Ecological Watching Brief. Care should be taken not to damage any surrounding vegetation to be retained.
- 3.20. The tree protection measures recommended above should be managed through an Arboricultural Method Statement (MS) that is bespoke to the Site and activities concerned, including detailed construction proposals and final position of fencing / construction working areas as agreed with the Main Contractor.

## 4. Summary

- 4.1. The Site and survey area included trees of mostly semi-mature to early-mature age; a number of which are subject to an Area Tree Preservation Order or located within the Mortlake Conservation Area. Trees are largely located along the boundaries of the Site or in the middle of the Site, open green space, the River Thames towpath, streets or Mortlake Green. The tree survey comprised a total of 163 individual trees, 36 tree groups and 1 hedgerow which are listed in the schedule of existing trees within **Appendix B** and shown on **Drawings 1 and 2**. The trees on Site are mostly similar in age, likely dating to the current 20<sup>th</sup> Century brewery development, with the exception of three trees (T13, T18 and T41) which although recently felled, show signs of vigorous regeneration and may be derived from a previous phase of residential development on the Site from the late 19<sup>th</sup> Century. A summary of the trees surveyed and their Category Grading are described in **Table 2**.

Table 2: Category Grading of Trees / Groups / Hedge

Category	Quantity	Description
A	13	T3*, <b>T29*</b> , T48*, T49*, T50*, T51*, T52*, T53*, T54*, T55*, T56*, T57*, and G155
B	96	T4*, <b>T5*</b> , <b>T6*</b> , <b>T7*</b> , <b>T8*</b> , <b>T9*</b> , <b>T10*</b> , <b>T11*</b> , <b>T14*</b> , <b>T15*</b> , <b>T25*</b> , <b>T26*</b> , <b>T27*</b> , G42*, T43*, T44*, <b>T45*</b> , <b>T46*</b> , G58g**, G58k**, G58l**, G58s**, G58t**, G58u**, G58w**, <b>T64*</b> , T67*, T68*, T70*, T71*, T73*, T74*, T75*, T76*, T77*, T78*, T79*, T82*, T83*, T84*, T85*, T86*, <b>T88*</b> , <b>T90*</b> , <b>T93*</b> , <b>T94*</b> , <b>T95*</b> , <b>T96*</b> , <b>T97*</b> , <b>T98*</b> , <b>T99*</b> , <b>T100*</b> , G101, T103, G104, T106, T107, <b>T111</b> , T116, <b>G117 (part removed)</b> , T118, <b>T121</b> , <b>T122</b> , T123, T129, G131, <b>T133</b> , <b>T134</b> , <b>T136</b> , <b>T137</b> , T140, T143, T144, T145**, G146**, G148, T149, G150, G151, T153, T154, G156, T157, T158, T159, T161, T163, G164, T165, G166, G167, G169, T170, G174, T175 and G176
C	83	<b>T1*</b> , <b>T2*</b> , <b>T13*</b> , <b>T16*</b> , <b>T17*</b> , <b>T18*</b> , T19*, T20*, T21*, <b>T22*</b> , <b>T23*</b> , <b>T24*</b> , <b>T31*</b> , <b>T32*</b> , <b>T33*</b> , <b>T34*</b> , <b>T35*</b> , <b>T36*</b> , <b>T37*</b> , T38*, T39*, T40*, T41*, G47 ( <b>part removed</b> )*, G58a**, G58b**, G58c**, G58d**, G58e**, G58f**, G58h**, G58i**, G58j**, G58m**, G58n**, G58o**, G58p**, G58q**, G58r**, G58v**, <b>T59**</b> , <b>T60**</b> , T61*, <b>T62*</b> , <b>T63*</b> , <b>T65*</b> , <b>T66*</b> , T69*, T72*, T80*, T81*, <b>T87*</b> , <b>T89*</b> , <b>T91*</b> , <b>T92*</b> , H102*, T105, T108, G109, T110, <b>G112</b> , T113, T114, G115, <b>T120</b> , T124, <b>T125</b> , <b>T126</b> , T127, T128, T130, G132, T142, <b>G147**</b> , T152**, T160, G162, T168, T171, G172, T173, G177 and T178
U	8	T12*, T28*, T30*, T119, T135, G138, G139 and G141

Nb. **Bold** denotes trees to be removed. \* indicates trees covered by Tree Preservation Order T0880/2016 and \*\* indicates trees within Mortlake Conservation Area.

