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BS 5837:2012 Arboricultural Survey

Islington Marina, Manchester
for:

TMV Architects

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BS 5837:2012 Arboricultural Survey

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1.0 Non-Technical Summary

1.1 Arboricultural Survey

1.1.1 The site is located within Cotton Field Park south of New Islington Marina and west of Old Mill Street, in the Northern quarter of Manchester and comprises amenity grassland, mature trees and hard surfacing, as well as the edge of the canal basin.

1.1.2 A tree survey in accordance with BS 5837:2012 was carried out by Enzygo Ltd. in May 2024. 18 trees and 15 tree groups were surveyed within the site and within 15m of the site boundary. The trees are predominantly of native species, mature and of generally low to moderate value.

1.1.3 There are no legally protected trees within the vicinity of the development areas.

1.2 Design recommendations

1.2.1 The site layout design should take into account the constraints posed by the trees on site and should seek to retain as many trees on site as possible to minimise the effect of the development on the amenity of the site and the local landscape as well as on the ecological value of the site. The retention of trees described in this report as being of high or moderate value should be prioritised.

1.2.2 *BS 5837:2012 Trees in relation to design, demolition and construction* chapters 5.2 and 5.3 describe the constraints posed by existing trees and outline the potential conflict between proposed structures and retained trees and how these can be avoided or minimised.

1.2.3 New structures, hard landscape, services and construction access should be designed outside the canopy spreads and Root Protection Areas (RPA) of retained trees as far as reasonably practicable. Lowering of ground levels within the RPA of retained trees is not acceptable. Specialist solutions to manage the conflict between the proposals and retained trees are available but may have significant impact on the costs of the construction phase. These include access facilitation pruning, no-dig construction for hard surfaces, temporary ground protection, specialist engineering for buildings and foundations and trenchless solutions for services.

2.0 Overview

2.1 Introduction

2.1.1 Enzygo Limited [Enzygo] have been commissioned by TMV Architects to prepare an Arboricultural Survey Report in accordance with BS 5837:2012 for the site at Cotton Field Park south of New Islington Marina in Manchester in support of the erection of an ancillary building and new build store at the site.

2.1.2 This report should assist the preparation of the site layout, allowing the designer to consider the arboricultural constraints on site, including the retention of desirable trees (high and moderate value and/or trees which are found to be legally protected) and the protection of above and below ground parts of retained trees. It should also assist in designing any construction routes to the two sites.

2.2 Structure of the Report

2.2.1 This report presents site-specific information as follows:

- Chapter 2.0 provides a brief description of the site and its location.
- Chapter 2.3.1 summarises the planning background, including national and local planning policies and any relevant planning history of the site.
- Chapter 4.0 summarises the findings of the Arboricultural Survey, describing the overall species mix, age, condition and value of the trees recorded on site.
- Chapter 5.0 provides both general and site-specific design recommendations to assist with the development of any future site layouts which are sympathetic to the existing trees

2.2.2 Supportive of and appended to the report are the Tree Constraints Plan in Appendix 1, the Arboricultural Survey Schedule in Appendix 2 and relevant site photographs in Appendix 3.

2.2.3 The methodology underlying the Arboricultural Survey is described in Appendix 4 – Methodology.

2.3 Site Description

2.3.1 The site comprises two small parcels of land within Cotton Field Park, a Public Open Space (POS) south of New Islington Marina in the Northern Quarter of Manchester. Both are 182m² and comprise the existing 'boaters hut' in the West of the marina and an existing compound in the East. The areas are within publicly accessible land and can be viewed from around the park and the marina; the hut and the compound are not accessible the wider public.

3.0 Planning background

3.1 National Planning Policy Framework (December 2023)

3.1.1 The National Planning Policy Framework (NPPF) published by the government and updated in December 2023 sets out the framework objectives for development in England. These are used by Local Planning Authorities (LPA) both during the preparation of their local planning policies as well as to guide them in making individual decisions for Planning Applications.

