Arboricultural Impact Analysis

Proposed Phase 3 Development

at

Coram Comunity Campus
Mecklenburgh Square
London
WC1N 2QA

for

The Coram Foundation

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1 Introduction

1.1 This report contains a detailed appraisal of the impact of proposed new development upon existing trees within or adjacent to the boundaries of Coram Community Campus, Mecklenburgh Square, London WC1N 2QA.

1.2 The report assesses the health and safety of the trees under their current growing conditions and considers the impact of a proposed new three-storey building in the north east corner of the Campus, hereafter referred to as Coram Phase 3, measured against the advice and guidance set out in *BS5837: 2012 Trees in relation to design, demolition and construction – Recommendations.*

1.3 The detailed tree survey on which the appraisal is based was carried out on the afternoon of Saturday 16 January 2010 in overcast conditions with light rain for part of the time, with a follow-up inspection on the afternoon of Wednesday 03 and the morning of 04 February 2010 in bright, dry conditions. The trees have been annually reinspected since the date of the original inspection, but not re-measured.

1.4 The **Tree survey schedule** and **plan** in **Appendix a** covers 47 individual trees but only 18 of these are affected by the proposal. The 18 trees affected are listed in detail in **Section 3** of this report.

1.5 This appraisal was commissioned by Matthew Barker of Gleeds Construction Consultants on behalf of the client, The Coram Foundation.

1.6 I have been supplied with digital copies (in .dwg and .pdf format) of the following drawings:

- Milton Keynes Surveys Limited Topographical Survey Drawing No. 14632

- Philip Meadowcroft Architects' Drawing Nos. 0903E_500 to 504_130813 (Floor plans), 510_130813 (Site plan), 520_130813 (Sections) and 530 to 533_130813 (Elevations).

1.7 I have also been supplied with digital copies (in .pdf format) of the following reports and submissions, all of which are referred to in **Sections 2, 3** and **4** of this assessment:

- Meadowcroft Griffin Architects' *New East Building - Pre Planning Submission 2_190410*
- *Proposed development at Coram Community Campus, Mecklenburgh Square London WC1N 2QA – Ground Investigation Report* by Soiltechnics Limited dated April 2010, hereafter referred to as the Soiltechnics report
- Report on trees by Geoffrey Bunyan Associates dated 12 March 2004 and entitled *Coram Family Campus* relating to a previous development proposal in the north east corner of the Coram Community Campus (the subject of London Borough of Camden Planning Decision Notice No. 2006/2951/P).
- *Report on the condition of trees at Coram Fields, Brunswick Square London WC1 with respect to new development* by Dr P G Biddle dated 09 July 1991, hereafter referred to as the Biddle report.

1.8 I have also been supplied with digital copies (in .pdf or .jpg format) of historical maps of the site dating from 1682, 1746, 1792, 1813, 1871, 1893, 1914 and 1951 gathered together in Collett and Farmer Architects' Planning Design Report (a document submitted in support of a previous planning application for development within the Community Campus). These maps are referred to in **Section 2** of this report but are not included in its appendices.

1.9 The **Tree survey plan** in **Appendix a** included in this report is based on Milton Keynes Surveys Limited Topographical Survey Drawing No. 14632 together with on-site measurements.

1.10 The **Tree removals** and **Tree constraints plans** in **Appendix a** are based on Philip Meadowcroft Architects' Drawing Nos. 0903E_500 and 510_130813 – proposed Phase 3 GF and Site plan drawings.

2 Background information

2.1 Layout, boundaries and topography

2.1.1 The main Coram Community Campus site is wedge shaped with its longest axis running approximately south west to north east. An additional rectangular area of green space, Collingham Gardens, abuts the main campus on its north western boundary

2.1.2 The combined site is level throughout.

2.1.3 As a whole the campus is enclosed on all boundaries with security fencing of varying types and materials, with the exception of the north west boundary, which is defined by a (Listed) brick wall.

2.1.4 There are two vehicular accesses to the site, one in the south west corner and one in the south east corner of the campus.

