

**THAMES YOUNG MARINERS,
RIVERSIDE DRIVE, RICHMOND,
GREATER LONDON**

**ARBORICULTURAL IMPACT
ASSESSMENT**

A Report to: Pick Everard

Report No: RT-MME-157100-02

Date: August 2022



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REPORT VERIFICATION

This study has been undertaken in accordance with British Standard 5837:2012 "*Trees in Relation to Design, Demolition and Construction - Recommendations*".

Report Version	Date	Completed by:	Checked and Approved by:
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DISCLAIMER

The contents of this report are the responsibility of Middlemarch Environmental Ltd. It should be noted that, whilst every effort is made to meet the client's brief, no site investigation can ensure complete assessment or prediction of the natural environment.

Middlemarch Environmental Ltd accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

VALIDITY OF DATA

The findings of this study are based upon the survey data produced as part of the Preliminary Arboricultural Assessment which is valid for a period of 12 months from the date of survey. If a planning application has not been submitted by this date, an updated site visit should be carried out by a suitably qualified and experienced arboriculturist to assess any changes to the trees and hedgerows on site to inform a review of the conclusions and recommendations made.

It should be noted that trees are dynamic living organisms that are subject to natural changes as they age or are influenced by changes in their environment. As such, following any significant meteorological event or changes in the growing environment of the trees they should be re-assessed by a suitably qualified and experienced arboriculturist.

This Arboricultural Impact Assessment has been produced following a review of a proposed development layout for the site based on data provided by the client. Should the development proposals change, this report will need to be updated to assess the impact of the amended development.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND AND SITE DESCRIPTION

Middlemarch Environmental Ltd were commissioned by Pick Everard to undertake an Arboricultural Impact Assessment as part of a planning application for redevelopment at Thames Young Mariners, Riverside Drive, Richmond, Greater London. The site under consideration is located at Ordnance Survey Grid Reference TQ 1648 7232. The location of the trees surveyed can be found on Middlemarch Environmental Ltd Drawing Number C157100-01-01, provided in Section 10 of this report.

A survey of the trees and hedgerows on site and within influencing distance of the boundaries was undertaken on the 23rd and 25th March 2022. This survey was completed to aid design and avoid unnecessary tree removal.

This Arboricultural Impact Assessment has been carried out in accordance with British Standard 5837:2012 '*Trees in Relation to Design, Demolition and Construction - Recommendations*' (hereafter referred to as BS5837). BS5837 sets out a structured assessment methodology to assist in determining which trees would be considered suitable or unsuitable for retention in the context of the proposed development.

The purpose of this report is to:

- Identify the potential impact of the proposed development upon the existing trees and hedgerows identified during the Preliminary Arboricultural Assessment in accordance with BS5837:2012 "*Trees in Relation to Design, Demolition and Construction - Recommendations*".
- Provide a Tree Retention Plan that identifies the trees and hedgerows to be retained and incorporated into the proposed development including Root Protection Areas (RPA) for the retained trees. The Tree Retention Plan also identifies trees and hedgerows that are to be removed to facilitate the development proposals.
- Identify mitigation proposals to offset any tree or hedgerow loss as part of the development proposals.
- Identify all areas where specific working methods will be required to ensure protection to trees as part of an Arboricultural Method Statement.

1.2 DEVELOPMENT PROPOSALS

The proposed development of the site includes the demolition of an existing building and construction of new buildings, as well as associated soft and hard landscaping which includes a widened access road and enhanced parking facilities.

The proposed development has been designed so that safe and healthy existing trees are retained wherever possible and that those trees to be retained are not significantly impacted upon by the development.

1.3 DOCUMENTATION PROVIDED

This assessment is based upon the information provided by the client in addition to information collected by Middlemarch Environmental Ltd during the Preliminary Arboricultural Assessment. The documents and drawings considered are detailed within Table 1.1.

Author	Document	Drawing Number	Date
Pick Everard	Landscape Masterplan	PR-200-PEV-XX-XX-DR-L-00200 P05	02/08/2022

Table 1.1: Documentation Provided

2. METHODOLOGY

2.1 DESK STUDY

Consultation with the Local Planning Authority was undertaken to identify if any of the trees present within or near the site are protected by Tree Preservation Orders (TPOs) or if the site is situated within a Conservation Area.

An online search using the Multi Agency Geographical Information for the Countryside (*MAGIC*) website for statutory conservation sites was also undertaken (where appropriate) to determine the presence of Ancient Woodland within 15.0 metres of the site boundary.

2.2 SURVEY SCOPE

To determine the status of the trees and hedgerows within the site, a full arboricultural survey has been undertaken, assessing the species and status of all trees and hedgerows present. This survey has been carried out in accordance with British Standard 5837:2012 '*Trees in Relation to Design, Demolition and Construction – Recommendations*'.

All trees and hedgerows have been assigned a unique reference number. Individual trees above 75 mm in diameter (at 1.5 m above ground level) have had their position plotted to the Tree Survey Plan. Trees, and hedgerows were visually assessed and a schedule prepared listing:

- Tree number,
- Species,
- Tree height,
- Stem diameter at 1.5 m above ground level (or in accordance with Annex C of BS5837:2012),
- Crown spread (cardinal points where necessary),
- Minimum crown clearance,
- Age class,
- Condition and;
- Preliminary management recommendations (where required).

Measurements for tree height, minimum crown clearance and crown spread were taken to an accuracy of 0.5 m. Stem diameter measurements were recorded to the nearest 10 mm. Any specific observations or management recommendations were also noted. All observations and measurements are included in Appendix A Tree Schedule.

Trees and hedgerows were assessed and assigned one of the following categories:

- **Category U:** Trees 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.
- **Category A:** Trees of high quality with an estimated remaining life expectancy of at least 40 years.
- **Category B:** Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
- **Category C:** Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm.

Categories A, B and C have further sub-categories with regards to the reasons for tree retention:

- 1: Mainly arboricultural qualities.
- 2: Mainly landscape qualities.
- 3: Mainly cultural values, including conservation.

N.B. Certain category U trees may possess existing or potential conservation value which make them desirable to preserve in the context of wildlife habitat (e.g. areas with limited public access).

2.3 ROOT PROTECTION AREA (RPA)

In order to avoid damage to the roots or rooting environment of retained trees, the RPA has been calculated for each of the Category A, B and C trees in accordance with section 4.6 of BS5837. This is a minimum area around a tree which is deemed to contain sufficient roots and rooting volume to maintain the tree's viability. Where groups of trees have been assessed, the Root Protection Area has been shown based on the maximum sized tree stem in each group and so may exceed the Root Protection Area required for some of the individual specimens within the group. Further detailed inspection of the individual trees forming a group may be required where development impacts upon individual trees forming the combined group.

Protection of the roots and soil structure within the RPA should be treated as a priority. These figures have been calculated utilising the formulas within Section 4.6 and Annex D of British Standard 5837:2012.

2.4 TREE SCHEDULE

Appendix A details the individual trees, groups and hedgerows found during the assessment and includes the relevant information for each at the time of inspection. General observations of any structural and physiological condition and the presence of any decay or physical defects have also been included. Preliminary management recommendations have also been recorded where appropriate.

2.5 HEDGEROWS

For the purposes of this assessment, a hedgerow is described as a line of trees or shrubs with canopies less than 5.0 m wide which is regularly managed through pruning. Where trees are present within a hedgerow that are significantly different in character from the remainder, these have been identified and recorded separately. A tree survey in accordance with BS5837 does not assess hedgerows against the Hedgerow Regulations 1997 or from an ecological perspective.

2.6 ASSESSMENT LIMITATIONS

This survey has been undertaken in accordance with BS5837 recommendations only. Trees under 75mm in diameter and the specific location of species within a hedgerow have not been identified in accordance with the guidance. It may therefore be necessary during detailed design to undertake further assessment and accurate positioning of juvenile trees or woody species within hedgerows and tree groups to assist structural calculations for foundation design of structures in accordance with current building regulations and NHBC Chapter 4.2 *Building near Trees*.

The exact position of individual trees or species included as part of a tree group or hedgerow should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken.

2.7 CONDITIONS OF TREE SURVEY

The survey was completed by a suitably qualified and experienced Arboriculturist from ground level only and from within the boundary of the site. Aerial tree inspections or the internal condition of the stem/s or branches was not undertaken at this stage. Evaluation of tree condition given within this assessment applies to the date of survey and cannot be assumed to remain unchanged. It may be necessary to review these within 12 months, in accordance with sound arboricultural practice.

2.8 TREE SURVEY PLAN

The Tree Survey Plan seeks to act as a design tool that shows potential opportunities for inclusion of the existing trees and hedgerows across the site as well as the above and below ground constraints which should be considered during the design process.