3.1.2 The NPPF sets out several objectives concerning the natural environment, including trees, woodland and hedgerows. In addition to broad objectives addressing biodiversity and the challenges posed by climate change (e.g. flood resilience, species selection), the following paragraphs ask for the recognition of existing trees in relation to development:

- Paragraph 136 states that "*Trees make an important contribution to the character and quality of urban environments, and can also help mitigate and adapt to climate change. Planning policies and decisions should ensure* (…) *that existing trees are retained wherever possible.*"
- Paragraph 180 requests that "*Planning policies and decisions should contribute to and enhance the natural and local environment by* […] *recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland*".

3.2 Local Planning Policy

3.2.1 Policy EN 9 of the Manchester City Council Core Strategy Development Plan (Adopted July 2012) states that the council "will seek to protect existing street trees and promote new planting, particularly where this can enhance green links in the urban area". Additionally, Policy EN 15 states that the council's objective is "to protect and conserve the City's existing trees and woodlands and they aim for a net increase in trees across the City".

4.0 Arboricultural Survey

4.1 Overview

4.1.1 The arboricultural survey in accordance with BS 5837:2012 was carried out by Hazel Irving FdSc Arboriculture with Urban Forestry in May 2024. At the time of the survey any deciduous trees were fully in leaf.

4.1.2 18 trees and 15 tree groups were recorded during the walk-over survey, including trees within 15m from the development boundary as well as any trees which may be affected by construction traffic to both parts of the development area. This includes trees along the access road along the southern boundary of the park and

4.1.3 A plan of the site illustrating the location, canopy spread and Root Protection Area of each feature is included in Appendix 1 – Tree Survey and Constraints Plan

4.1.4 Appendix 2 - Arboricultural Survey Schedule providing survey details of each tree.

4.1.5 A selection of photographs showing both the site and notable individual trees and tree groups is included in Appendix 3 – Site photographs.

4.2 Tree species, age and overall condition

4.2.1 The vast majority of trees are of native species and include pedunculate/common oak (*Quercus robur*), white willow (*Salix alba*), field maple (*Acer campestre*) and Scots pine (*Pinus sylvestris*). They're in good to fair condition, given that they're likely to be monitored and managed within a public open space.

4.3 Tree quality, value and significance on site and local landscape

4.3.1 The majority of trees within Cotton Field Park and its access points are of moderate value (BS retention category B), with smaller trees of lower value (category C) scattered between them.

4.3.2 Immediately to the South of the boaters' hut site is a category B group of mature willow (G21), the boundary group of early mature native trees to the West is of low overall value (BS retention category C).

4.3.3 The second site is surrounded by moderate value tree groups G23 and G25 (both made up of white willow) as well as another low value native boundary group (G26).

4.3.4 Category A trees were only recorded within the wider surroundings; they are two significant willows in the southwestern corner of the park (T4) and on the canal side immediately to the East of the boaters' hut (T22).

4.4 Root Protection Areas (RPA)

4.4.1 The Root Protection Areas for each Category A to C tree and tree group has been calculated based on measured stem diameters. Both the radius and the area of each RPA are shown on the plan included in Appendix 1 – Tree Survey and Constraints Plan

4.4.2 Appendix 2 - Arboricultural Survey Schedule Appendix 2 - Arboricultural Survey Schedule.

4.5 Tree Preservation Orders (TPO) and Conservation Areas

4.5.1 Manchester City Council has confirmed that none of the trees included in this survey are protected by Tree Preservation Order. The site is not located within a Conservation Area.

4.5.2 There are no non-statutory designations affecting the site.

5.0 Design recommendations

5.1 General recommendations

5.1.1 Design decisions should be based on the recommendations in chapters 5.2 and 5.3 of *BS 5837:2012 Trees in relation to design, demolition and construction* which describe the constraints posed by existing trees and outline the potential conflict between proposed structures and retained trees and how these can be avoided or minimised.

5.2 Maximise tree retention

5.2.1 It is recommended that the site layout design considers the safe retention of any trees which have been assigned the retention categories A, B and C as far as practicable to retain the ecological value and the mature character of the site and to minimise the potential visual impact the development may have on the surrounding landscape.

