Part 1: BS: 5837 Tree Survey & Tree Constraints Plan Report

Site:

The Whitworth
The University of Manchester
Oxford Road
Manchester
M15 6ER

Date of Site Visit:

9th February 2023

Prepared for:

Patrick Osborn
The University of Manchester

Prepared by:

Mr G Davies
Arboricultural Consultant
ISA Tree Risk Assessment Qualified
Professional Tree Inspector Qualified

Bartlett Project Reference:

GD/230038/R1

Bartlett Tree Experts
Oakwood Nurseries
Chelford Road
Ollerton
Cheshire
WA16 8SE
www.bartlett.com

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY: 3
1.1 Table 1: BS: 5837 (2012) Tree Quality Assessment 3
2.0 SCOPE OF REPORT 4
2.1 Instruction 4
2.2 Documents & Supporting Information 4
2.3 Aspects Included within Report 4
2.4 Aspects Excluded from Report 4
3.0 TREE PROTECTION STATUS 5
3.1 Statutory Protection 5
3.2 Tree Preservation Order (TPO) Status 5
3.3 Conservation Area (CA) Status 5
3.4 Tree Management Implications 5
4.0 GENERAL SITE DETAILS 6
4.1 Description of the Site 6
4.2 Local Landscape and Amenity Evaluation 6
5.0 GENERAL TREE DETAILS 7
5.1 Tree Identification & Location 7
5.2 Trees Included within Survey 7
5.3 Categorisation & Gathered Data 7
6.0 TREE CONSTRAINTS PLAN 8
6.1 Below Ground Level Constraints 8
6.2 Modification of RPA 8
6.3 Above Ground Level Constraints 8
7.0 CONCLUSIONS 9
7.1 Initial Considerations 9
7.2 Future Considerations 9
APPENDIX 1 TREE SURVEY KEY 11
APPENDIX 2 BRITISH STANDARD: 5837 (2012) TABLE 1: TREE CATEGORISATION 12
APPENDIX 3 BRITISH STANDARD: 5837 (2012) TREE SURVEY SCHEDULE 13
APPENDIX 4 LIMITATIONS OF REPORT 17
APPENDIX 5 REPORT REFERENCES 18
APPENDIX 6 GLOSSARY 19

1.0 EXECUTIVE SUMMARY:

1.0.1 The following report evaluates the trees within and adjacent to the above site, using the criteria and guidance set out in the British Standard 5837:2012 *Trees in Relation to Design, Demolition and Construction – Recommendations*.

1.0.2 The wider amenity and landscape values of the trees, as well as their useful life expectancies are determined, and as a result, a category grading is assigned to all trees for retention using the "Cascade Chart for Tree Quality Assessment".

1.0.3 A Tree Constraints Plan has also been drawn and appended to the report. The Plan illustrates the tree locations, their above and below ground constraints and their above ground spatial requirements with any proposed development.

1.0.4 Part of the University of Manchester, Whitworth Art Gallery is located on the northeast corner of Whitworth Park adjacent to Oxford Road and Denmark Road, to the south of Manchester. It is a historic and listed structure of great importance to the city.

1.0.5 The building shares its ground with Whitworth Park a public open space the park contains a large number of high quality specimen trees and is considered a significant amenity in the Manchester area.



Figure 1: Photograph of site as viewed from the south

1.1 Table 1: BS: 5837 (2012) Tree Quality Assessment

BS: 5837 (2012) Category	Number
A	14
B	3
C	0
U	4
Total	21

2.0 SCOPE OF REPORT

2.1 Instruction

2.1.0 Bartlett Consulting has been instructed to undertake a tree survey in accordance with British Standard 5837:2012 *Trees in Relation to Design, Demolition and Construction – Recommendations*, for the trees and vegetation adjacent to the south of the main building that have the potential to influence the proposed restoration works, which therefore must be considered as a constraint within the project planning.

2.2 Documents & Supporting Information

2.2.0 Bartlett Consulting was provided with the following documentation and plans, prior to the site visit & tree survey, via email in both PDF and DWG file format:

- Gallery Level Site Plan Ref: WAG/01/0004 Rev T1: dated Feb 2012

2.3 Aspects Included within Report

2.3.0 The tree survey included within this report follows the guidance of Clause 4 of British Standard 5837: *Trees in Relation to Design, Demolition and Construction – Recommendations*. The tree survey schedule, included within Appendix 3, details: tree common name; various physical dimensions; notable observations; tree categorisation with respect to their landscape/cultural value and perceived life expectancy.

2.3.1 The tree survey has been conducted in accordance with the principals of the Visual Tree Assessment (VTA) method developed by Mattheck & Breloer (1994). This is a basic visual tree assessment and must not be misinterpreted as a detailed/advanced tree condition inspection or tree risk assessment.

2.3.2 Any prescribed tree works are made with regards to good tree management, irrespective of any proposed development. Management recommendations may also be made in response to a pathogen or pest of known contagion which may pose a concern to people or other trees.

2.3.3 This report is accompanied by a Tree Constraints Plan (TCP) accurately detailing the positions of surveyed trees and vegetation; illustrating the physical dimensions of the crowns as per the cardinal points; the calculated Root Protection Area (RPA) of each tree; and tree shade/shadow patterns.

2.3.4 Modified RPA's will be illustrated if known below ground level obstructions exist.

2.3.5 Future canopy spread for young trees will also be illustrated where necessary.

2.4 Aspects Excluded from Report

2.4.0 The prescribed tree works contained within this report do not take into consideration possible facilitation pruning. This report does not include an Arboricultural Impact Assessment (AIA), Arboricultural Method Statement (AMS), or a Tree Protection Plan (TPP).