2.1.5 The **Tree survey plan** in **Appendix a** shows the existing site configuration, excluding current construction works in the south west corner of and access improvements along the southern boundary of the campus

2.1 Geology and soils

2.2.1 Underlying conditions are described in some detail in the Soiltechnics report (see 1.7 above) and specific reference is made to its findings in **Sections 3** and **4** of this report.

2.2.2 In the briefest outline, the Soiltechnics report identifies a surface layer of Made Ground of variable composition with a minimum depth of 1.6m, in all the trial pits and bores excavated in the course of the investigation to which it refers.

2.2.3 Below the Made Ground the site investigation recorded either Lynch Hill Gravel, a sandy/gravelly clay associated with the post-diversionary River Thames extending to a maximum depth of about 5m below ground surface, or London Clay (extending to about 20m below surface).

2.2.4 Where Lynch Hill Gravel deposits occur, they are underlain by London Clay.

2.3 Planning constraints

2.3.1 The site is in the Bloomsbury Conservation Area.

2.4 The trees: a general appraisal

2.4.1 The analysis in this part of **Section 2** covers the total tree population within and immediately adjacent to the campus and provides a context within which the detailed development proposals , the subject of this report, can be viewed.

History

2.4.2 Judging from the evidence provided by the historical maps referred to in 1.8 above, the very substantial mature London Planes that play such a large part in defining the character of Coram Community Campus, date from around 1840 (about 170 years old). The older Lime trees (005, 006 and 007 for example) may be of similar age or perhaps a little younger.

2.4.3 The smaller trees and large shrubs on the eastern site boundary and to the south of the existing South Wing and Nursery Building are all much younger, between about 10 years (Field Maple 032 for example) and 50 years (Beech 013) old.

A*ge distribution*

2.4.4 The sizes of the different age classes referred to in general terms in 2.4.2 and 2.4.3 above are as follows:

Mature and Over-mature	31 trees
Semi-mature	10 trees
Young	6 trees

Species range and distribution

2.4.5 The predominant species is London Plane (*Platanus x hispanica*). 23 of the 47 trees listed in the **Tree survey schedule** in **Appendix a** are Plane trees.

2.4.6 Of the remaining 24 trees, 6 are Sycamores (*Acer pseudoplatanus*), 4 are common Lime (*Tilia x europaea*), 1 is a Beech (*Fagus sylvatica*) and the rest are mostly smaller ornamental species. 5 of the Sycamores and the 3 of the Limes stand in or adjacent to Collingham Gardens.

2.4.7 The 23 London Planes referred to in 2.4.5 above are all within or immediately adjacent to the main part of Coram Community Campus (that is, excluding Collingham Gardens).

2.4.8 Geographically the tree resource is quite evenly distributed, bearing in mind the density of the built environment.

Retention category

2.4.9 In terms of each tree's Retention Category as defined in *BS5837:2012 - Trees in relation to design, demolition and construction – Recommendations* - a tree-by-tree measure of the interplay between visual prominence, future safe life, replaceability and general health - a remarkable 13 trees (all London Planes) are classified as Category A, 11 as Category B or B+ (indicating that they are close to Category A) and 21 as Category C or C+. 2 trees are classified as R (now U) indicating that they should be removed now for the reasons stated in the **Tree survey schedule** in **Appendix a.**

2.4.10 The explanatory notes to the **Tree survey schedule** in **Appendix a** define of all four Retention Categories (A, B, C and R)

A technical note

2.4.11 Several large lateral limbs on the largest and oldest London Planes have been supported with steel cable braces of unknown age. These braces are referred to in the Biddle report (1991) and it is unlikely that they have been maintained or replaced within the last 20 years. They should not be regarded as having any practical function.

2.5 The proposed development

2.5.1 The proposed development consists of the construction of a stand-alone three storey office building with a rectangular footprint in the north east corner of the Coram Community Campus, replacing existing office accommodation and storage facilities.

2.5.2 The proposals are shown in plan on Meadowcroft Griffin Architects' Drawing No. 0903E_510_130813 Coram Phase 3 - Proposed Site Plan.