5.3 Minimise residual effect of trees on development

5.3.1 In addition to the desired retention of existing trees as described in 5.2 above, it is advised to consider the impacts any retained trees would have on the development, including excessive shading of sensitive building elevations and open spaces and the increased requirement for routine tree management near built structures (i.e. regular crown reduction near buildings).

5.4 Minimise residual effect of development on retained trees

Proposed buildings, structures and hard surfacing

5.4.1 The site layout design should allow generous distances between vertical structures and tree canopies and allow for the expected future expansion of crowns.

5.4.2 The location of new structures and hard surfacing within the canopy spread of existing trees and tree groups should be considered carefully. Excessive management of these trees to facilitate any such elements may cause an imbalance of stem/crown ratio, unbalanced crowns or unnatural shape of specific tree species. The future requirement for continuous tree management to limit any conflicts should remain minimal.

5.4.3 Where built structures and hard landscape elements are proposed within the Root Protection Areas of existing trees, specialist methodologies may have to be adopted to manage the conflict. These solutions may have an impact on costs of the construction phase and it may be desirable to keep this to a minimum by developing a layout which is sensitive to the existing trees. Any vertical elements such as fences should be proposed at such a distance from tree stems as to allow for the future increase of the stem diameter and root buttresses.

Utilities and earthworks

5.4.4 Underground services and any proposed design elements requiring foundations (e.g. boundary treatments, street furniture, hard surfaces) should be placed outside of Root Protection Areas where possible.

5.4.5 Excavations for underground services may have an impact where they are proposed within the RPA of retained trees. Proposed above ground services may further conflict with parts of tree canopies.

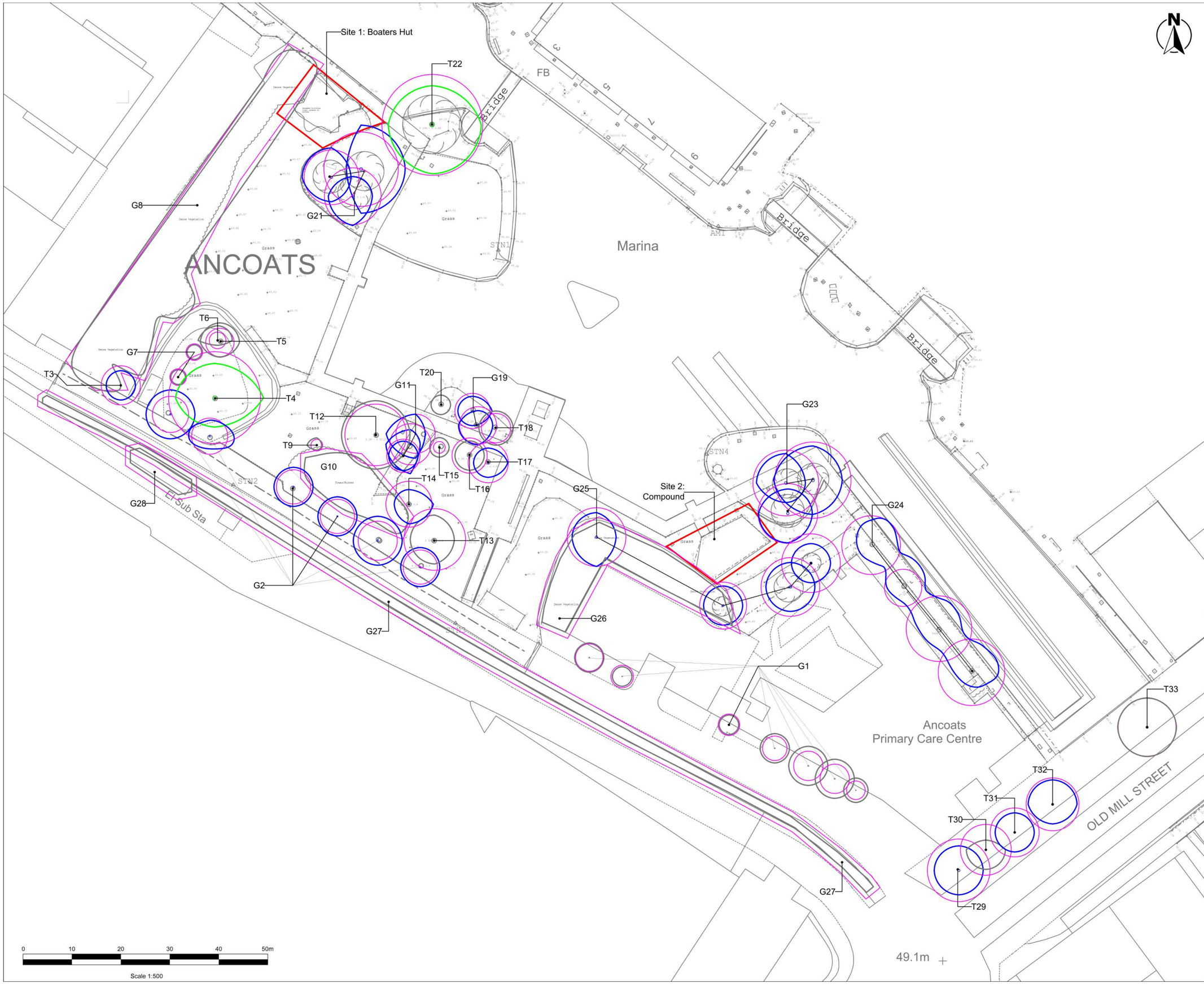
5.4.6 The reduction of ground levels within the Root Protection Areas of retained trees are not acceptable. Where this can't be avoided, the removal of the tree may have to be considered.