2.9 TREE RETENTION PLAN

The Tree Retention Plan identifies which trees and hedgerows are to be retained and incorporated as part of the site development and which are to be removed. The positions of trees and hedgerows and their current crown spread that are to be removed have been shown on the Tree Retention Plan with a dashed outline.

All survey data is based on a topographical survey where possible, supplied by the client. Where topographical information has not identified tree positions or Ordnance Survey mapping has been utilised, trees and hedgerows have been positioned using GPS and aerial photography to provide approximate locations in relation to existing surrounding features. Further confirmation of tree and hedgerow locations through a topographical survey of the site is recommended to ensure future design accuracy.

3. STATUTORY PROTECTION

3.1 TREE PRESERVATION ORDER AND CONSERVATION AREA DESIGNATIONS

It is understood following consultation with Richmond and Wandsworth Council, that there are no Tree Preservation Orders or Conservation Area designations that would apply to any trees present on, or in close proximity to the assessment site and therefore no statutory constraints would apply to the development in respect of trees.

Reference to the Multi Agency Geographical Information for the Countryside (MAGIC) website indicates that no ancient woodland is present within a 15.0 m buffer of the survey area.

3.2 PROTECTED SPECIES

Bats

Mature trees often contain cavities, hollows, peeling bark or woodpecker holes which provide potential roosting locations for bats. Bats and the places they use for shelter or protection (i.e. roosts) receive European protection under The Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2017). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. Consequently, causing damage to a bat roost constitutes an offence.

Generally, should the presence of a bat roost be suspected whilst completing works on any trees on site then an appropriately licensed bat worker should be consulted for advice.

Birds

Trees and hedgerows offer potential habitat for nesting birds which are protected under the Wildlife and Countryside Act WCA 1981 (as amended). Some species (listed in Schedule 1 of the WCA) are protected by special penalties. This legislation makes it an offence to intentionally or recklessly damage or destroy an active bird nest or part thereof.

As the trees on, and adjacent, to the site provide potential habitat for nesting birds all tree work should ideally be completed outside the nesting bird season (Generally March to September).

If this is not possible then the vegetation should be subject to a nesting bird inspection by a suitably experienced ecologist prior to commencement of works. If any active nests are identified then the vegetation, and a defined buffer zone, will need to remain in place until the young have naturally fledged.

4. RESULTS SUMMARY

4.1 PRELIMINARY ARBORICULTURAL ASSESSMENT

Thirty-six individual trees, nineteen groups of trees and two hedgerows were surveyed as part of the Preliminary Arboricultural Assessment. Trees assessed during the survey are listed as individual trees and groups of trees in the Tree Schedule (Appendix A) in accordance with BS5837:2012 recommendations. Table 4.1 provides a summary of the survey results in terms of categorisation.

BS5837:2012 Category	Tree/ Group/ Hedgerow Reference
U	T25, T26.
A	T21, T22, T24.
B	T1, T3, T6, T8, T9, T10, T12, T13, T14, T15, T17, T19, T20, T23, T34, G2, G4, G7, G8, G9, G10, G19.
C	T2, T4, T5, T7, T11, T16, T18, T27, T28, T29, T30, T31, T32, T33, T35, T36, G1, G3, G5, G6, G11, G12, G13, G14, G15, G16, G17, G18, H1, H2.

Table 4.1: Summary of Trees, Groups and Hedgerows in BS5837:2012 Categories

The 25-acre outdoor activity centre is situated between Richmond and Kingston, alongside the River Thames and comprises a 10-acre lake nestled within a mixture of open green space and tree cover. The site supported a diverse range of planted tree specimens as well as self-seeded and closed-canopy tree cover which offered a range of arboricultural and conservation value to the site.

The site contained three high value English Oak trees located on the southern site boundary. These specimens (T21, T22, T24) were considered noteworthy and as such, Retention Category A trees. All three trees presented good structure and vigour, with only a small number of noted defects which include – minor deadwood, pruning wounds and historic branch stubs.

Fifteen individual trees and seven groups of trees assessed on site exhibited moderate value and were categorised as ‘Retention Category B’. These trees presented good retention value due to their arboricultural and landscape qualities which are likely to continue for at least 20 years. Tree groups G7 and G10 were particularly prominent as together they provide tangible arboricultural and cultural value which is clearly visible through the presence of a sustainable and well-managed forest school located within these areas. Another stand-out specimen which delivered high amenity value to the site was a mature Lombardy Poplar (*Populus nigra 'italica'*) which was visible from almost any part of the site.

Two trees (T25, T26) identified during the survey were considered to be unsuitable to retain due to the presence of a combination of major defects as well as their reduced remaining life expectancy of less than 10 years. Therefore, these trees – a mature crack willow (*Salix fragilis*) and a mature sycamore (*Acer pseudoplatanus*), which were both located along the Northern site boundary were categorised as ‘U’.

The remaining trees, groups of trees and hedgerows that were identified within the survey (See Table 4.1) were all considered to present a low retention value and designated Retention Category C. These trees were broadly spread across the site and either exhibited low quality due to a combination of defects or their juvenility. Moreover, they were deemed to provide little beneficial impact to the site with an estimated remaining contribution timescale of approximately ten to twenty years.

5. ARBORICULTURAL IMPACT ASSESSMENT

5.1 INTRODUCTION

This section of the report details the potential impacts that the proposed development may have upon the site's tree stock. The assessment has been based upon the documents detailed in Table 1.1 with reference to the results of the Preliminary Arboricultural Assessment. The location of the trees can be found on the Tree Survey Plan and a schedule of the trees (Appendix A) attached to this report.

5.2 IMPACTS FROM DEVELOPMENT LAYOUT

5.2.1 Tree Retention and Removal

The proposed development has been designed so that, where possible, existing trees are retained, however, to accommodate the proposed development, it will be necessary to partially remove one group.

The trees to be removed are detailed within Table 5.1 and are identified on the Tree Retention Plan, attached to this report. All trees, groups and hedgerows not featured within Table 5.1 are to be retained within the proposed development.

Group Reference	Species	Retention Category	Reason for Removal
G8*	Bird cherry Wild cherry	B	Entrance widening.
<u>Key</u>			
*: Partial removal of trees within group.			

Table 5.1: Tree Removal

The proposed development will require the partial removal of one group (G8) to facilitate the widening of the existing entrance, this group was located behind an outgrown hedgerow and its loss is unlikely to result in an impact to the visual amenity of Richmond Drive. The partial loss of tree group G8 should not cause objection as new planting and management of the site can provide suitable mitigation.

5.2.2 Tree Pruning

Pruning of mature trees should only be undertaken where essential, to prevent open wounds that allow the ingress of decay and provide an opportunity for fungal spores to infect the tree. Pruning works should ideally be undertaken during the winter months when the tree is dormant or during the summer months when the tree is fully active. Autumn pruning (when fungal spores are abundant in the surrounding atmosphere) should be avoided if possible. Juvenile trees should be formatively pruned in their early years to reduce the presence of potential defects into maturity that would reduce their lifespan.

All tree pruning works should be detailed as part of an Arboricultural Method Statement and completed in accordance with the current best practice guidance set out within BS3998:2010 "*Tree Work – Recommendations*" by suitably competent, qualified, and insured arboricultural contractors. It is recommended that the extent of pruning required is then identified to contractors in a pre-commencement site meeting as part of the enabling works.

5.3 IMPACTS FROM DEMOLITION AND RELATED OPERATIONS

5.3.1 Building Demolition

T1 is located close to demolition works. However, these works are not located within its RPA and as such no direct impact is likely. This tree should be protected during demolition works and Tree Protection Barriers should be erected prior to undertaking these works.

5.3.2 Removal of Hard Surfaces

Removal of hardstanding is not required within the RPAs of retained trees.

5.4 DIRECT IMPACTS FROM CONSTRUCTION

5.4.1 Works within RPAs

Some aspects of the proposed development will require works within the RPAs of retained trees as detailed within Table 5.2.

Tree/ Group Reference	Species	Retention Category	Initial RPA	Affected m ²	Affected RPA (%)	Proposed Works
T3	Lombardy Poplar	B	272	78	29	Mulch surfacing
T5	Hawthorn	C	56	17	30	Mulch surfacing
T7	Sycamore	C	81	13	16	Mulch surfacing
G19	Mixed species	B	-	10	-	Mulch surfacing

Table 5.2: Works in RPAs and Canopy Spreads

It should be noted that the RPAs affected by mulching works are already hard surfaced, therefore these works are unlikely to impact these trees. It should be noted that all works within the Root Protection Areas or beneath the canopy spreads of retained trees should be detailed as part of an Arboricultural Method Statement to ensure the method of construction is suitably considered.

5.4.2 Underground and Overhead Utilities

Wherever possible, common service trenches should be specified to minimise land take associated with underground service provision and facilitation access for future maintenance.