2.4.1 The contents of this report do not include discussions regarding subsidence and/or heave as a result of tree retention or tree removal, nor does this report consider the water demands of trees present to determine foundation design and depth. If required, this can be provided on request.

3.0 TREE PROTECTION STATUS

3.1 Statutory Protection

3.1.0 The Town & Country Planning Act (Tree Preservation) (England) Regulations 2012 and the Town & Country Planning Act 1990 (as amended) provides legislative protection for trees within England. A tree protection status check was conducted by Bartlett Consulting on 20th February 2023 via email correspondence within the Manchester City Council.

3.2 Tree Preservation Order (TPO) Status

3.2.0 None

3.3 Conservation Area (CA) Status

3.3.0 None

3.4 Tree Management Implications

3.4.0 Following confirmation with Mr Anthony Moore (Team Lead) at Manchester City Council we do not believe the surveyed trees are afforded by either individual, group or area tree protection orders. Furthermore we have been informed that neither the Whitworth Art Gallery nor Whitworth Park are afforded protection via their location within a designated conservation area.

4.0 GENERAL SITE DETAILS

4.1 Description of the Site

4.1.0 As detailed within the Executive Summary, the Whitworth Art Gallery is located on the northeast corner of Whitworth Park adjacent to Oxford Road and Denmark Road, to the south of Manchester. It is a historic and listed structure of great importance to the city.



Figure 3: Photograph showing the application site as viewed from the public park adjacent to the site

4.2 Local Landscape and Amenity Evaluation

4.2.0 The building shares its ground with Whitworth Park a public open space The park contains a large number of high-quality specimen trees and is considered a significant amenity in the Manchester area. The area of concern is the group of trees growing within the grassed verge to the south of the main building.

4.2.1 The landscape and tree cover of the immediate and wider site features a diverse mixture of native and exotic deciduous and evergreen tree species pronominally early mature and mature specimens.

4.2.2 Located within the ground of the public open park the trees subject to the report are considered to have a high public visibility and amenity value.

5.0 GENERAL TREE DETAILS

5.1 Tree Identification & Location

5.1.0 We have been informed that the trees subject to this report are located within an area of land under the ownership of the Manchester University however the grounds form part of the Whitworth Park.

5.1.1 The locations of the surveyed trees are illustrated on the Tree Constraints Plan (TCP) accompanying this report.

5.1.2 The accuracy of the tree locations is based upon the provided site plan referenced in Section 2.2 above.

5.2 Trees Included within Survey

5.2.0 Only trees that are present at the time of the site visit, with a measured stem diameter equal to or greater than 75 millimetres (at 1.5 metres above ground level) are included within the survey.

5.2.1 Tree and canopy height, and where possible canopy spread of all surveyed trees were accurately recorded with the laser range finder. Estimated canopy spreads were used where the canopy extended over the buildings. Estimated figures will be accompanied with a * suffix in the tree survey schedule.

5.3 Categorisation & Gathered Data

5.3.0 All gathered data contained within the Tree Survey Table as provided within Appendix 1 of this report follows the guidance set out within Clause 4.4 of British Standard 5837 (2012): *Trees in Relation to Design, Demolition and Construction – Recommendations*.

5.3.1 Furthermore, each tree within the Tree Survey Table at Appendix 1 is categorised as per the "Cascade Chart for Tree Quality Assessment" given as Table 1 within British Standard 5837:2012 – a copy of which is provided within Appendix 2 of this report.

6.0 TREE CONSTRAINTS PLAN

6.1 Below Ground Level Constraints

6.1.0 The below ground level constraint on any site will include the root system and rooting environment of trees being retained. The data gathered during the tree survey permits the creation of a Tree Constraints Plan (TCP). The TCP illustrates the tree location within and adjacent to the site, the physical dimensions of the main stem and crown above ground as well as the constraints below ground level caused by the calculated Root Protection Area (RPA) of each tree.

6.1.1 The calculated RPA is indicated by the orange broken circle on the TCP and shows the minimum area around each tree or groups of trees, subject to the tree survey, which is deemed to contain sufficient roots and rooting environment to maintain the current vitality of the tree. This area is as per the recommendations of Clause 4.6 of British Standard 5837:2012 *Trees in Relation to Design, Demolition and Construction - Recommendations*.

6.1.2 In the first instance, the RPA should remain a construction exclusion zone and all proposed development should be planned and located outside the RPA for trees of such quality and value to be retained, essentially leaving the RPA sacrosanct.

6.2 Modification of RPA

6.2.0 Whilst not affecting the total area of the calculated RPA, in some circumstances, the shape of the RPA has been modified or off-set. This decision has been made by Bartlett Consulting when taking into account the morphology and disposition of roots as influenced by topography of the site and existing site conditions such as the presence of hard surfacing, kerbing, existing buidings.

6.2.1 The RPA of a number of trees have been off set to account for the historical presence of the building which is known to have a subterranean level.

6.3 Above Ground Level Constraints

6.3.0 The above ground level constraints on a development site can be numerous, resulting primarily from the current and/or ultimate crown height and spread of the retained tree; tree species characteristics such as evergreen or deciduous; the height of the tree crown above ground level; and any "nuisance" that might be the result of a tree's proximity to living areas.

6.3.1 Proposed structures should be designed and/or located with due consideration of above ground constraints to prevent direct damage from occurring to the structure, as well as the need for unnecessary and possibly damaging tree management works due to shade and/or falling leaves affecting amenity space and living areas.

6.3.2 Where considered appropriate to do so, this report will give consideration to the growth potential of younger trees and the possible effects caused of this above ground constraint on the site.