Construction operations

5.4.7 Demolition and construction operations near retained trees are likely to cause accidental damage of tree trunks and low hanging branches. Where possible, the design should allow for reasonable distances between new structures and above ground parts of retained trees, including sufficient clear working areas around those structures.

5.4.8 Vehicle and plant movement during demolition and construction may further cause ground compaction which could lead to irreversible damage of tree roots and the rooting environment within the RPA of retained trees. The construction phase plans should ensure that site access routes, site compounds and internal routes are proposed outside the Root Protection Areas (RPA) of retained trees.

6.0 Appendix 1 – Tree Survey and Constraints Plan



NOTES

- Do not scale from this drawing for construction purposes
- This drawing is to be read in conjunction with all relevant drawings and documents associated with this project.
- All surveyed information including levels and layout is provided by others
- All existing and proposed dimensions, levels and locations to be checked and verified by the main contractor on site prior to the commencement of the works and any anomalies reported to the engineer.

KEY - Tree Survey and Tree Constraints Plan

Tree Categories BS 5837 (2012)

- Tree Category A
- Tree Category B
- Tree Category C
- Tree Category U

Root Protection Area (RPA)

Rev	Date	Description			
PL01	31/05/24	For Planning	HI	VM	VM

Project
Islington Marina
Manchester

Client
TMV Architects

Drawing Title
Tree Constraints Plan

Status	Date	Scale
For Planning	31/05/24	1:500 @ A2

Drawn	Designed	Checked	Approved
HI	--	VM	VM

DWG No.	Revision
CRM.944.001.ENZ.XX.00.DR.AR.45.101	PL01

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7.0 Appendix 2 - Arboricultural Survey Schedule