5.5 IMPACTS FROM CONSTRUCTION RELATED OPERATIONS

5.5.1 Site Access

It is understood that construction access to the site will be provided through the existing access from Richmond Drive and it may therefore be necessary to undertake access facilitation pruning works to low-hanging branches to minimise the potential for vehicular impact.

It will be necessary to ensure retained trees adjacent to the access route are protected from vehicular impact through the installation of tree protection barriers, prior to the commencement of the development.

5.5.2 Site Compound, Contractors Car Parking, Delivery and Storage of Materials

Material deliveries to the site will utilise the existing entrance off Richmond Drive. Retained trees will be protected from harm by the prior installation of tree protection barriers and the completion of access facilitation pruning works (if required).

The site compound, contractor's parking, and areas for materials storage within the site should be confirmed as part of an Arboricultural Method Statement following approval of the current planning application.

5.6 POST-DEVELOPMENT IMPACTS

5.6.1 Shading

The shade from trees can be considered both a constraint and opportunity and therefore its effect upon the new development should be fully considered to ensure a harmonious and sustainable relationship can be achieved. When considering the position and orientation of new buildings in relation to existing trees, primary living areas should receive the largest proportion of natural sunlight. BRE guidelines recommends "*at least half of the garden or open space should receive at least two hours sunlight on March 21 (Spring Equinox)*".

5.6.2 Future Pressure for Removal

The layout of the proposed development is such that future pressure for tree removal is generally unlikely to occur.

5.6.3 Seasonal Nuisance

It is unlikely that a significant degree of seasonal nuisance will occur due to the lack of retained tree cover across the site.

The sweeping up of leaves and cleaning of gutters, which may become blocked by falling leaves, is considered routine seasonal maintenance and as such, no notable conflict with the proposed development is considered likely to occur. Nonetheless, it may prove appropriate in certain areas to use gutter guards, or otherwise enclosed gutters, to minimise the potential for leaf fall to cause blockage and an ongoing nuisance.

6. SUMMARY OF IMPACTS

The proposed development of the site is unlikely to significantly impact the visual amenity of the local area as a result of the proposed tree removal adjacent to the main entrance are unlikely to impact significantly upon the long-term health of retained trees.

Whilst some works are to be undertaken within the RPAs of retained trees, the nature of those works are such that they can be completed without impacting significantly upon the trees subject to the adoption of appropriate working practices as detailed in a future Arboricultural Method Statement following approval of the current planning application.

7. MITIGATION AND PROTECTION

7.1 INTRODUCTION

This section of the report details the mitigation for the proposed tree loss, initial protection and avoidance measures suggested to prevent harm to the retained trees.

7.2 NEW TREE PLANTING

New tree planting will form an integral part of the proposed development, however, proposals for new tree planting should be appropriate for the future use of the site and not just aim to mitigate the proposed tree loss.

As part of the development proposals, tree planting has been demonstrated on the plan Landscape plan produced by Pick Everard. The purpose and function of the new tree planting should be carefully considered so that key objectives from a wildlife habitat and landscape perspective can also be achieved.

The landscaping scheme should consider the use of both native tree species (for their low maintenance requirements and nature conservation value) and ornamental species (for their contribution to urban design and amenity value). Species choices should be selected on the basis of their suitability for the final site use. Careful consideration should be given to the following: ultimate height and canopy spread, form, habit, density of crown, potential shading effect, colour, water demand, soil type and maintenance requirements in relation to both the built form of the new development and existing properties.

Through careful species selection, the landscape scheme shall reduce the risk of trees being removed in the future on the grounds of nuisance. Nuisance can be perceived in a number of ways and vary from person to person however most commonly, within the context of trees, low overhanging branches, excessive shading, seasonal leaf fall and the perception that trees close to buildings cause damage.

Tree planting should be avoided where they may obstruct overhead power lines or cables. Any underground apparatus should be ducted or otherwise protected at the time of construction to enable trees to be planted without resulting in future conflicts.

7.3 GENERAL TREE PROTECTION

7.3.1 Construction Exclusion Zone

To minimise the potential for harm to the root systems and canopies of retained trees during development construction exclusion zones will be required throughout the site. These are areas surrounding the trees' RPAs and canopies in which construction works, or related activities, will be avoided.

It is recommended that the exclusion zones are always afforded protection using tree protection barriers and/or ground protection (specified in accordance with BS5837:2012). No works that cause compaction of the soil or severance of tree roots, except where undertaken in accordance with the guidance provided within this document or detailed within a subsequent AMS, will be undertaken within any exclusion zone.

7.3.2 Tree Protection Barriers

The protective barriers should be erected following any tree removal or tree surgery works and prior to the commencement of any construction site works e.g. before any construction materials or machinery are brought on site or the stripping of soil commences.

The protective barriers are to be constructed in accordance with the specification detailed in BS5837:2012. Any variation to the specification of the protective barrier should be agreed with the Local Planning Authority Arboricultural Officer or included as part of an Arboricultural Method Statement following approval of the current planning application.

7.3.3 Ground Protection

There are no areas on site where ground protection measures will require installation on this site.

8. ARBORICULTURAL METHOD STATEMENT

An Arboricultural Method Statement will be required for the site as various aspects of the proposed development will need to be fully considered due to the presence of retained trees.

The purpose of an Arboricultural Method Statement is to ensure that all site operations can occur with minimal risk of adverse impact upon trees that are to be retained. The document will identify all areas where specific working methods will be required to ensure protection to trees. The document will also specify the location and extent of tree protection barriers and ground protection.

In relation to this development the Arboricultural Method Statement should address the following:

- Tree Surgery
- Site setup and logistics
- Works within Root Protection Areas
- Working space to construct new buildings
- Suitable site access, material storage contractor's car parking and site compound locations.
- Final protective barrier and ground protection locations and specifications.
- Phased approach to development works to ensure retained trees are not impacted through demolition and new access construction works.
- Extent of access facilitation pruning works to be undertaken.
- Pre-commencement site meeting.

9. REFERENCES AND BIBLIOGRAPHY

British Standards Institution. (2010). *British Standard 3998:2010, Tree Work - Recommendations*. British Standards Institution, London.

British Standards Institution. (2012). *British Standard 5837:2012, Trees in Relation to Design, Demolition and Construction – Recommendations*. British Standards Institution, London.

Middlemarch Environmental Ltd. (2022). *Report Number RT-MME-157100-01*. Preliminary Arboricultural Assessment.

Littlefair P. (2011). *Site layout planning for daylight and sunlight: a guide to good practice* (BR 209). British Research Establishment, Watford.

10. DRAWINGS

Drawing Number C157100-01-01 – Tree Survey Plan

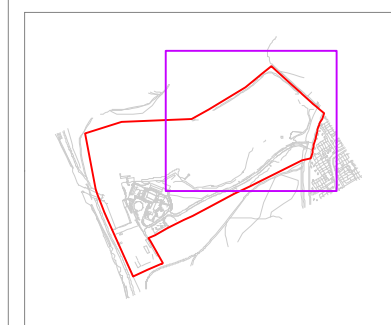
Drawing Number C157100-02-01 – Tree Retention Plan

Appendix A: Tree Schedule

Legend

- Tree location and stem diameter
 - Current canopy extent
 - Root Protection Area
 - Category A
 - Category B
 - Category C
 - Category U
 - Indicative tree shadow
 - Site boundary
- T - Tree
H - Hedgerow
G - Tree group

The original of this drawing was produced in colour - a monochrome copy should not be relied upon



NOTES

All dimensions to be verified on site. Do not scale this drawing, use figured dimensions only. All discrepancies to be clarified with Project Arboriculturalist. Drawing to be read in conjunction with Preliminary Arboricultural Assessment and Tree Schedule. Drawing has been produced in colour and is based on digital information in .dwg format, aerial images and/or GPS location where appropriate. A monochrome copy should not be relied upon. The exact position of individual trees or species included as part of a tree group, woodland or hedgerow should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths.

Trees are living organisms that change over time, the condition of all trees illustrated herein, are to be checked by the Project Arboriculturalist should works commence 12 months after the date of this survey. SOME TREES MAY BE SUBJECT TO STATUTORY CONSTRAINTS. IT IS THEREFORE ADVISED THAT NO WORKS SHOULD BE UNDERTAKEN TO ANY TREES ILLUSTRATED HEREIN WITHOUT FIRST OBTAINING THE RELEVANT AUTHORISATION TO DO SO UNLESS AGREED AS PER THE APPROVED PLANS THROUGH PLANNING CONSENT.