6.3.3 Proposed structures should be designed and/or located with due consideration to above ground constraints as shown on the TCP in order to reduce the potential for direct damage to proposed structures and/or existing trees, as well as the need for unnecessary and possibly damaging tree management.

7.0 CONCLUSIONS

7.1 Initial Considerations

7.1.0 The proposed works includes the rebuilding of the retaining wall to south corner of the existing building.

7.1.1 At this initial stage specific details as to the required works are unknown however following an initial on site meeting we have been advised that there will need to be a degree of excavations of the soils and possibly a degree of root severance directly adjacent to the wall 1.0 to 2.0m in width.

7.1.2 It is likely that roots from trees T13, T14, T15, T16, T17 & T18 will be present within the soils directly adjacent the retaining wall however due to the subterranean aspect of the existing building it is considered unlikely that roots will be present below the retaining wall.

7.1.3 Due to the proximity of T14 I consider any works carried out to the corner section of the retaining wall will have to be carefully considered with regards to disturbance of the roots.

7.1.4 I would recommend that any necessary excavation of the soils should be undertaken with use of air-spade technology and under the supervision of suitable qualified arboriculturalist. Only after this will the root morphology be understood, allowing for an informed judgment as to the appropriateness of any root severance.

7.1.5 Careful considerations will have to be given to the in-direct impacts attributed to onsite works such as compaction of the soils moving machinery and material to and from site. In this instance we would advise that a suitable route is first established, and a non-compacting ground protection is installed. The use of robust tree protection fencing should also be considered to prevent construction works from occurring beyond the designated area.

7.1.6 Given the location of the site within the park, careful consideration will also have to be given as to how construction machinery and material will access the designated working area and the route used.

7.1.2 All these trees are important in the landscape as amenity assets, as well as for wildlife habitat, with the potential for post-development pressure providing grounds for objection from the Manchester City Councils development policy DC.16.

7.1.5 Other than trees identified within the survey as category U the works should not include the removal of any trees, nor should the works have a direct or indirect impact on the long-term retention of the current tree stock.

7.2 Future Considerations

7.2.0 Once more detail has been presented as the requirements involved in rebuilding the wall, an Arboricultural Impact Assessment (AIA) can be undertaken, formally taking into account any issues relating to the proposed work, with regards to the existing trees.

7.2.1 The AIA will identify any trees that will require facilitation pruning or removal, and the appropriateness of such works.

7.3.2 Where the AIA has identified potential tree and development conflicts, we will provide recommendations for design modification where necessary. The AIA will also provide methods of mitigation to ensure potential conflict does not cause damage to any retained trees.

7.3.3 An Arboricultural Method Statement (AMS) will be the final phase of the project, whereby specific construction methods and details pertaining to mitigation measures are provided.

7.0 CONCLUSIONS (Continued…)

7.3.4 The Tree Protection Plan (TPP) is typically composed at the same time when the AMS is written, following finalisation of a development design/ site layout. The TPP will identify trees to be retained, removed, and pruned for facilitation purposes, as well as the location and specification of tree protection barriers and non-compacting ground protection to be installed on site.

7.3.5 The AMS will consider construction activities where they are in close proximity to retained trees, dealing with issues such as site access, intensity of activity, the provision of a suitable working space, designated areas for delivery and storage of building materials, and if know at the time of writing the location of service runs and soakaways.

APPENDIX 1 TREE SURVEY KEY

Tree Reference Number	The tree number of physical tree tag (if applicable) provided to an individual tree or group of trees, as shown on the Tree Constraints Plan.
Species	Generally the common name given to the tree species. The Latin name is sometimes provided as clarification where deemed necessary.
Height	This figure is given in metres. Measurements are obtained using a digital clinometer. A black asterisk * will denote that the measurement is estimated.
Stem Diameter	This figure is given in millimetres. Measurement are obtained using a standard diameter tape, whilst measured from 1.5 metres above ground level, or otherwise indicated. A black asterisk * will denote that the measurement is estimated.
Crown Spread	This figure is given in metres. Measurements are obtained radially for all four cardinal points using a laser range finder. A black asterisk * will denote that the measurement is estimated.
Crown Clearance	This figure is given in metres. Measurements are obtained radially for all four cardinal points, between the crown and ground level, and obtained using a digital clinometer. A black asterisk * will denote that the measurement is estimated.
Height to first major branch	This is an approximate figure given in metres. Measurements are obtained by identifying the lowest lateral branch within the crown. Recorded information will also refer to a cardinal direction, and obtained using a digital clinometer. A black asterisk * will denote that the measurement is estimated.
Age	The following abbreviations are used to give the age of the tree; NP = Newly Planted, Y = Young, aged less than one quarter of its life expectancy, SM = Semi-Mature, trees of approx. one quarter of its life expectancy, EM = Early-Mature, between one quarter & half of its life expectancy, M = Mature, trees of over half of its life expectancy, OM = Over Mature, trees exceeding their life expectancy, V = Veteran, over mature trees which contain multiple wildlife habitat features & associations.
Physiological Condition	The following considerations are used to evaluate the physiological conditions of a tree (foliage & vitality): Dead, Poor, Fair & Good, with intermediate descriptions using same phrasing.
Structural Condition	Standard comments referring to the visible structural condition of tree: Hazardous, Poor, Fair, Good, with intermediate descriptions using same phrasing.
Observations	These are brief comments which relate to observations from ground level, unless otherwise stated. These observations are made to assist in categorising the tree. They do not provide or replace a comprehensive condition survey.
Preliminary Management Recommendations	These recommendations will only identify the need for more detailed assessment/inspection or tree management due to tree hazards of features which present an immediate risk to persons & property. The tree works do not consider general husbandry or required management of the trees, nor do they consider tree works that may be required prior to development or to facilitate access to the site.
Estimated Remaining Contribution	This is the number of estimated years that the tree will remain present and contribute to the local landscape. The following bands are used; <10 years, 10+ years, 20+ years & 40+ years.
Categorisation	This is the grading category applied following the tree survey. Trees are categorised in accordance with the cascade chart provided within Table 1 in BS: 5837 (2012). A copy of this chart is provided within Appendix 2 of this report. A red asterisk * will denote that the categorisation as given will be dependent upon information gained from further detailed inspection of the tree.
Root Protection Area & Root Protection Radius	The RPA is a figure given in metres squared, the minimal area which should be left undisturbed. The RPR is a figure given in metres, a measured radial distance away from the trees main stem.