7.1 Information recorded and symbols used

Ref	Sequential tree reference as per Tree Survey Plan
Species	Common name (*Scientific name*)
Ht (m)	Estimated tree height in metres
Stem dia (cm)	Stem diameter measured in accordance with BS5837:2012 Annex C
Canopy Spread	Estimated branch spread (in metres) at four cardinal points
Clear crown	Height of the lowest branch(es) including cardinal point(s) where applicable
Life stage	YNG -Young SM -Semi-mature EM - Early mature M - Mature OM - Over-mature (including veteran trees)
RULE	Remaining useful life expectancy estimated in years
Cond.	G - Good F - Fair P - Poor
Notes	Including observations and notes on: Defects and other structural and physiological abnormalities, nesting birds, bat roost potential (where possible), notes on surrounding land incl. soil compaction, Tree Preservation Orders and Conservation Area (where information is available), notes on limited access/inspection, off site location and preliminary management recommendations (in italics)
BS Cat.	Retention category and sub-category in accordance with BS5837:2012 A - High Quality1 - Mainly arboricultural value B - Moderate Quality2 - Mainly landscape value C - Low Quality3 - Mainly cultural value U - Unsuitable for retention
RPA (m)	Radius of Root Protection Area calculated in metres (Radius of RPA= 12x stem diameter). This will usually be capped at 15m for trees with a stem diameter larger than 1.25m
RPA (m^2)	Area of Root Protection Area (relevant if RPA is not circular due to pre-existing site conditions, incl. water courses, retaining structures and building foundations). Rounded up to nearest m^2. This will usually be capped at 707m^2 for trees with a stem diameter larger than 1.25m.

Ref	Species	Ht (m)	Stem dia (cm)	Canopy spread (m)				Clear crown	Life stage	RULE	Cond.	Notes (*Including preliminary management recommendations*)	BS Cat.	RPA (m)	RPA (m²)
				N	E	S	W								
G1	Common Oak (*Quercus robur*)	To 10	230,190, 180,210, 250,250, 160	See plan for canopy extents				2m to 2.5m	EM	40+ Years	Good	A linear group of seven early mature oak trees. Evidence of previous crown lifting over the access road and car parking area. Cars are parked very close to the stems (within 1m). No guards around the stems to protect them from mechanical damage. Stem with DBH 190 has a basal bark wound and a sparse canopy.	C 1,2	See plan for RPA	See plan for RPA
G2	Common Oak (*Quercus robur*)	To 12	310,310, 290,330, 290,290	See plan for canopy extents				4	EM	40+ Years	Good	A linear group of seven early mature oak trees. Evidence of previous crown lifting over the access road. Canopies appear full and healthy.	B 1,2	See plan for RPA	See plan for RPA
T3	Common Oak (*Quercus robur*)	12	330	3	3	3	3	4	EM	40+ Years	Good	Evidence of previous crown lifting over the road. No wound wood yet forming at pruning sites. Limited inspection due to brambles at base of stem.	B 1,2	4	50
T4	White willow *(Salix alba)*	16	780	7	10	6	8	3	M	40+ Years	Good	Single stemmed and vertical with a well-balanced crown. Large surface roots visible. Evidence of previous crown lifting with no wound wood forming at pruning sites. Major piece of deadwood in the south side of the lower crown. Deadwood hanger caught up close to the stem. No major visible defects.	A1	9.4	278
T5	Apple *(Malus sp.)*	6	240	4.0	4.0	3.0	4.0	2	EM	40+ Years	Good	Limited detailed inspection due to ivy.	C1	2.9	26

Ref	Species	Ht (m)	Stem dia (cm)	Canopy spread (m)				Clear crown	Life stage	RULE	Cond.	Notes (*Including preliminary management recommendations*)	BS Cat.	RPA (m)	RPA (m²)
				N	E	S	W								
T6	Field maple *(Acer campestre)*	8	140	3.0	3.0	1.0	4.0	2	EM	40+ Years	Fair	Self-set tree, leaning West away from the canopy of the adjacent apple tree.	C1	1.7	9
G7	Chanticleer pear *(Pyrus calleryana 'Chanticleer')*	6	140, 140	See plan for canopy extents				2	EM	40+ Years	Fair	A group of two pear trees. No major visible defects.	C1	See plan for RPA	See plan for RPA
G8	Wild cherry *(Prunus avium)* White willow *(Salix alba)* Goat willow *(Salix caprea)* Field maple *(Acer campestre)*	To 14	100 avg.	See plan for canopy extents				0	EM	40+ Years	Good	A group of boundary trees providing screening. Mostly multi-stemmed and self-set specimens.	C 1,2	See plan for RPA	See plan for RPA
T9	Scots pine *(Pinus sylvestris)*	5	100	1.5	1.0	1.0	2.0	2	SM	40+ Years	Good	No major visible defects.	C1	1. 2	5
G10	Goat willow x3 *(Salix caprea)*	8	260 avg.	See plan for canopy extents				2	EM	40+ Years	Good	A group of three goat willows. Two multi-stemmed trees and one single-stemmed tree.	C 1,2	See plan for RPA	See plan for RPA
G11	Scots pine *(Pinus sylvestris)*	To 15	280,330, 350	See plan for canopy extents				7	EM	40+ Years	Good	A group of three Scots pine. Stem with DBH 280, has slightly sparse foliage and is not as large as the other two.	B 1,2	See plan for RPA	See plan for RPA
T12	Goat willow *(Salix caprea)*	8	230,250, 80,100,1 70,220,1 30,230	7	7	7	7	2.5	EM	40+ Years	Good	Multi-stemmed from ground level.	C1	6.3	125
T13	Goat willow *(Salix caprea)*	5	220,370, 150,190, 190	5	5	5	5	3	EM	40+ Years	Good	Multi-stemmed tree from 1m. Evidence of previous crown lifting.	C1	6.3	125