- 4.2. The 'A' Category trees present on Site are awarded a slightly higher value than might otherwise be afforded to boundary trees due to their strategic screening and amenity value to the Site and adjacent public realm in that they form part of formal / semi-formal groups or are of significant size. Some 'C' Category trees have been graded as such due to their immaturity, however a number of these trees have the potential to increase in value as they mature on Site. The 'U' category trees on Site are either in severe decline, are dead or are considered to be impeding the growth or natural development of adjacent trees of superior quality and / or value and as such their removal in the medium to long term is recommended.

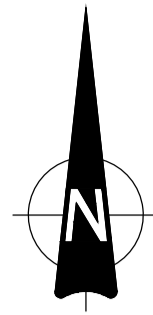
- 4.3. Where trees are currently retained within the Site, protection measures will be required to mitigate for potential above and below ground impacts and ensure these trees are retained successfully. Although the Development will result in the removal of a number of 'B' Category trees and one 'A' Category tree due to direct conflicts with the proposals, the Development provides an important opportunity to improve the growing conditions of some retained trees within the Site (i.e. the London Plane trees along Ship Lane). In addition, the further diversification of species mix and age across the Site as a result of mitigatory and new tree planting would enhance the Site with regards to environmental / disease resilience and biosecurity in addition to providing scope for informed management of trees across the Site. The current loss (and replacement) of trees as identified within this report is not considered to significantly affect the screening, amenity and habitat value provided on Site.
- 4.4. This Tree Survey Report and Impact Assessment should be used to guide the detailed design process of the Development regarding existing arboricultural constraints. Once detailed scheme proposals including soft landscape have been agreed, this report should be updated accordingly.



## DRAWINGS

Drawing 1: Tree Survey (Sheet 1 of 2) (ref. WIE10667-100-SA-77-7701-A01)





This drawing should not be scaled. Dimensions to be verified on site. Any discrepancies should be referred to the Engineer prior to work being put in hand.  
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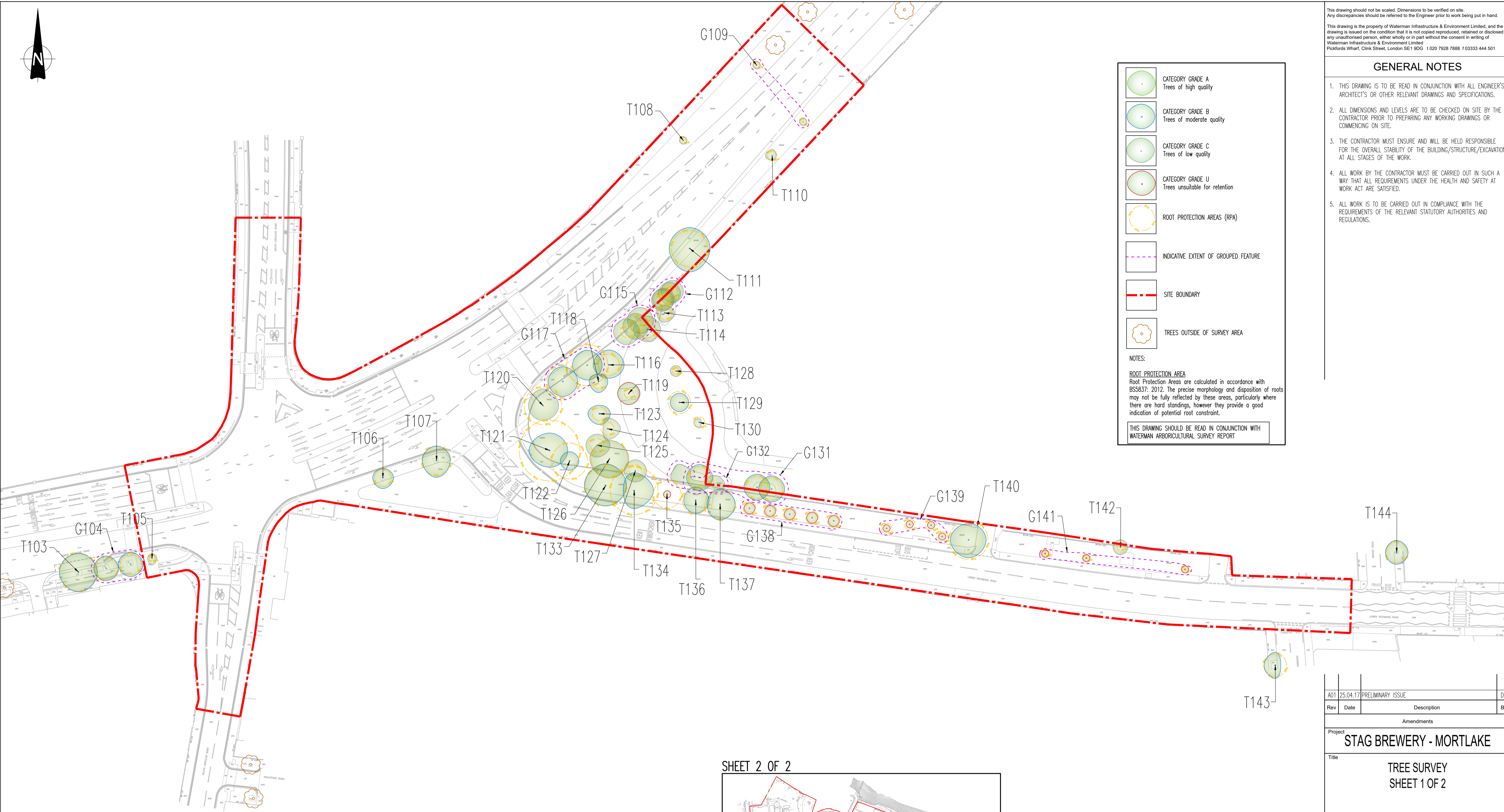
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2. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.
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	CATEGORY GRADE A Trees of high quality
	CATEGORY GRADE B Trees of moderate quality
	CATEGORY GRADE C Trees of low quality
	CATEGORY GRADE U Trees unsuitable for retention
	ROOT PROTECTION AREAS (RPA)
	INDICATIVE EXTENT OF GROUPED FEATURE
	SITE BOUNDARY
	TREES OUTSIDE OF SURVEY AREA