APPENDIX 2 BRITISH STANDARD: 5837 (2012) TABLE 1: TREE CATEGORISATION

TREES UNSUITABLE FOR RETENTION				
CATEGORY & DEFINITION	**CRITERIA**			**IDENTIFICATION ON PLAN**
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.	Trees that have serious, irremediable, structural defects, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline. Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality. NOTE: Category U trees can have existing or potential conservation value which might be desirable to preserve.			**DARK RED**
TREES TO BE CONSIDERED FOR RETENTION				
CATEGORY & DEFINITION	**CRITERIA (subcategories)**			**IDENTIFICATION ON PLAN**
	1. Mainly arboricultural values	2. Mainly landscape values	3. Mainly cultural values, including conservation	
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years.	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation. Historical, commemorative or other value (e.g. veteran trees or wood-pasture)	**LIGHT GREEN**
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management & storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	**MID BLUE**
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significant greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	**GREY**
	NOTE: Whilst category C trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150 mm should be considered for relocation.			

APPENDIX 3 BRITISH STANDARD: 5837 (2012) TREE SURVEY SCHEDULE

Tree Ref No.	Species	Ht. (m)	Stem Dia. (mm)	Crown Spread				Crown Clearance				Ht. to 1st limb (m)	Age	Phys. Cond	Structural Condition			Observations	Preliminary Management Recommendations	Life Exp.	Cat.	RPA in m2 (Radius/ m)
				North	East	South	West	North	East	South	West				Basal	Stem	Crown					
T1	Common Ash *Fraxinus excelsior*	9	760	0	0	0	0	0	0	0	0	0	EM	Dead	G	F	P	• Dead standing stem	• Remove to ground level or retain as habitat	N/A	U1	-
T2	Common Ash *Fraxinus excelsior*	19	510	6	1	3	6	4	5	5	4	5.0m north & west	EM	Poor	G	F	F	• Historical mechanical wounding on lower stem • Evidence of decline within tree crown and bias to north-west	• No works currently required	10+	B2	117 6.1
T3	Common Ash *Fraxinus excelsior*	19	730	2	2	4	4	8	8	8	8	-	EM	Poor	F	F	P	• *Ganoderma* fungal fruiting body attached at base of stem • Frame- work pollard resulting in epicormic regrowth • In decline • Suspected *Inonotus* attached at 14.0m within southern crown	• Removal to ground level due to condition and proximity to building and footpath or • Monolith at safe height and retain for ecological value	<10	U1	-
T4	Common Ash *Fraxinus excelsior*	20	760	5.5	4.5	5.5	4	8	8	4	4	4.0m south	EM	Poor	P	P	P	• Poor resonance when sounded on main stem indicating significant internal decay • Seam to southern quadrant • Significant dieback within crown	• Remove to ground level due to condition and proximity to building and footpath or • Monolith at safe height and retain for ecological value	<10	U1	-
T5	Common Ash *Fraxinus excelsior*	20	800	5	7	10	5	6	9	3	3	8m east	EM	Fair	P	F	F	• Partial decline within crown • Asymmetrical crown bias to east	• No works currently required	20+	B2	290 9.6
T6	Common Ash *Fraxinus excelsior*	19	540	6	1	3	3	8	8	8	8	9.0m north	EM	Poor	G	G	P	• Bifurcation of main stem at 5.0m • Limited live growth and significant die-back expressed • Previous pruning to remove dead wood	• Consider removal due to condition and proximity to building	<10	U1	-

Tree Ref No.	Species	Ht. (m)	Stem Dia. (mm)	Crown Spread				Crown Clearance				Ht. to 1st limb (m)	Age	Phys. Cond	Structural Condition			Observations	Preliminary Management Recommendations	Life Exp.	Cat.	RPA in m2 (Radius/ m)
				North	East	South	West	North	East	South	West				Basal	Stem	Crown					
T7	Common Ash *Fraxinus excelsior*	20	850	10*	7	10	5	7	9	10	9	7.0m north	EM	Fair	G	G	F	• Prominent buttress formation • Historical wounding at 5.0 • Suspected loss of co-dominant leader • Die-back expressed throughout the crown • Northern crown overhanging building	• No works currently required	20+	B2	327 10.2
T8	London Plane *Platanus x hispanica*	22	1110	7*	6	3	8	7	8	7	7	7.0m north	M	Good	G	G	G	• Bifurcation of main stem at 2.5m • Asymmetrical crown bias to north overhanging building • Major deadwood present within lower southern crown	• Remove major deadwood within lower southern crown	40+	A2	547 13.2
T9	London Plane *Platanus x hispanica*	22	980	8	2	10	10	3	5	5	2	2.0m south	M	Good	G	G	G	• Bifurcation of main stem at 2.5m • Die-back expressed within lowest southern lateral leader • Asymmetrical crown bias to west Previously topped	• Remove lowest southern lateral expressing die-back	40+	A2	437 11.8
T10	London Plane *Platanus x hispanica*	21	760	6	4	4	4	9	8	9	7	8.0m north	M	Good	G	G	G	• Slight lean on main stem to east self-corrected at 3.0m Drawn up form due to competition from neighbouring trees	• No works currently required	40+	A2	260 9.1
T11	London Plane *Platanus x hispanica*	21	900	3	7	9	10	10	8	3	6	5.0m south	M	Good	G	G	G	• Trifurcation of main stem at 3.0m • Asymmetrical crown bias to south & west • Evidence of previous pruning within crown	• No works currently required	40+	A2	366 10.8
T12	London Plane *Platanus x hispanica*	22	600	7	4	6	4	2	5	5	3	3.5m south	M	Good	G	G	G	• Bifurcation of main stem at 3.5m • Sweep on main stem and drawn up form	• No works currently required	40+	A2	163 7.2