Ref	Species	Ht (m)	Stem dia (cm)	Canopy spread (m)				Clear crown	Life stage	RULE	Cond.	Notes (*Including preliminary management recommendations*)	BS Cat.	RPA (m)	RPA (m²)
				N	E	S	W								
T14	Scots pine *(Pinus sylvestris)*	15	390	3.0	5.0	4.0	3.0	3.0	EM	40+ Years	Good	Single-stemmed and slightly leaning East. Minor deadwood in lower crown.	B1	4.7	69
T15	Rowan *(Sorbus aucuparia)*	7	90,50	2.0	2.0	2.0	2.0	2.0	EM	40+ Years	Good	Twin-stemmed from ground level.	C1	1.2	5
T16	Wild cherry *(Prunus avium)*	7	140,140, 60,60,14 0,90,130	3.0	3.0	3.0	3.0	3.0	EM	40+ Years	Good	Multi-stemmed from ground level. Evidence of previous crown lifting. Occluding bark wounds on south side of lower stem and branches.	C1	3.6	41
T17	Scots pine *(Pinus sylvestris)*	15	340	3.0	4.0	3.0	3.0	3.0	EM	40+ Years	Good	Single-stemmed and vertical with a high crown and occluding tear out wound at 10m south of main stem.	B1	4.1	53
T18	Bird cherry *(Prunus padus)*	6	50,70,11 0,70,100, 130,110	3.5	3.5	3.5	3.5	3.5	EM	40+ Years	Good	Multi-stemmed from ground level. Minor bark wounds noted. Likely vandalism. Smaller, most southern stem ringbarked (50dbh). Some crossing and rubbing branches.	C1	3	28
G19	Scots pine *(Pinus sylvestris)*	15	300,320	See plan for canopy extents				3	EM	40+ Years	Good	A group of two early mature Scots pine. Single-stemmed and vertical with a well-balanced, full crowns.	B 1,2	See plan for RPA	See plan for RPA
T20	Rowan (*Sorbus aucuparia*)	6	60,110,9 0,70	2	2	2	2	2	EM	40+ Years	Good	Multi-stemmed from 30cm. Evidence of previous crown lifting with no wound wood yet forming at pruning sites.	C1	2	13
G21	White willow *(Salix alba)*	16#	630,480, 470	See plan for canopy extents				5	EM	40+ Years	Good	A group of 3 trees, all Single-stemmed and vertical with a homogeneous crown. Bird boxes affixed to each tree.	B 1,2	See plan for RPA	See plan for RPA