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Project **Thames Young Mariners,
Riverside Drive, Richmond**

Drawing **Tree Survey Plan - Page 1**

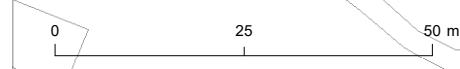
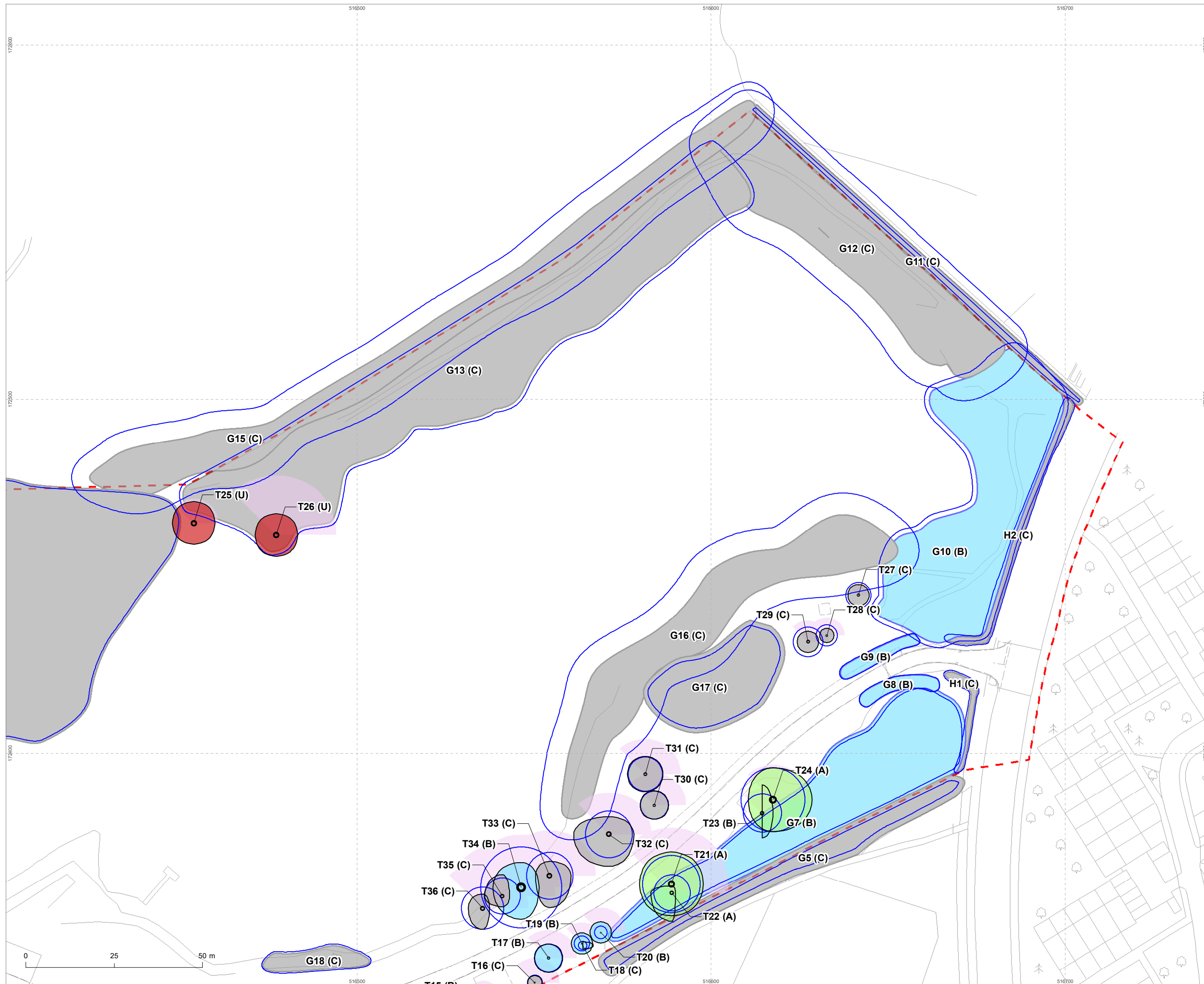
Client **Pick Everard**

Drawing Number C157100-01-01	Revision 00
Scale @ A3 1:1000	Date March 2022
Approved By LW	Drawn By CD



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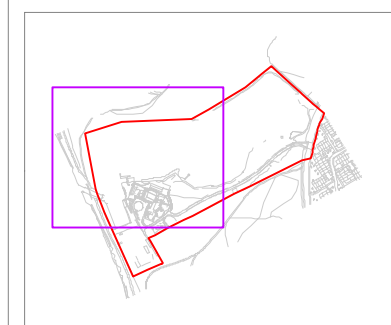
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Legend

- Tree location and stem diameter
 - Current canopy extent
 - Root Protection Area
 - Category A
 - Category B
 - Category C
 - Category U
 - Indicative tree shadow
 - Site boundary
- T - Tree
H - Hedgerow
G - Tree group

The original of this drawing was produced in colour - a monochrome copy should not be relied upon



NOTES
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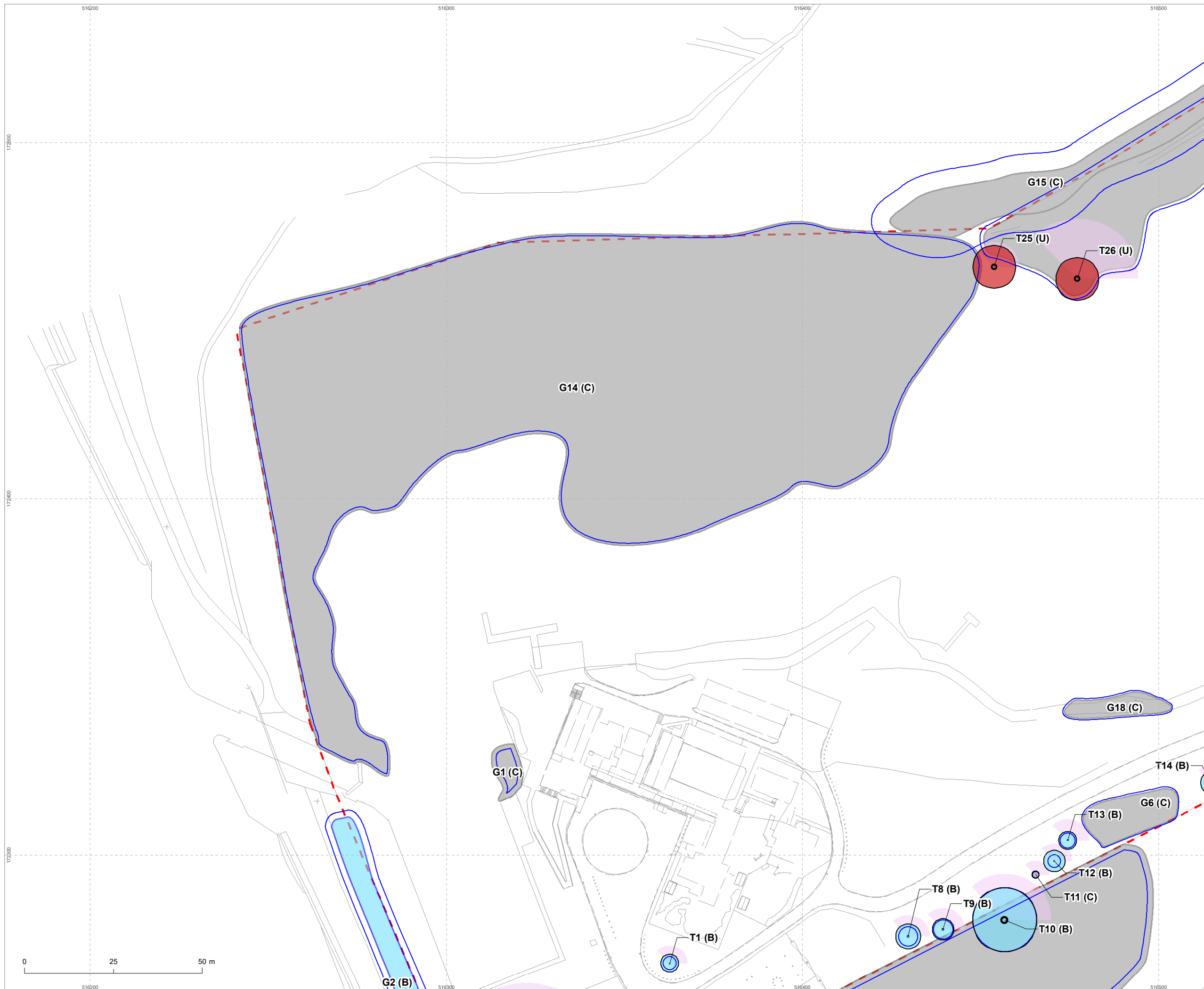