Tree Ref No.	Species	Ht. (m)	Stem Dia. (mm)	Crown Spread				Crown Clearance				Ht. to 1st limb (m)	Age	Phys. Cond	Structural Condition			Observations	Preliminary Management Recommendations	Life Exp.	Cat.	RPA in m2 (Radius/ m)
				North	East	South	West	North	East	South	West				Basal	Stem	Crown					
T13	London Plane *Platanus x hispanica*	22	850	7	7	9	5	2	6	4	3	4.0m south	M	Good	G	G	G	• Significant lean on main stem self-corrected at 6.0m • Multiple co-dominant leaders forming • Evidence of previous pruning within southern crown • Asymmetrical crown bias to east and south	• No works currently required	40+	A2	327 10.2
T14	London Plane *Platanus x hispanica*	22	820	10*	8	6	7	6	5	8	4	8.0m east	M	Good	G	G	G	• Slight lean on main stem to south self-corrected at 3.0m Northern crown overhanging and in direct contact with building	• No works currently required	40+	A2	302 9.8
T15	London Plane *Platanus x hispanica*	22	740	8	7	8	4	5	6	10	8	6.0m north	M	Good	G	G	G	• Slight lean on main stem to south-east • Trifurcation of main stem at 4.0m • Asymmetrical crown bias to east	• No works currently required	40+	A2	249 8.9
T16	London Plane *Platanus x hispanica*	22	930	9	9	8	5	3	3	9	10	7.0m east	M	Good	G	G	G	• Bifurcation of main stem at 3.0m • Asymmetrical crown bias to north & east	• No works currently required	40+	A2	394 11.2
T17	London Plane *Platanus x hispanica*	22	790	4	9	8	1	3	10	10	10	10.0m east	M	Good	G	G	G	• Significant lean on main stem to south-east • self-corrected at 6.0m • Asymmetrical crown bias to east and south	• No works currently required	40+	A2	284 9.5
T18	London Plane *Platanus x hispanica*	22	1020	6	11	10	4	6	2	5	6	6.0m south	M	Good	G	G	G	• Significant lean on main stem to south self-corrected within upper crown • Asymmetrical crown bias to east and south	• No works currently required	40+	A2	468 12.2

Tree Ref No.	Species	Ht. (m)	Stem Dia. (mm)	Crown Spread				Crown Clearance				Ht. to 1st limb (m)	Age	Phys. Cond	Structural Condition			Observations	Preliminary Management Recommendations	Life Exp.	Cat.	RPA in m2 (Radius/ m)
				North	East	South	West	North	East	South	West				Basal	Stem	Crown					
T19	London Plane *Platanus x hispanica*	22	970	6	9	9	5	3	4	3	3	2.5m south	M	Good	G	G	G	• Recent loss of lowest western lateral • Evidence of previous pruning within crown • Asymmetrical crown bias to east and south	• No works currently required	40+	A2	423 11.6
T20	*Sycamore Acer pseudoplatanus*	22	700	6	7	9	4	8	5	3	4	5.0m north	M	Good	G	G	G	• Bifurcation of main stem at 4.0m • Slight asymmetrical crown bias to south	• No works currently required	20+	A2	222 8.4
T21	London Plane *Platanus x hispanica*	22	820	6	5	9	10	10	10	4	10	7.0m east	M	Good	G	G	G	• Trifurcation of main stem at 6.0m • Evidence of previous pruning within southern crown • Asymmetrical crown bias to south and west	• No works currently required	40+	A2	302 9.8

APPENDIX 4 LIMITATIONS OF REPORT

Limitations of the Tree Survey & Scope of the Report

- This report is restricted to those trees & vegetation shown on the attached Tree Constraints Plan, described within the tree survey schedule, as identified within the instruction as per Section 1.1.
- All plans are illustrative of the discussions within the report and based entirely on the drawings provided to Bartlett Consulting. All scaled measurements must be checked against the original submission documents as well as confirmed on site.
- The survey was based on unaided, visual observations made from ground level only, using the principles of a Visual Tree Assessment (VTA).
- The trees were not climbed at the time of the survey.
- All observations were made from within the curtilage of the site or from a public open space unless otherwise stated.
- The tree survey is preliminary in its nature and must not be interpreted as a detailed tree condition inspection.
- This report does not consider the possible implications to any existing or proposed built structures. These matters will be dealt with in future reports as deemed necessary/ as and when instructed.

Timing of the Tree Survey & the Report

- The observations & findings of this report remain valid for one year, from the date of issuance.
- The observations & findings will be invalidated if any building works are undertaken, soil levels altered or tree works implemented.
- In the instance where building works have occurred, soil levels are altered or tree works completed, it is recommended that a new tree survey and report is completed.