Ref	Species	Ht (m)	Stem dia (cm)	Canopy spread (m)				Clear crown	Life stage	RULE	Cond.	Notes (*Including preliminary management recommendations*)	BS Cat.	RPA (m)	RPA (m²)
				N	E	S	W								
T22	White willow *(Salix alba)*	14#	860	8	10	10	9	6	M	40+ Years	Good	Historical Pollard from 2m with mature stems. Minor and major deadwood throughout crown. Evidence of recent crown lifting.	A1	10.3	333
G23	White willow *(Salix alba)*	14#	650,510, 560	See plan for canopy extents				4	EM	40+ Years	Good	A group of three willows, all single stemmed and vertical with well-balanced crowns. Evidence of previous crown lifting with no wound wood forming at pruning sites. Basal flares not visible.	B 1,2	See plan for RPA	See plan for RPA
G24	White willow *(Salix alba)*	3	570,560, 320,500	See plan for canopy extents				3	EM	40+ Years	Poor	A linear group of four recently pollarded trees. Some short, epicormic growth present. Condition at present is poor however the trees are likely to recover.	B 1,2	See plan for RPA	See plan for RPA
G25	White willow *(Salix alba)*	16#	500#,500 #,400#,5 00#	See plan for canopy extents				2	EM	40+ Years	Good	A group of willows within unkempt area of scrub and brambles. Four trees. Limited inspection due to lack of access. Provide boundary screening.	B 1,2	See plan for RPA	See plan for RPA
G26	Wild cherry (*Prunus avium*) Rowan (*Sorbus aucuparia*) Common alder (*Alnus glutinosa*) Common hawthorn (*Crataegus monogyna*) Bird cherry (*Prunus padus*)	6	100 avg.	See plan for canopy extents				0	Y to EM	40+ Years	Good	A group of dense, mixed vegetation. Will grow up to provide good screening and wildlife benefits.	C 1,2	See plan for RPA	See plan for RPA

Ref	Species	Ht (m)	Stem dia (cm)	Canopy spread (m)				Clear crown	Life stage	RULE	Cond.	Notes (*Including preliminary management recommendations*)	BS Cat.	RPA (m)	RPA (m^2)
				N	E	S	W								
G27	Field maple (*Acer campestre*) Buddleja (*Buddleja sp.*) Silver birch (*Betula pendula*) Norway maple (*Acer platanoides*) Goat willow (*Salix caprea*) Rowan (*Sorbus aucuparia*)	8	100 avg.	See plan for canopy extents				2.5	EM	40+ Years	Good	Low value offsite boundary vegetation.	C 1,2	See plan for RPA	See plan for RPA
G28	Field maple (*Acer campestre*) Bird cherry (*Prunus padus*)	10	200 avg.	See plan for canopy extents				2	EM	40+ Years	Good	Offsite trees within 15m. Ground level change between two sites. Off-site ground level approximately 1.5m-2m lower.	C 1,2	See plan for RPA	See plan for RPA
T29	White willow *(Salix alba)*	12	530	5.0	5.0	5.0	5.0	2	EM	40+ Years	Good	Single-stemmed specimen forming part of a linear group of street trees. Minor deadwood throughout the crown. Appears in good condition.	B 1,2	6.4	129
T30	White willow *(Salix alba)*	11	430	2.0	4.0	4.0	4.0	4.0	EM	40+ Years	Good	Major bark wound on northern side of stem from ground level to first branch, resulting in the dieback of the North side of the canopy. Major deadwood overhanging car parking area with fairly high footfall. Otherwise appears in fair condition.	C 1,2	5.2	85
T31	White willow *(Salix alba)*	11	420	4.0	4.0	4.0	4.0	4.0	EM	40+ Years	Good	Single-stemmed and vertical with a well-balanced crown.	B 1,2	5.0	79

Ref	Species	Ht (m)	Stem dia (cm)	Canopy spread (m)				Clear crown	Life stage	RULE	Cond.	Notes (*Including preliminary management recommendations*)	BS Cat.	RPA (m)	RPA (m^2)
				N	E	S	W								
T32	White willow *(Salix alba)*	10	450	5.0	5.0	4.0	5.0	4.0	EM	40+ Years	Good	Single-stemmed and vertical with a well-balanced crown. Canopy pruned back over road way.	B 1,2	5.4	92
T33	White willow *(Salix alba)*	8	490	6.0	6.0	6.0	6.0	2.0	EM	40+ Years	Good	Pollarded to a height of 2m with semi mature regrowth. *Trametes versicolor* present in the stem unions around the oollarding points indicating dysfunctional wood beneath bark. Canopy slightly sparse.	C 1,2	5.9	109