Project	Thames Young Mariners, Riverside Drive, Richmond		
Drawing	Tree Survey Plan - Page 2		
Client	Pick Everard		
Drawing Number	C157100-01-01	Revision	00
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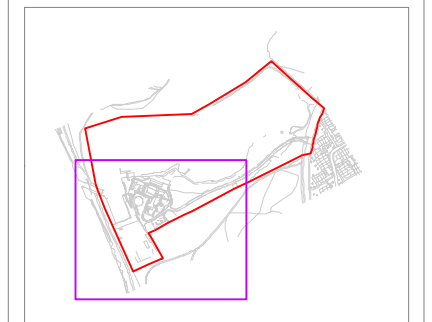


C157100-01-01

Legend

- Tree location and stem diameter
 - Current canopy extent
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 - Category A
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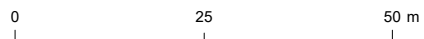
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Project **Thames Young Mariners,
Riverside Drive, Richmond**

Drawing **Tree Survey Plan - Page 3**

Client **Pick Everard**

Drawing Number	C157100-01-01	Revision	00
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Scale @ A3	1:1000	Date	March 2022
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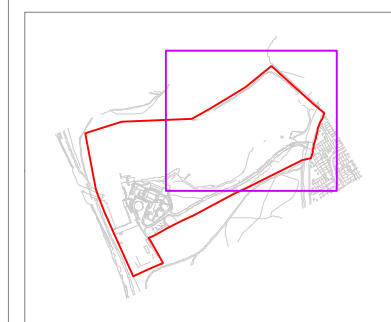
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Legend

- Tree location and stem diameter
- Current canopy extent
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Project **Thames Young Mariners,
Riverside Drive, Richmond**

Drawing **Tree Retention Plan - Page 1**

Client **Pick Everard**

Drawing Number C157100-02-01	Revision 00
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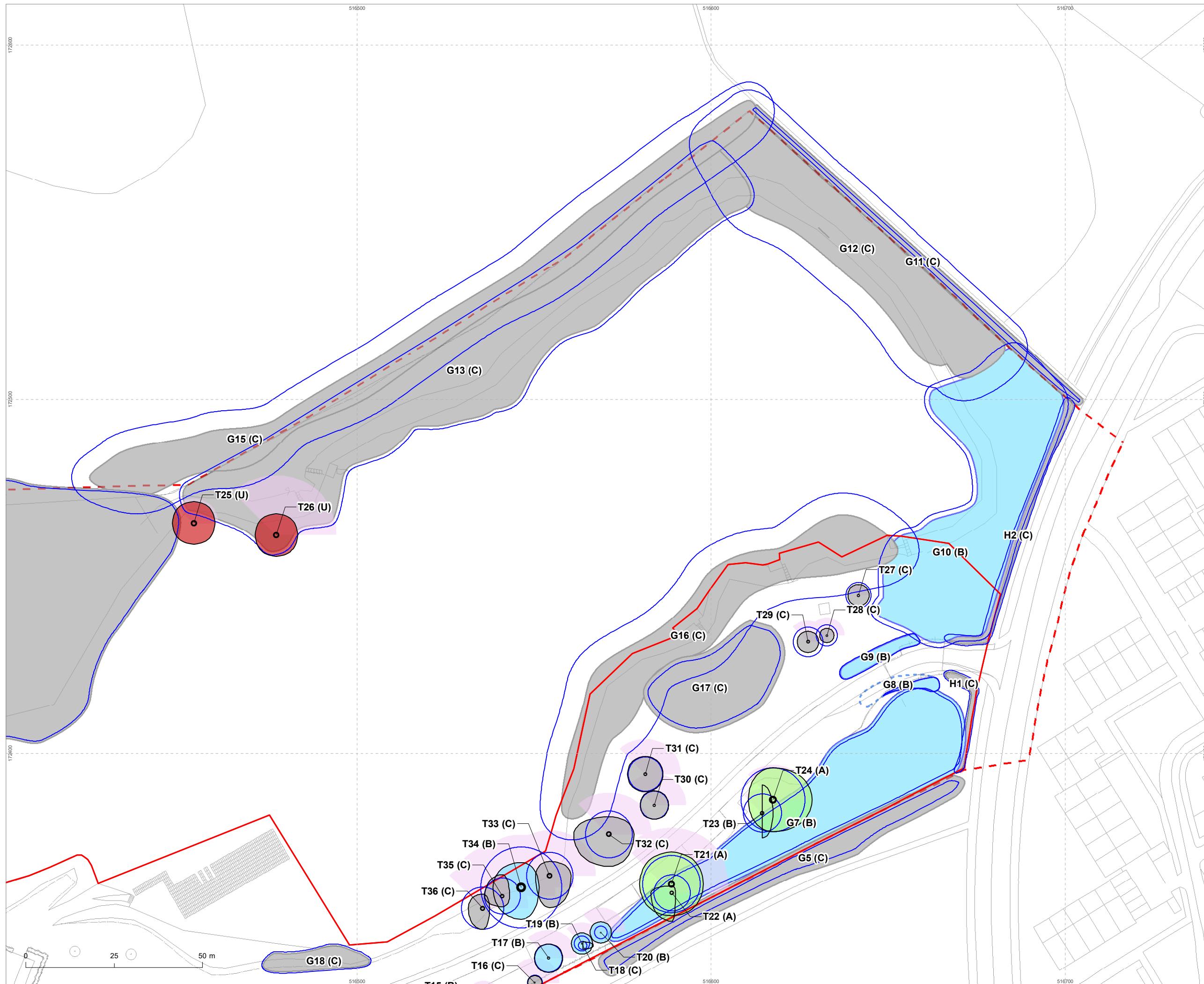
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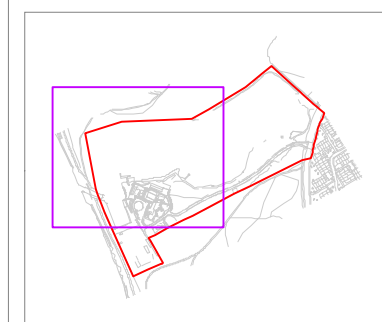
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Project Thames Young Mariners, Riverside Drive, Richmond