Trees in Relation to Other Properties

- The tree survey and report consider only those trees in relation to the site as identified.
- It does not comment upon the possible effects of trees on neighbouring properties, including matters concerning subsidence or heave, or with regards to potential hazards presented by trees surveyed.
- Neighbouring land/tree owners that are identified as posing a potential risk to the site should seek their own independent advice.
- Damage to, or potential damage to any existing structures that are not referred to within this report is not considered, unless otherwise specified. This is inclusive of built structures within and neighbouring the site.

Trees in Relation to Subsidence, Heave and Direct Damage

- This report does not deal with matters concerning subsidence or heave to any existing built structure on or neighbouring the site. It may be prudent to consider the effects of heave on any built structure if trees are to be removed.
- Similarly, the issue of direct damage (physical damage caused by tree roots) is not dealt with in this report.

Trees Subject to Statutory Controls

- Whilst Bartlett Consulting has made attempts to ascertain if any of the trees subject to this report are ‘protected’, their status may be subject to change. Therefore the final responsibility for checking statutory protection for trees rests with the employed contractor and not with Bartlett Consulting
- Any prescribed tree works to a protected tree are provided due to perceived hazard and risk, and should be considered acceptable by the Local Planning Authority (LPA). However appropriate notification must still be provided to the LPA as they may take an alternative point of view.

Trees Subject to Environmental Factors

- The statements, findings and preliminary recommendations made within this report do not take into account any effects of extreme climate and weather incidences, vandalism, changes in the natural and built environment around the tree(s) after the date of this report, nor any damage whether physical, chemical or otherwise.

Copyright

- All rights in this report are reserved. The contents and format are for the exclusive use of the addressee in dealing with the site. It may not be sold, lent, hired or divulged to any third party not directly involved in this site without the written consent of Bartlett Consulting.

APPENDIX 5 REPORT REFERENCES

As a progressive company, we keep abreast of research data relating to Arboriculture. All observations, recommendations and works are based on current industry standard reference material and a selection of pertinent items is shown below.

This survey and report have evolved from industry material including the following:

- O'Callaghan & Lawson (1995) *Trees and Development Conflicts: Importance of Advanced Planning & Site Control in Tree Preservation Plans*
- Matheny & Clark (1998) *Trees and Development a Technical Guide*
- BS 5837: (2012) *Trees in Relation to Design, Demolition and Construction – Recommendations*
- BS 3998: (2010) *Tree Works - Recommendations*
- Town & Country Planning Act (Tree Preservation) (England) Regulations 2012
- Mattheck, C, Bethge K, Weber K. (2015) *The Body Language of Trees – Encyclopaedia of Visual Tree Assessment*
  Karlsruhe Institute of Technology Campus North.

Bartlett Consulting's arboricultural expertise has been used to interpret these references for practical application to the site and the trees which are the subject of this report, and to provide the most appropriate advice and guidance at this stage of project planning.

© F. A Bartlett Tree Expert Co. Ltd

APPENDIX 6 GLOSSARY

Abiotic. Pertaining to non-living agents; e.g. environmental factors.
Absorptive roots. Non-woody, short-lived roots, generally having a diameter of less than one millimetre, the primary function of which is uptake of water and nutrients
Adaptive growth. In tree biomechanics, the process whereby the rate of wood formation in the cambial zone, as well as wood quality, responds to gravity and other forces acting on the cambium. This helps to maintain a uniform distribution of mechanical stress.
Adaptive roots. The adaptive growth of existing roots; or the production of new roots in response to damage, decay or altered mechanical loading.
Ancient tree. A specimen that has passed maturity, is very old in comparison to other trees of the same species and is in the final stage of its life. Ancient trees are important ecological assets in the landscape.
Architecture. In a tree, a term describing the pattern of branching of the crown or root system.
Bacteria. Microscopic single-celled organisms, many species of which break down dead organic matter, and some of which cause diseases in other organisms.
Bark. A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, hard and rigid with protective capabilities.
Bifurcation. The junction where single stems/branches divide into two at a union, sometimes implying that the two stems above the union are of similar size (see co-dominance).
Biotic. Pertaining to living agents; e.g. viruses, bacteria, fungi, plants & animals.
Bracing. The use of rods or cables to restrain the movement between parts of a tree.
Branch:

- **Scaffold.** A first order branch arising from a stem
- **Lateral.** A second order branch, subordinate to a scaffold branch or stem and bearing sub-lateral branches
- **Sub-lateral.** A third order branch, subordinate to a lateral or scaffold branch, or stem and usually bearing only twigs