2.5.3 This plan, together with supporting documentation of which this report is a part, forms the basis of a current planning application.

3. Discussion

3.1 General

3.1.1 18 out of the total of 47 trees within and immediately adjacent to the campus are affected by the proposed development.

3.1.2 These are Trees 009, 010, 011, 012, 014, 015, 016, 017, and 020 (Planes), 013A (Purple Leaved Plum), 013 (Beech), 014A (Fig), 014B-E (Hollies), 016A (Holly) and one tree in St George's Gardens to the north of Coram Community Campus – 038 (Plane).

3.2 Trees to be removed

3.2.1 It is proposed to remove 5 trees – T010, 013A, 013. 014A and 016A to enable the development.

3.2.2 Consent for the removal of Trees 010 (Plane), 013A (Purple Leaved Plum), 013 (Beech) and 014A (Fig) has been granted under 2 existing permissions (Nos. 2006/2951/P and 2010/4408/P) for the construction of stand-alone office buildings of comparable size to the proposal under discussion here.

3.2.3 The removal of Tree 016A (Holly) is necessary to allow the construction of a new sub-station (see 3.3.5 below). This tree is small and its loss will not have a major impact upon public visual amenity.

3.3 Trees to be retained

3.3.1 It is doubtful whether the guidance in *BS5837:2012 Trees in relation to design, demolition and construction – Recommendations* with regard to Root Protection Areas (RPAs) can be applied meaningfully to the Coram Community Campus in view of the intensity of existing development and the presence of a significant depth of Made Ground over part or all of the development area.

3.3.2 The findings of the Soiltechnics report (particularly the depth and composition of the Made Ground covering part or all of the proposed development site and the likely depth of ground water), the resilience with which existing trees have coped with repeated disturbance over the last 60 years and the results of a detailed investigation of the rooting patterns of London Planes 008 and 009 to the west of the proposed development (see *Tree Root Investigation – Trees at Coram Community Campus* (Skerratt: 31.05.10) in **Appendix b**) all provide information on the likely characteristics of the root systems of existing mature trees within and immediately adjacent to the proposed development area.

3.3.3 On the basis of this information, it is concluded that the root systems of trees within the development area are likely to extend to considerable depth, be unevenly distributed in a horizontal plane and be composed mostly of small diameter (25mm or less) roots originating from short, large diameter major roots. In addition it is likely that, wherever direct precipitation or run-off can penetrate the ground surface, a shallow near-surface network of fine roots will develop rapidly to take advantage of the available moisture.

3.3.4 The results of a very recent (July 2013) investigation around the perimeter of a portable office building immediately to the south of the proposed development accords with this interpretation (see **Appendix b**).

3.3.5 Nevertheless a **Tree constraints plan** has been included in **Appendix a** as an additional aid to the evaluation of the likely impacts of the proposed development. The Root Protection Areas (RPAs) on this plan are shown as symmetrically arranged circles of the appropriate size.

3.3.6 The analysis in this section deals primarily with the likely impacts of the construction of the proposed new building but also addresses the construction of disabled parking bays, a new sub-station, a meter cupboard and a bin store within the red line boundaries shown on Philip Meadowcroft Drawing No. 0903E_500_130813 Site Plan.

3.3.7 At this stage, pipe and cable routes have not been finalised and are not addressed in detail in this appraisal. There are already a significant number of underground routes into the development area and it will be necessary to ensure that, as far as possible, new services follow existing lines of disturbance or take new lines that do not prejudice existing trees.

Tree 009

3.3.8 Provided that construction activities are properly controlled, there will be a net benefit to Tree 009 after construction is complete as existing buildings due for demolition are closer at points than the new development will be.

3.3.9 It is not anticipated that the proposed development will affect the major structural roots of this tree.

3.3.10 It may be necessary to lift the north eastern limit of T009's crown in order to accommodate the height of the proposed new development. This can be achieved without the loss of major limbs (greater than 250mm at point of origin) however, and without significant detriment to the tree's visual quality

3.3.11 Taking into account the general observations set out in 3.3.2 and 3.3.3 above, provided that unnecessary disturbance is avoided during construction, the proposed development is unlikely to have a significant adverse impact upon Tree 009.