Drawing Tree Retention Plan - Page 2

Client Pick Everard

Drawing Number C157100-02-01 Revision 00

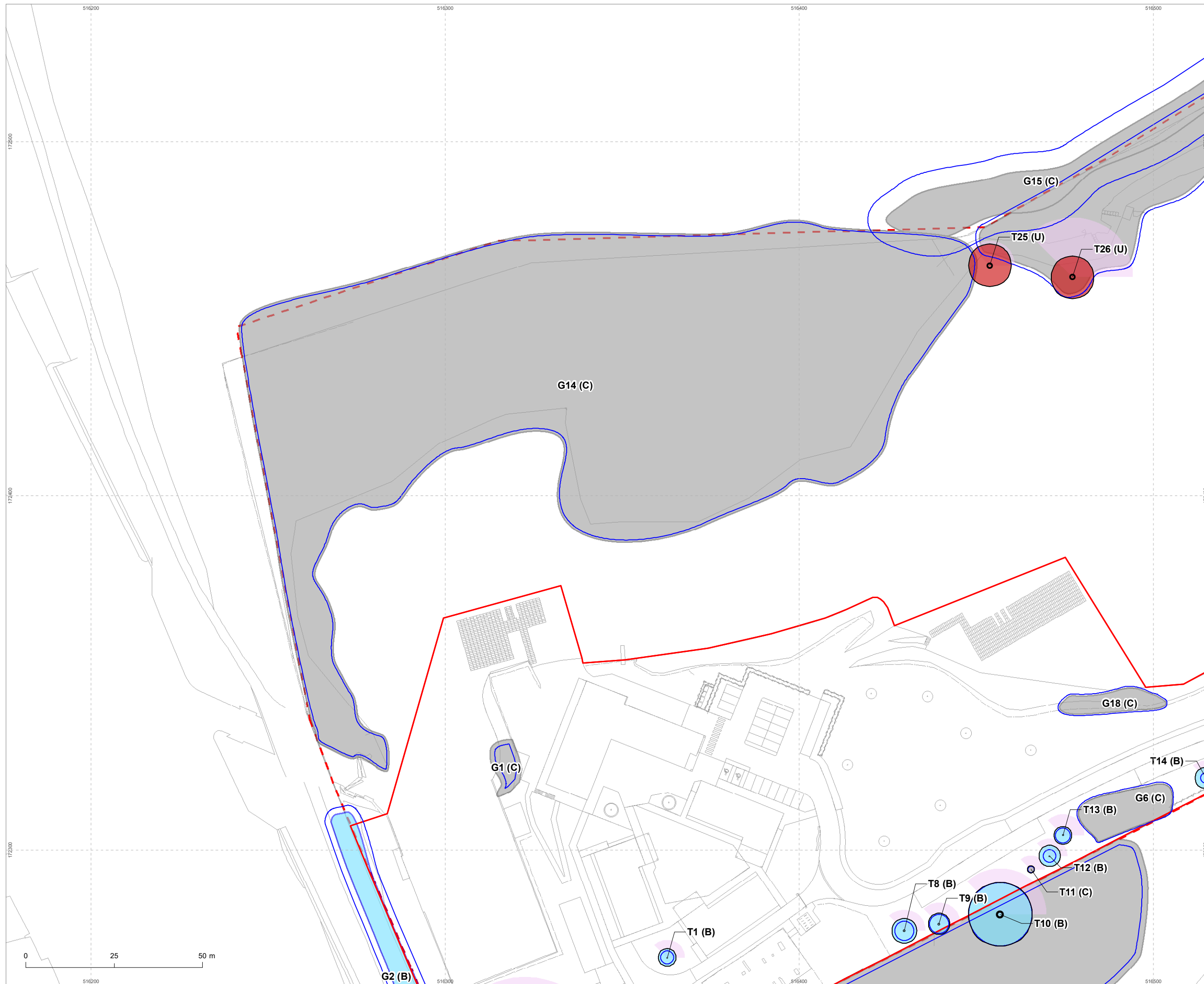
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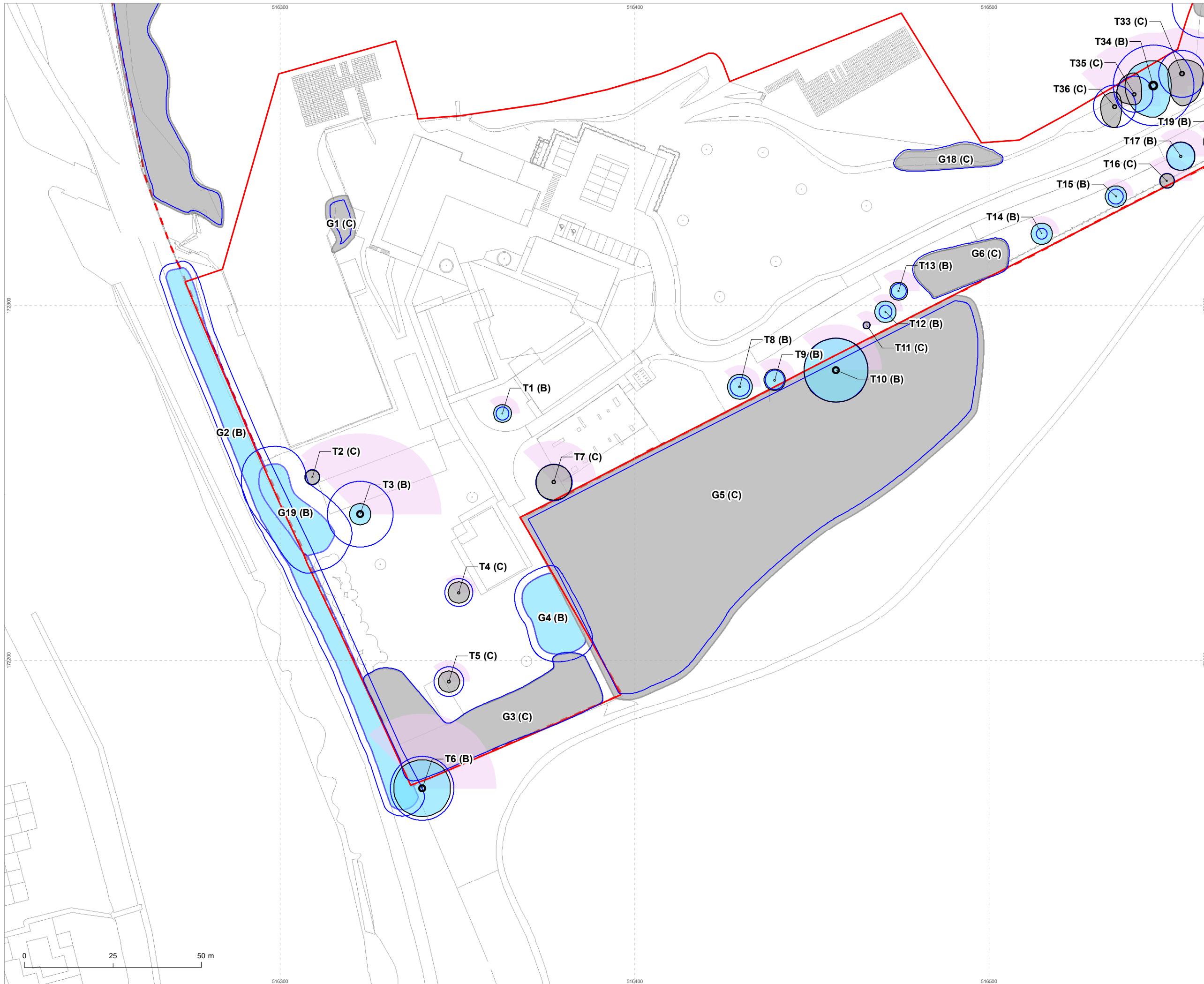
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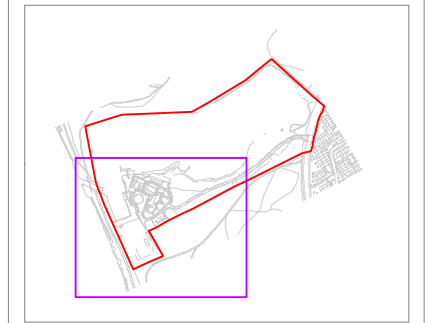


C157100-02-01

Legend

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Project **Thames Young Mariners,
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Drawing **Tree Retention Plan - Page 3**

Client **Pick Everard**

Drawing Number **C157100-02-01** Revision **00**

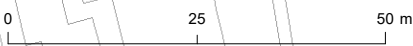
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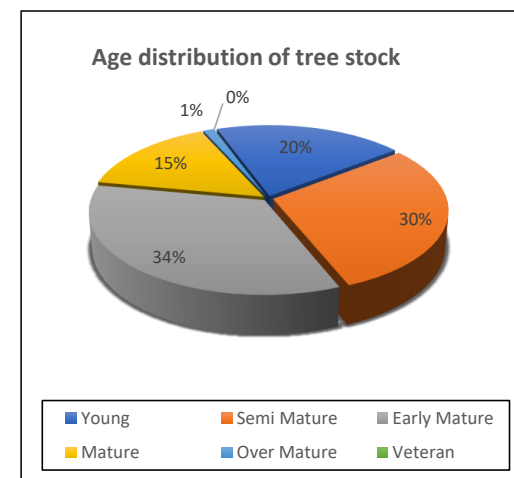
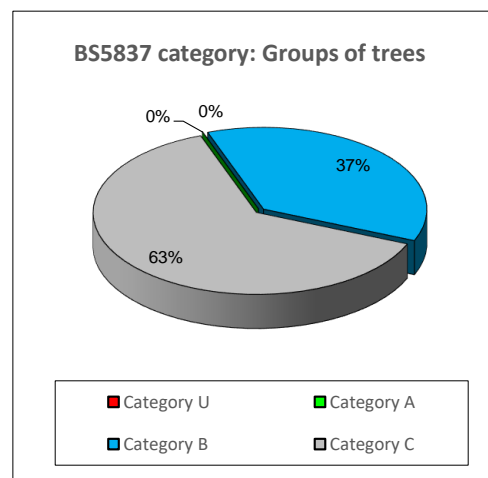
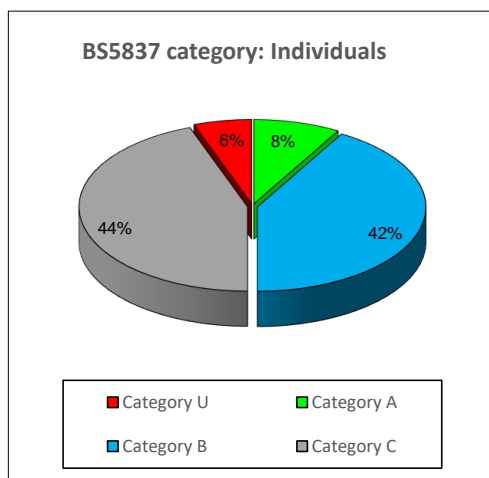


Appendix A - Tree Schedule

Measurements	Age Class	Overall Condition	Root Protection Area (RPA)
Height - estimated from ground level (m).	YNG: Young trees up to ten years of age.	G - Good: Trees with only a few minor defects and in good overall health needing little, if any attention.	<ul style="list-style-type: none"> The RPA column gives the required area (m²). The RPA Radius column gives the radius (m) of an equivalent circle. The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the required rooting area in order for a tree to be retained.
Stem Dia. - Diameter measured (mm) in accordance with Annex C of the BS5837.	SM: Semi-mature, trees less than 1/3 life expectancy.	F - Fair: Trees with minor, but rectifiable, defects or in the early stages of stress from which it may recover.	
Crown - crown spread estimated radially from the main stem (m).	EM: Early mature, trees 1/3 – 2/3 life expectancy.	P - Poor: Trees with major structural and/or physiological defects such that it is unlikely the tree will recover in the long term.	
Abbreviations Est - Estimated stem diameter Avg - Average stem diameter Max - Maximum stem diameter	M: Mature trees, over 2/3 life expectancy.	D - Dead: Trees no longer alive. This could also apply to trees that are dying and unlikely to recover.	
	OM: Over mature, declining or moribund trees of low vigour.	In the assessment, of the BS category, particular consideration has been given to the following <ul style="list-style-type: none"> The health, vigour and condition of each tree The presence of any structural defects in each tree and its future life expectancy The size and form of each tree and its suitability within the context of a proposed development The location of each tree relative to existing site features e.g. its screening value or landscape features Age class Life expectancy 	
	V: Veteran, tree possessing certain attributes relating to veteran trees.		