Branch bark ridge. The raised arc of bark tissues that forms within the acute angle between a branch and its parent stem.
Branch collar. A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base.
Brown-rot. A type of wood decay in which cellulose is degraded, while lignin is only modified.
Buckling. An irreversible deformation of a structure subjected to a bending load.
Canker. A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria
Co-dominance. In a woodland, a tree whose crown is at the general level of the canopy. Alternatively, within the crown of a tree, branches/stems of equal size above a union.
Compartmentalization. The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region.
Compression strength. The ability of a material or structure to resist failure when subjected to compressive loading; measurable in trees with special drilling devices.
Compression. A force which pushes and tends to compress. The material fails by being crushed or by buckling (following sideways deflection).
Condition. An indication of the physiological vitality of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree
Conservation Area (CA). A geographical area recognized in the Town and Country Planning Act 1990 as being *'of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance'.*
Crown/Canopy. The main foliage bearing section of the tree
Crown Clean. The removal of dead, dying, damaged or diseased branches from the crown of a tree. Sometimes called 'dead wooding'.
Crown Lifting. The removal of limbs and/or small branches to achieve a specified vertical clearance above ground level or other surface.
Crown Reduction/shaping. An operation that results in an overall reduction in the height and/or spread of the crown of a tree by means of a general shortening of twigs and/or branches, whilst retaining the main framework of the crown and preserving, as far as possible, the natural tree shape.
Crown Thinning. The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure.
Defect. Any feature of a tree that is likely to make it less safe (in the case of a structural defect) or otherwise to reduce its health, longevity, landscape prominence or conservation value for any other reason.
Dieback. The death of parts of a woody plant, starting at shoot-tips or root-tips.
Disease. A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms.
Dominance. In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours.
Dysfunction. In woody tissues, the loss of physiological function, especially water conduction, in sapwood.
DBH (Diameter at Breast Height). Stem diameter measured at a height of 1.5m or the nearest measurable point. Where measurement at a height of 1.5 metres is not possible, another height may be specified.
Deadwood. Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard.
Epicormic shoot. A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot.
Felling licence. In the UK, a permit to fell trees in excess of a stipulated number of stems or volume of timber.
Formative pruning. Pruning of young trees to modify their form at maturity, either to avoid future structural defects (for instance by singling a twin-stem) or to create a desired cultivated tree form.
Flush-cut. A pruning cut which removes part of the branch bark ridge and or branch-collar.
Girdling root. A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue
Habit. The overall growth characteristics, shape of the tree and branch structure.
Harm. Personal injury or death, property damage, or disruption of activities.
Hazard. An element of tree risk: the tree part(s) with a capacity to cause damage or injury.

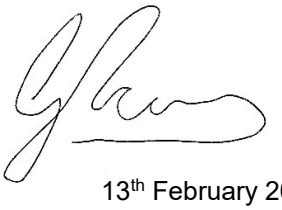
Hazard beam. A curved woody stem, where loading tends to bend it against the direction of curvature. They have a tendency to split longitudinally through the centre due to strongly opposing internal stresses.
Heartwood/false-heartwood/ripe wood. Sapwood that has become dysfunctional as part of the natural aging processes.
Included bark (ingrown bark). Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact.
Infection. The establishment of a parasitic micro-organism in the tissues of a tree or other organism.
Lever arm. A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch.
Lions tailing. A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end-loading.
Loading. A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure.
Longitudinal. Along the length (of a stem, root or branch)
Lopping. A term often used to describe the removal of large branches from a tree, but also used to describe other forms of cutting.
Minor deadwood. Deadwood of a diameter less than 25mm and or unlikely to cause significant harm or damage upon impact with a target beneath the tree.
Mulch. Material laid down over the rooting area of a tree or other plant to help conserve moisture; a mulch may consist of organic matter or a sheet of plastic or other artificial material.
Natural bracing. A natural/grown structure formed above a union in the crown of a tree, which restricts the movement of the constituent union parts. Without mechanical stimulus, the centre of a union may not develop normally.
Occlusion. The process whereby a wound is progressively closed by the formation of new wood and bark around it.
Photosynthesis. The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products.
Pollarding. The removal of the tree canopy, back to the stem or primary branches. Pollarding may involve the removal of the entire canopy in one operation, or may be phased over several years. The period of safe retention of trees having been pollarded varies with species and individuals. It is usually necessary to re-pollard on a regular basis, annually in the case of some species.
Pruning. The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs.
Reactive Growth/Reaction Wood. Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth).
Risk. The combination of the likelihood of an event and the severity of the potential consequences.
Risk Assessment. The process of risk identification, analysis and evaluation.
Root zone. Area of soils surrounding a tree likely to contain absorptive and/or structural roots of the tree/s. The Primary root zone is that which we consider of primary importance to the physiological well-being of the tree.
Saprophyte: a fungi which uses non-living organic material and works beneficially for its host, recycling carbon, nitrogen, and other nutrients.
Sapwood. Living xylem tissues.
Selective delignification. A kind of wood decay (white-rot) in which lignin is degraded faster than cellulose.
Simultaneous white-rot. A kind of wood decay in which lignin and cellulose are degraded at about the same rate.
Soft-rot. A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole.
Shrub species. Woody perennial species forming the lowest level of woody plants in a woodland and not normally considered to be trees.
Stem/s. The main supporting structure/s, from ground level up to the first major division into branches.
Stress. In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature.
Stress. In mechanics, the application of a force to an object
Structural roots. Roots, generally having a diameter greater than ten millimetres, and contributing significantly to the structural support and stability of the tree.
Stub (snag). In woody plants, a portion of a cut or broken stem, branch or root which extends beyond any growing-point or dormant bud; a snag usually tends to die back to the nearest growing point.
Taper. In stems and branches, the degree of change in girth along a given length.
Targets. In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it.
Tension. A force which pulls and tends to stretch. A material in tension may suffer ductile failure or brittle failure.
Topping. In arboriculture, the removal of the crown of a tree, or of a major proportion of it.
Tree Preservation Order (TPO). An order made by a local planning authority in England to protect specific trees, groups of trees or woodlands in the interests of amenity.
Understorey. A layer of vegetation beneath the main canopy of woodland or forest or plants.
Union. The area of physiological division of one primary tree stem/branch into two or more secondary members, commonly referred to as 'fork'.
Vascular wilt. A type of plant disease in which water-conducting cells become dysfunctional.
Veteran tree. A loosely defined term for an old specimen that is of interest biologically, culturally or aesthetically because of its age, size or condition and which has usually lived longer than the typical upper age range for the species concerned.
Vigour. The health and resilience of a tree (from the Latin 'to be strong'), reflected in the capacity of the whole tree to grow. The term is often used as a description of overall condition on a qualitative scale from 'high' to 'low'.
Vitality. A close synonym of vigour reserved for active processes in a tree that do not result in the capacity for growth, for instance a tree's response to injury, insect attack or disease.
VTA. Visual Tree Assessment. A structured and systematic evaluation of a tree considering biological and mechanical functions and systems, arriving at a failure criteria and tree management recommendations.
White-rot. A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded.
Wind exposure. The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity.
Wind pressure. The force exerted by a wind on a particular object.
Windthrow. The blowing over of a tree at its roots.
Woundwood. Wood with atypical anatomical features, developed in response to a wound, often resulting in a swelling (as round a pruning wound) which gradually occludes the wound.