NOTES:  
**ROOT PROTECTION AREA**  
 Root Protection Areas are calculated in accordance with BS5837: 2012. The precise morphology and disposition of roots may not be fully reflected by these areas, particularly where there are hard standings, however they provide a good indication of potential root constraint.

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH WATERMAN ARBORICULTURAL SURVEY REPORT



Rev	Date	Description	By
A01	25.04.17	PRELIMINARY ISSUE	DC

Amendments

Project  
**STAG BREWERY - MORTLAKE**

Title  
**TREE SURVEY SHEET 1 OF 2**

Client  
DARTMOUTH CAPITAL ADVISORS LTD

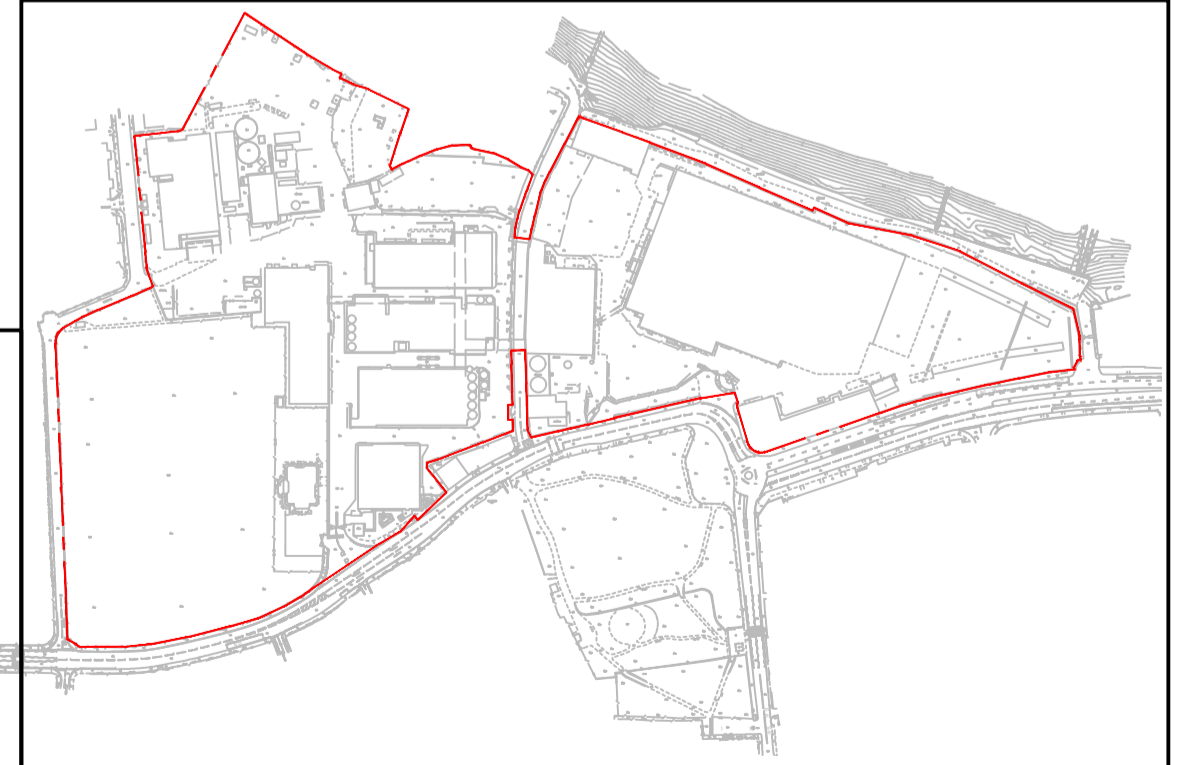
Merchants House Wapping Road Bristol BS1 4RW  
 0117 637 8200  
 mail@watermangroup.com www.watermangroup.com