8.0 Appendix 3 – Site photographs



Plate 1: Tree xx



Plate 2: Tree xx



Plate 3: Tree xx



Plate 4: Tree xx



Plate 5: Tree xx



Plate 6: Tree xx

9.0 Appendix 4 – Methodology

9.1 Introduction

9.1.1 This report and the methodology adopted to carry out the Arboricultural Survey is based on recommendations outlined in *British Standard (BS) 5837:2012 Trees in relation to design, demolition and construction- Recommendations*. This was published by BSI Standards Limited and came into effect on 30th April 2012. It supersedes BS 5837:2005 which is withdrawn.

9.2 Arboricultural Survey

9.2.1 A tree survey or arboricultural survey is a ground-based visual assessment of existing trees and tree groups on a site. It records the location of trees, the species, the estimated height and canopy spread, the stem diameter, and the tree's life stage, remaining useful life expectancy (RULE) and overall condition. Any distinctive features and abnormalities such as structural defects and physiological condition which may or may not have an adverse effect on the health or stability of the tree are also recorded, together with any signs of nesting birds and bat roost potential. Where ground conditions may influence the tree's growth, health and stability, such as water logging, ground compaction and severe level changes, this would also be recorded.

9.2.2 The site walkover includes an assessment of the overall value and quality of the trees on site by assigning a retention category to each tree and tree group. This assists stakeholders in deciding which trees should be removed or retained in the event of development occurring. There are four categories: A (high quality), B (moderate quality), C (low quality) and U (unsuitable for retention). For trees in categories A to C, these should qualify under one or more subcategories: 1 (mainly arboricultural qualities), 2 (mainly landscape qualities) and 3 (mainly cultural values).

9.2.3 The findings of the tree survey are recorded in an Arboricultural Survey Schedule supported by a Tree Survey and Tree Constraints Plan, both appended to the report.

9.2.4 The survey includes all trees which have a stem diameter of at least 75mm at 1.5m height or measured in accordance with BS 5837:2012 Annex C.

9.2.5 The tree survey usually records individual trees (labelled "T" on the Tree Survey and Tree Constraints Plan and in the Tree Survey Schedule), but may also group trees of similar age, species and condition into Groups (labelled "G"). Trees may also be grouped where they form a homogeneous unit (e.g. tree belts and woodland groups) which is unlikely to be directly

affected by the development (labelled “G” for small groups or “W” for Woodland Groups, as appropriate). Hedgerows are also recorded where present (labelled “H”).

9.2.6 To determine the location of trees, groups and hedgerows on site, Enzygo Ltd. and any surveyor sub-consultants use a handheld GPS tracking device with an accuracy of up to 1-2m. It enables the surveyor to plot trees onto a base plan, usually a digital copy of a topographic survey or an OS map tile, and to simultaneously record all tree survey information required for a full tree survey schedule to BS 5837:2012.

9.2.7 Following the completion of the site survey this is then uploaded into a Computer Aided Design (CAD) programme in order to produce the Tree Survey and Tree Constraints Plan, with the tree survey information converted into a corresponding Tree Survey Schedule.

9.2.8 The survey includes any trees outside the site boundary which may be affected by any development proposals by overhanging canopies or by Root Protection Areas which are likely to extend into the site. These trees are normally found within 15m from the site boundary.

9.2.9 In addition to a site walk-over survey, a desk-study is carried out which includes the calculation of Root Protection Areas (RPA) in accordance with BS 5837:2012 clause 4.6 as the minimum area of land around the stem of a tree which should be protected during construction.

9.2.10 The desk study includes liaison with the relevant local authority to establish whether any of the trees on site are protected by Tree Preservation Order (TPO) or whether Conservation Areas affect the legal status of any trees. Some local authorities provide online mapping tools on their website which identify any legal tree protection.



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