We trust that the contents and recommendations contained within this report were informative, easy to understand and helpful to you, with regards to managing your tree. Should you have any further questions or concerns, please do not hesitate to contact us again.

REPORT CLASSIFICATION: Part 1: BS: 5837 Tree Survey & Constraints Plan

REPORT STATUS: Final

REPORT COMPLETED BY: Mr G Davies *FdSc Arb*
Arboricultural Consultant

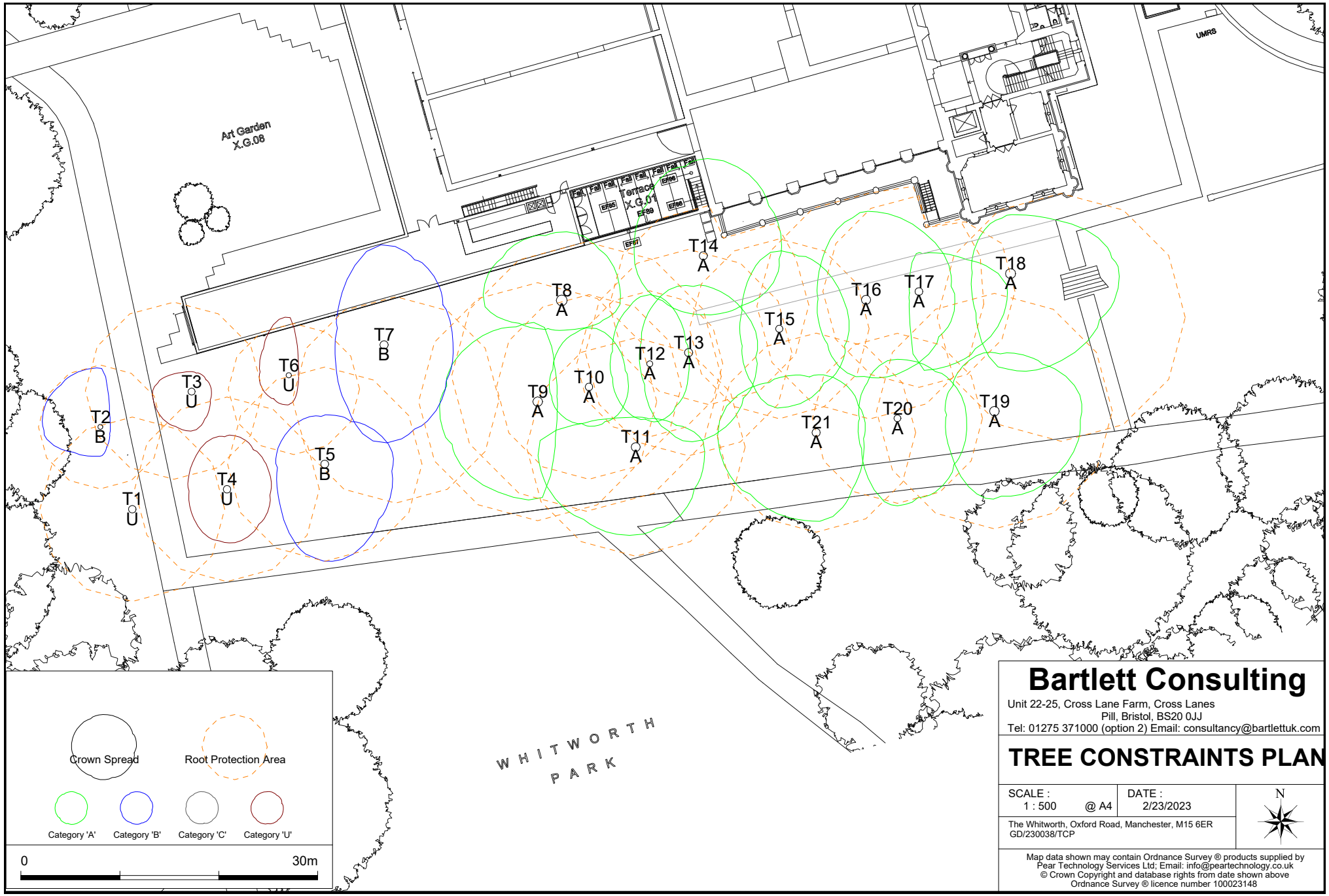
SIGNATURE: 

DATE: 13th February 2023

REPORT REVIEWED BY: Mr B Hauxwell
Arboricultural Consultant

SIGNATURE: 

DATE: 20th February 2023



Bartlett Consulting

Unit 22-25, Cross Lane Farm, Cross Lanes
Pill, Bristol, BS20 0JJ
Tel: 01275 371000 (option 2) Email: consultancy@bartlettuk.com

TREE CONSTRAINTS PLAN

SCALE :	DATE :
1 : 500 @ A4	2/23/2023

The Whitworth, Oxford Road, Manchester, M15 6ER
GD/230038/TCP

N

Map data shown may contain Ordnance Survey ® products supplied by Pear Technology Services Ltd; Email: info@peartechnology.co.uk
© Crown Copyright and database rights from date shown above
Ordnance Survey ® licence number 100023148