Trees 011 & 012

3.3.12 Trees 011 and 012 (Planes) form an interdependent group. About 7% of the RPA of T011 (viewed as a symmetrical circular zone) overlaps the footprint of the proposed development and there may be some loss of surface root network. It should however be borne in mind that Trees T013 and T013A, both to be removed, are currently competing for moisture and nutrients in the area between Trees 011 and 012 and the southern elevation of the proposed development. The removal of their soil moisture demand will benefit the quickly regenerating near-surface root networks of 011 and 012.

3.3.13 It will be necessary to raise the outer north western limits of the crown of Tree 011 by about 4m to accommodate the height of the proposed development, but this can be achieved without the loss of major limbs (greater than 250mm at point of origin) and without significant detriment to the tree's visual quality

3.3.14 Taking into account the general observations set out in 3.3.2 and 3.3.3 above, provided that unnecessary disturbance is avoided during construction, the proposed development is unlikely to have a significant adverse impact upon Trees 011 and 012.

Trees 014B-E

3.3.15 Trees 014B- 014E are all middle aged Hollies, providing useful low-level visual screening close to the site boundary.

3.3.16 Subject to careful protection during construction, Trees 014B-D inclusive should not be adversely affected by the proposed development.

3.3.17 Tree 014E will be affected by the proposed new meter cupboard referred to in 3.3.6 above, but as the tree is young and vigorous and the new structure is of lightweight construction, the disruption need not be significant, provided that this Holly is separated from the main construction site with protective fencing. The routing of underground cables to and from this meter cupboard will, however, be critical (see 3.3.7 above).

Tree 014

3.3.18 Tree 014 (Plane) is unusual in that it grows in an area of open ground outside the footprint of the proposed development.

3.3.19 Its RPA (viewed as a symmetrical circular zone) does not overlap the proposed new building footprint and nor does its crown.

3.3.20 The proposed meter cupboard referred to in 3.3.6 And 3.3.17 above is within the RPA of this tree. Taking into account the available evidence on the rooting pattern of the trees within the campus (see particularly **Appendix b**) it is unlikely that the construction of this lightweight structure will cause significant disruption but the routing of underground cables to and from it will, however, be critical (see 3.3.7 above).

3.3.21 Taking into account the general observations set out in 3.3.2 and 3.3.3 above and provided that unnecessary disturbance is avoided during construction, the proposed development can be achieved without a significant adverse impact upon Tree 014.

Trees 015, 016, 017, and 020

3.3.22 The proposed new building considered here has a smaller footprint than the already consented scheme covered by London Borough of Camden Planning Decision Notice No. 2006/2951/P, but in terms of access, storage requirements and construction method, both proposals have strong similarities.

3.3.23 The new disabled parking bays, bin store and sub-station referred to in 3.3.6 above will be located within the RPAs of Trees 014 (just), 015, 016, 017 and 020.

3.3.24 Bearing in mind that the area within which these three structures are to be constructed is already hard surfaced and taking into account the general observations set out in 3.3.2 and 3.3.3 it is considered that they can built without significant adverse impact upon Trees 015, 016, 017 and 020.

3.3.25 The routing of underground cables to and from the sub-station will, however, be critical (see 3.3.7 above) and care must be taken to to avoid unnecessary disturbance in the course of their installation.

3.3.26 The arboricultural method prepared for the scheme referred to in London Borough of Camden Planning Decision Notice No. 2006/2951/P (see *Arboricultural Method Statement – Trees at Coram Community Campus* (Skerratt – 08.04.10) covers potential impacts upon Trees 015, 016, 017, 020 and 021 during and immediately after construction. Its provisions, modified where appropriate, will be applied to the scheme under consideration here.

Tree 038

3.3.27 The crown of Tree 038 (Plane), standing in St George's Gardens overhangs the brick boundary wall to Coram Campus.

3.3.28 There is abundant open space within St George's Gardens, and the adjacent brick boundary wall will act as a shallow root barrier.