Structural Condition
<p>The following has been considered when inspecting structural condition:</p> <ul style="list-style-type: none"> • The presence of fungal fruiting bodies around the base of the tree or on the stem, as they could possibly indicate the presence of possible internal decay. • Soil cracks and any heaving of the soil around the base. • Any abrupt bends in branches and limbs resulting from past pruning. • Tight or weak 'V' shaped forks and co-dominant stems. • Hazard beam formations and other such biomechanical related defects (as described by Claus Mattheck, Body Language of Trees HMSO Research for Amenity Trees No. 4 1994). • Cavities as a result of limb losses or past pruning. • Broken branches or storm damage. • Canker formations. • Loose or flaking bark. • Damage to roots. • Basal, stem or branch / limb cavities. • Crown die-back or abnormal foliage size and colour. • Any changes to the timing of normal leaf flush and leaf fall patterns.

Quality Assessment of Retention Category
Category U - Trees 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.
Category A - Trees of high quality with an estimated remaining life expectancy of at least 40 years.
Category B - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
Category C - Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.
Sub-categories: (i) - Mainly arboricultural value (ii) - Mainly landscape value (iii) - Mainly cultural or conservation value



Appendix A - Summary

	Individual Trees	Totals	Tree Groups	Totals
Category U	T25, T26	2		0
Category A	T21, T22, T24	3		0
Category B	T1, T3, T6, T8, T9, T10, T12, T13, T14, T15, T17, T19, T20, T23, T34	15	G2, G4, G7, G8, G9, G10, G19	7
Category C	T2, T4, T5, T7, T11, T16, T18, T27, T28, T29, T30, T31, T32, T33, T35, T36	16	G1, G3, G5, G6, G11, G12, G13, G14, G15, G16, G17, G18	12
	Total	36	Total	19

	Hedgerows	Totals	Woodlands	Totals
Category U		0		0
Category A		0		0
Category B		0		0
Category C	H1, H2	2		0
	Total	2	Total	0

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
T1	Indian horse chestnut	5.0	1.5	1	140	2.5	2.5	2.5	2.5	SM	G	G	10	1.8	B 1	Basal epicormic growth observed Typical crown form No obvious defects observed
T2	Sycamore	5.0	1.0	11	170	2.0	2.0	2.0	2.0	Y	P	G	14	2.1	C 1	Regeneration growth from felled stump
T3	Lombardy poplar	23.0	2.0	1	760	3.0	3.0	3.0	3.0	M	G	G	272	9.3	B 1	Minor deadwood in the crown Typical crown form No obvious defects observed Area of included bark observed
T4	Hawthorn	5.0	2.0	1	320	3.0	3.0	3.0	3.0	M	F	G	48	3.9	C 1	No obvious defects observed Branch stubs observed Typical crown form
T5	Hawthorn	6.0	2.0	2	300 170	3.0	3.0	3.0	3.0	M	F	G	55	4.2	C 1	Branch stubs observed Pruning wounds observed Minor deadwood in the crown Major deadwood in the crown Exposed heartwood
T6	Hybrid black poplar	21.0	5.0	1	750	8.0	8.0	8.0	8.0	M	F	G	255	9.0	B 1	Branch stubs observed Branch socket cavity observed Minor deadwood in the crown Major deadwood in the crown Typical crown form Pruning wounds observed
T7	Sycamore	12.0	2.0	1	410	5.0	5.0	5.0	5.0	EM	F	F	81	5.1	C 1	Apical dieback Branch stubs observed Minor deadwood in the crown
T8	Field maple	6.0	1.8	1	220	3.5	3.5	3.5	3.5	EM	G	G	23	2.7	B 1	Branch stubs observed No obvious defects observed Typical crown form
T9	Field maple	6.0	2.0	1	210	3.0	3.0	3.0	3.0	EM	G	G	23	2.7	B 1	Typical crown form No obvious defects observed Epicormic growth on the main stem
T10	Sycamore	13.0	2.0	1	750	9.0	9.0	9.0	9.0	M	F	G	255	9.0	B 1	Dense ivy on the stem Pruning wounds observed Minor deadwood in the crown Major deadwood in the crown Typical crown form Branch stubs observed Area of included bark observed

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
T11	Crab apple	4.0	2.0	1	70	1.0	1.0	1.0	1.0	Y	F	G	3	0.9	C 1	Typical crown form Weak form with limited future potential
T12	Indian horse chestnut	5.0	2.0	1	140	3.0	3.0	3.0	3.0	SM	F	G	10	1.8	B 1	Typical crown form No obvious defects observed
T13	Field maple	6.0	1.5	1	160	2.5	2.5	2.5	2.5	EM	G	G	14	2.1	B 1	Branch stubs observed Minor deadwood in the crown Typical crown form
T14	Indian horse chestnut	5.0	2.0	1	110	3.0	3.0	3.0	3.0	EM	G	G	7	1.5	B 1	Basal epicormic growth observed Typical crown form No obvious defects observed
T15	Field maple	5.0	2.0	1	170	3.0	3.0	3.0	3.0	EM	G	G	14	2.1	B 1	Typical crown form Basal wound
T16	Ash	7.0	2.0	1	160	2.0	2.0	2.0	2.0	EM	G	F	14	2.1	C 1	Typical crown form No obvious defects observed
T17	Ash	8.0	2.0	1	320	4.0	4.0	4.0	4.0	SM	G	G	48	3.9	B 1	Typical crown form Damage to surface roots
T18	Crab apple	3.0	1.5	1	90	1.0	3.0	1.0	0.0	EM	P	F	5	1.2	C 1	Heavy lean by 30%
T19	Field maple	6.0	2.0	1	170	3.0	3.0	3.0	3.0	EM	G	G	14	2.1	B 1	Typical crown form No obvious defects observed
T20	Field maple	7.0	2.0	1	140	3.0	3.0	3.0	3.0	EM	G	G	10	1.8	B 1	Typical crown form No obvious defects observed
T21	English oak	16.0	2.0	1	670	9.0	9.0	9.0	9.0	M	G	G	206	8.1	A 1	Branch stubs observed Pruning wounds observed Typical crown form
T22	English oak	16.0	3.0	1	420	2.0	1.0	8.0	6.0	M	G	G	81	5.1	A 1	Branch stubs observed Typical crown form Minor deadwood in the crown
T23	English oak	7.0	2.0	1	430	8.0	3.0	7.0	0.0	SM	F	G	92	5.4	B 1	Branch stubs observed Minor deadwood in the crown
T24	English oak	10.0	1.0	1	740	9.0	11.0	9.0	7.0	M	G	G	255	9.0	A 1	Branch stubs observed Conservation value lapsed pollarded form Minor deadwood in the crown Pruning wounds observed