Drawing Status  
**PRELIMINARY**

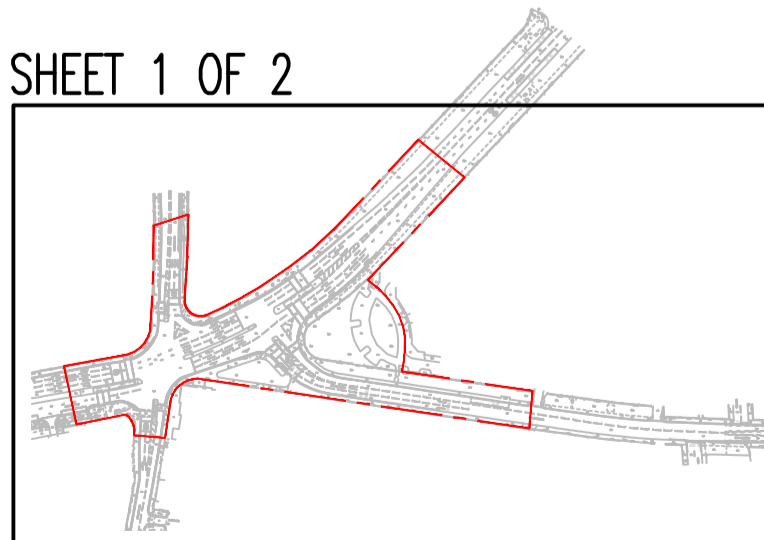
Designed by	RA	Checked by	TA	Project No
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Number	77	Revision	100	

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SHEET 2 OF 2



SHEET 1 OF 2

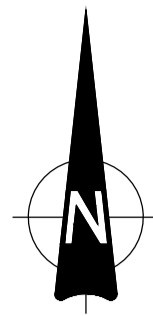






Drawing 2: Tree Survey (Sheet 2 of 2) (ref. WIE10667-100-SA-77-7702-A01)





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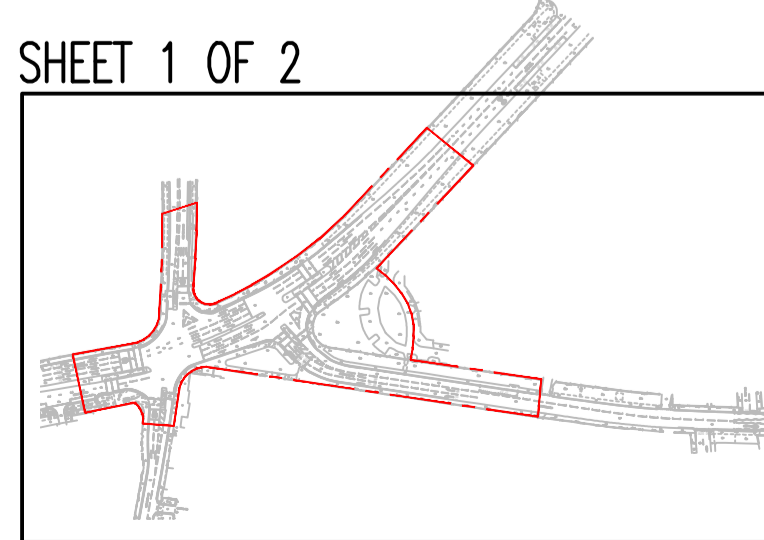
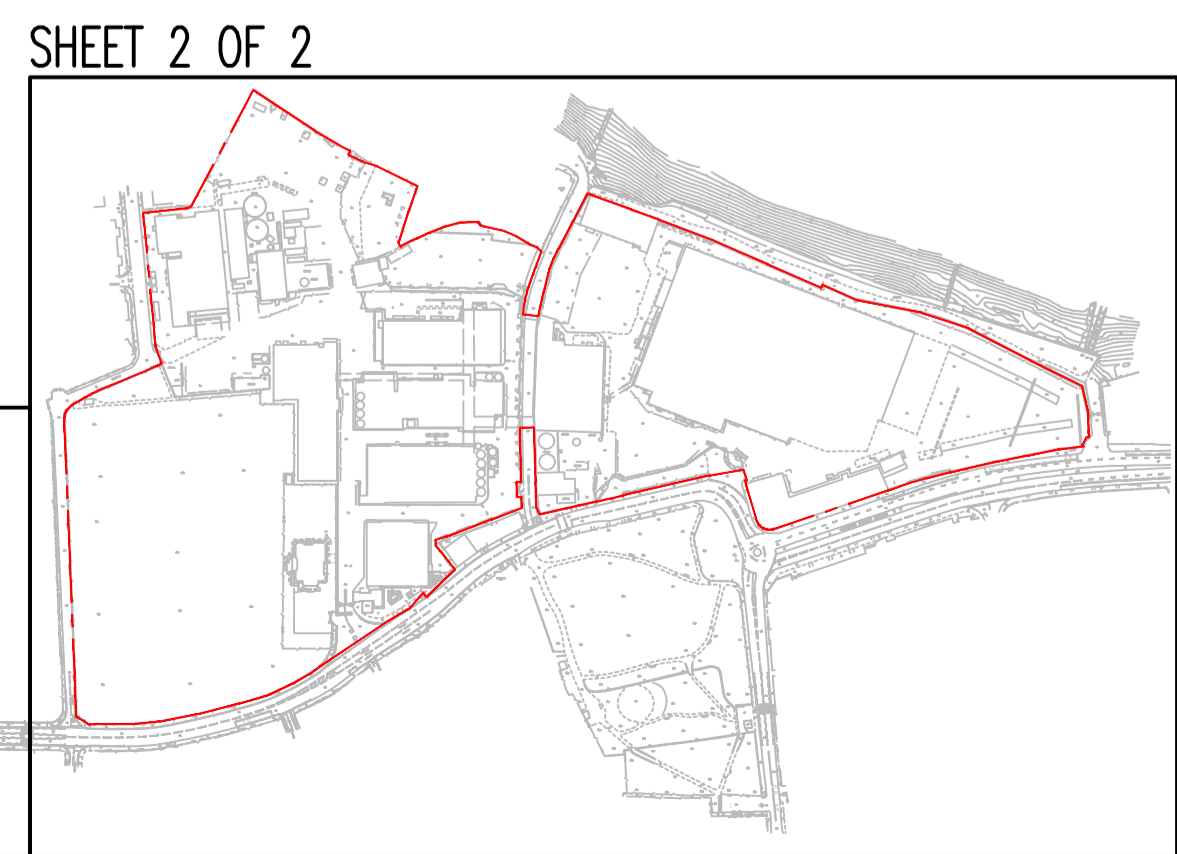
Rev	Date	Description	By
A01	25.04.17	PRELIMINARY ISSUE	DC

**Amendments**

Project	STAG BREWERY - MORTLAKE
Title	TREE SURVEY SHEET 2 OF 2
Client	DARTMOUTH CAPITAL ADVISORS LTD

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Drawing Status				
<b>PRELIMINARY</b>				
Designed by	RA	Checked by	TA	Project No
Drawn by	DC	Date	FEB 16	WIE10667
Scale	@ A1	N.T.S		Work Order No
Scale	work to figured dimensions only			100
Publisher	Zone	Category	Number	Revision
WIE	SA	77	7702	A01







Drawing 3: Proposed Site Wide Landscape Plan (Gillespies drawing no. P10736-00-001-101  
Revision D04)