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
T25	Crack willow	7.0	1.0	1	630	6.0	6.0	6.0	6.0	M	P	F	191	7.8	U	Branch socket cavity observed Exposed heartwood lapsed pollarded form Large hanging branches in the crown Lateral dieback observed Major deadwood in the crown Storm damage observed Tear wounds present Tree is showing signs of decline Wound present on main stem
T26	Sycamore	17.0	2.0	1	640	6.0	6.0	6.0	6.0	M	F	F	191	7.8	U	Branch socket cavity observed Branch stubs observed Exposed heartwood Major deadwood in the crown Minor deadwood in the crown Tree is showing signs of decline Epicormic growth observed in the crown Large open wound on main stem from 0-2m
T27	Hawthorn	3.0	1.5	4	190 150 130 120	3.0	3.0	3.0	3.0	M	F	F	41	3.6	C 1	Branch stubs observed Minor deadwood in the crown Pruning wounds observed
T28	Hawthorn	5.0	2.0	1	230	2.0	2.0	2.0	2.0	SM	G	G	28	3.0	C 1	Typical crown form No obvious defects observed
T29	Hawthorn	6.0	2.0	3	250 180 150	3.0	3.0	3.0	3.0	SM	G	G	55	4.2	C 1	Pruning wounds observed Typical crown form
T30	Ash	9.0	2.0	1	320	4.0	4.0	4.0	4.0	EM	G	G	48	3.9	C 1	Typical crown form Pruning wounds observed Minor deadwood in the crown
T31	Pear	10.0	1.5	3	260 145 220	5.0	5.0	5.0	5.0	SM	F	G	72	4.8	C 1	Included unions observed Minor deadwood in the crown
T32	Wild cherry	12.0	2.0	3	310 310 330	5.0	7.0	9.0	10.0	SM	P	G	137	6.6	C 1	Included unions observed Damaged surface roots
T33	Sycamore	13.0	3.0	1	530	4.0	6.0	9.0	4.0	M	G	G	137	6.6	C 1	Branch stubs observed Branch socket cavity observed Pruning wounds observed

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
T34	Sycamore	15.0	2.0	1	950	7.0	5.0	9.0	8.0	M	G	G	408	11.4	B 1	Branch socket cavity observed Exposed heartwood Pruning wounds observed lapsed pollarded form
T35	Ash	15.0	2.0	1	410	6.0	2.0	3.0	5.0	SM	G	G,F	81	5.1	C 1	Minor deadwood in the crown Branch stubs observed
T36	Robinia	13.0	3.0	3	400 220 180	4.0	2.0	6.0	4.0	SM	F	F	113	6.0	C 1	Minor deadwood in the crown Included unions observed Pruning wounds observed

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
G1	Ash Hawthorn Crack willow Elder	4.0	0.0	-	140	3.0	3.0	3.0	3.0	SM	F,P	G	10	1.8	C 2	Branch stubs observed Conjoined canopy Self seeded trees present
G2	English oak Hawthorn Holly Holm oak Elder Sweet chestnut Ash	15.0	2.0	-	650	6.0	6.0	6.0	6.0	M SM EM Y	F	G	191	7.8	B 2	Branch socket cavities Branch stubs observed Minor deadwood in the crowns Major deadwood in the crowns Typical crown forms
G3	Elder Ash Hawthorn	7.0	1.0	-	260	3.0	3.0	3.0	3.0	SM Y	F	G	34	3.3	C 2	Self seeded trees present Light ivy on stems Minor deadwood in the crowns
G4	Robinia	16.0	2.0	-	590	5.0	5.0	5.0	5.0	M EM	F	G	163	7.2	B 2	Branch stubs observed Conjoined canopy Minor deadwood in the crowns Typical crown forms
G5	Elder Sycamore Hawthorn Crack willow	19.0	0.0	-	450	7.0	7.0	7.0	7.0	M SM EM Y	F	G	92	5.4	C 2	Conjoined canopy Branch stubs observed Branch socket cavities No obvious defects observed Dense ivy on the stems Dense ivy in the crowns Typical crown forms
G6	Apple Elder Goat willow Holm oak	6.0	1.0	-	280	3.0	3.0	3.0	3.0	M OM SM	F,P	F,P	41	3.6	C 2	Conjoined canopy Dense ivy on the stems Dense ivy in the crowns Branch stubs observed Typical crown forms

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
G7	English oak Hawthorn Ash Sycamore Cherry Crab apple Blackthorn Plum Norway maple Purple leaved plum Silver birch Goat willow	10.0	1.0	-	340	5.0	5.0	5.0	5.0	SM EM Y	G,F	G	55	4.2	B 2	Conjoined canopy Light ivy on stems Minor deadwood in the crowns Provides screening Self seeded trees present Typical crown forms Wildlife conservation value
G8	Bird cherry Wild cherry	4.0	1.0	-	90	1.0	1.0	1.0	1.0	Y EM	G	G	5	1.2	B 1	Typical crown forms No obvious defects observed
G9	Bird cherry Cherry Wild cherry	4.0	1.5	-	100	1.0	1.0	1.0	1.0	Y EM	G	G	5	1.2	B 1	Typical crown forms No obvious defects observed
G10	Ash Blackthorn Elder Goat willow Field maple Hawthorn Norway maple Sycamore Apple Holm oak Purple leaved plum Plum Holly	12.0	1.0	-	550	5.0	3.0	5.0	8.0	Y EM SM M	G,F	G,F	137	6.6	B 2	Branch socket cavities Branch stubs observed Conjoined canopy Dead and dying trees present Included unions observed Light ivy on stems Minor deadwood in the crowns Provides screening Pruning wounds observed Self seeded trees present Typical crown forms Wildlife conservation value
G11	Ash Hawthorn Sycamore Cherry English oak	12.0	2.0	-	350	5.0	5.0	5.0	5.0	Y EM SM	G,F	G	55	4.2	C 2	Branch stubs observed Branch socket cavities Conjoined canopy Light ivy on stems Minor deadwood in the crowns Typical crown forms

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
G12	Ash Elder Goat willow Hawthorn Sycamore Cherry Crack willow Plum Golden weeping willow	16.0	2.0	-	700	2.0	2.0	2.0	2.0	Y EM SM M	G,F	G,F	222	8.4	C 2	Branch socket cavities Branch stubs observed Conjoined canopy Included unions observed lapsed pollarded form present Light ivy on stems Dense ivy on the stems Pollarded forms Minor deadwood in the crowns Pruning wounds observed Self seeded trees present Typical crown forms Wildlife conservation value
G13	Ash Hawthorn Cherry Crab apple Sycamore Crack willow Yew Holm oak Holly Elder Goat willow	16.0	2.0	-	500	5.0	5.0	5.0	5.0	Y EM SM M	G,F	G,F	113	6.0	C 2	Branch socket cavities Branch stubs observed Conjoined canopy Dead and dying trees present Dense ivy on the stems Group is sparse in areas lapsed pollarded form present Light ivy in the crowns Minor deadwood in the crowns Pollarded forms Pruning wounds observed Self seeded trees present Typical crown forms Wildlife conservation value
G14	Sycamore Goat willow Hawthorn Elder Crack willow Ash	16.0	2.0	-	450	6.0	6.0	6.0	6.0	Y EM SM M	G,F,P	G,F,P	92	5.4	C 2	Branch socket cavities Conjoined canopy Dead and dying trees present Dense ivy in the crowns Dense ivy on the stems Ivy restricts inspection lapsed pollarded form present Limited inspection due to access Limited inspection due to dense vegetation Pollarded forms Wildlife conservation value

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
G15	Ash Elder Hawthorn Cherry Sycamore	15.0	2.0	-	420	5.0	5.0	5.0	5.0	Y EM SM M	G,F	G	81	5.1	C 2	Branch stubs observed Conjoined canopy Dense ivy on the stems Group is located off site but overhangs the study area Limited inspection due to access Minor deadwood in the crowns
G16	Ash Crack willow Hybrid black poplar English oak Sycamore Purple leaved plum	14.0	2.0	-	750	3.0	3.0	3.0	3.0	EM SM M	G	G	255	9.0	C 1	Limited inspection due to access Pollarded forms Pruning wounds observed Minor deadwood in the crowns Typical crown forms
G17	Elder Sycamore Hawthorn Crab apple	12.0	2.0	-	330	4.0	5.0	7.0	5.0	EM SM M	G,F	G	55	4.2	C 1	Branch stubs observed Conjoined canopy Group is sparse in areas Included unions observed Minor deadwood in the crowns Pruning wounds observed Typical crown forms
G18	Sycamore	5.0	1.0	-	200	2.0	2.0	2.0	2.0	Y EM	F	G	18	2.4	C 1	Included unions observed Coppice regrowth on bank edge
G19	Sycamore Hawthorn Elder	13.0	2.0	-	360	5.0	5.0	5.0	5.0	SM EM	F	G	64	4.5	B 2	Conjoined canopy Branch stubs observed Minor deadwood in the crowns Pruning wounds observed

Tree No	Species	Height (m)	Crown Clearance (m)	No. of Stems	Stem Dia. (mm)	Crown Radius				Age Class	Structure	Vigour	RPA (m)	RPA Radius (m)	Cat	Comments
						N	E	S	W							
H1	Plum Purple leaved plum Holm oak Elder Blackthorn	6.0	1.0	-	200	2.0	2.0	2.0	2.0	Y EM	G,F	G	18	2.4	C 2	Outgrown hedgerow Provides screening Limited inspection due to ivy
H2	Blackthorn Elder Plum Purple leaved plum	5.0	1.0	-	200	2.0	2.0	2.0	2.0	Y EM	G,F	G	18	2.4	C 2	Outgrown hedgerow Provides screening Limited inspection due to ivy