3.3.29 Bearing in mind the relatively hostile growing conditions in the north east corner of the Coram Campus, it seems reasonable to assume that this tree's root system will have concentrated its efforts on exploiting the open space in St George's Gardens, in preference to invading the northern edge of the Campus.

3.3.30 However, its RPA (viewed as a symmetrical circular zone) and its crown extend into the footprint of existing buildings within Coram Community Campus.

3.3.31 The proposed development should generate a net benefit as the new building footprint will be further away from the tree than existing buildings.

3.3.32 It may be necessary to lift or slightly reduce the south eastern extent of the tree's crown in order to accommodate the greater height of the proposed new building, but this can be achieved without the loss of major limbs (greater than 250mm at point of origin) and without significant detriment to the tree's visual quality

3.3.33 Provided that unnecessary disturbance is avoided during construction, the proposed development can be achieved without a significant adverse impact upon Tree 038.

4. Conclusions

4.1 The proposed development considered in this report can be achieved without significant adverse impact upon the health and safety of trees to be retained or detriment to the visual amenities that they provide.

4.2 It will be necessary to ensure that remedial pruning to create sufficient headroom for the new building is carried out to the standards set out in *BS3998 2010 Tree Work* prior to the start of construction. This requirement affects Trees 009, 011 and 038 in particular. It will also be necessary to lift the crown of Tree 015 standing on the access route, to avoid damage during construction.

4.3 Undergound service routes and external works surface treatments have not yet been defined and must be planned in such a way as to avoid damage to retained trees.

4.4 An arboricultural method statement (AMS) should be prepared specifying appropriate protective measures and working practices to avoid damage to retained trees above and below ground. This method statement should form part of the Main Contract.

Appendix a

Tree survey schedule
Tree survey plan
Tree constraints plan
Tree removals plan

For general information on any entry in the detailed survey text, refer to the notes below which are organised on a column by column basis.

tree number
All trees have been numbered in the survey text to correspond to the location numbers shown on the accompanying Tree Survey Plan. No trees have been marked on site.

species
Common English names have been used wherever possible and Latin names are listed (in brackets in *italics*) in all cases.

dimensions

height - are recorded in m.
stem diameter – recorded in cm at breast height (1.4m) wherever possible.
If the diameter has been measured at a different height, this has been recorded, e.g. 60 @ 1m = 60cm diameter at 1m height.
Other abbreviations used:

av - average	est - estimated	
ms - multi-stemmed	max – maximum	gl - ground level

crown spread - radial crown spreads in metres have been recorded at four points on the circumference of the crown (north, east, south and west). The Tree Survey Plan enclosed shows approximate crown shapes based on these measurements

age

Y	Young	SM	Semi-mature
EM	Early mature	M	Mature
OM	Over-mature		

Where the precise age of a tree is known, it has been recorded in brackets adjacent to the general classification i.e. M(7).

condition

physiological condition
Gives a measure of biological vigour and of the presence or absence of disease, insect attack or other debilitating factors.

G Good
F Fair
P Poor

structural condition
Gives a measure of each tree' physical form and mechanical stability.

G Good
F Fair
P Poor

comments
See also **background information**, **discussion** and **conclusions** in the accompanying report.

recommendations
Preliminary management recommendations under existing conditions

life expectancy
An approximate estimate for each tree's anticipated future safe life in the following ranges:

<10 years
10-20 years
20-40 years
40+ years

retention category
This grading is based on the recommendations set out in BS 5837:2005 *Trees in relation to construction - recommendations.* The categories are summarised in the standard as follows:

A Trees of high quality and value: in such a condition to make a substantial contribution (a minimum of 40 years is suggested)
B Trees of moderate quality and and value: those in such a condition to make a significant contribution (a minimum of 20 years is suggested)
C Trees of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested) or young trees with a stem diameter below 150mm

In addition the British Standard requires one or more subcategories to be applied to the main Retention Category. In summary these are as follows:

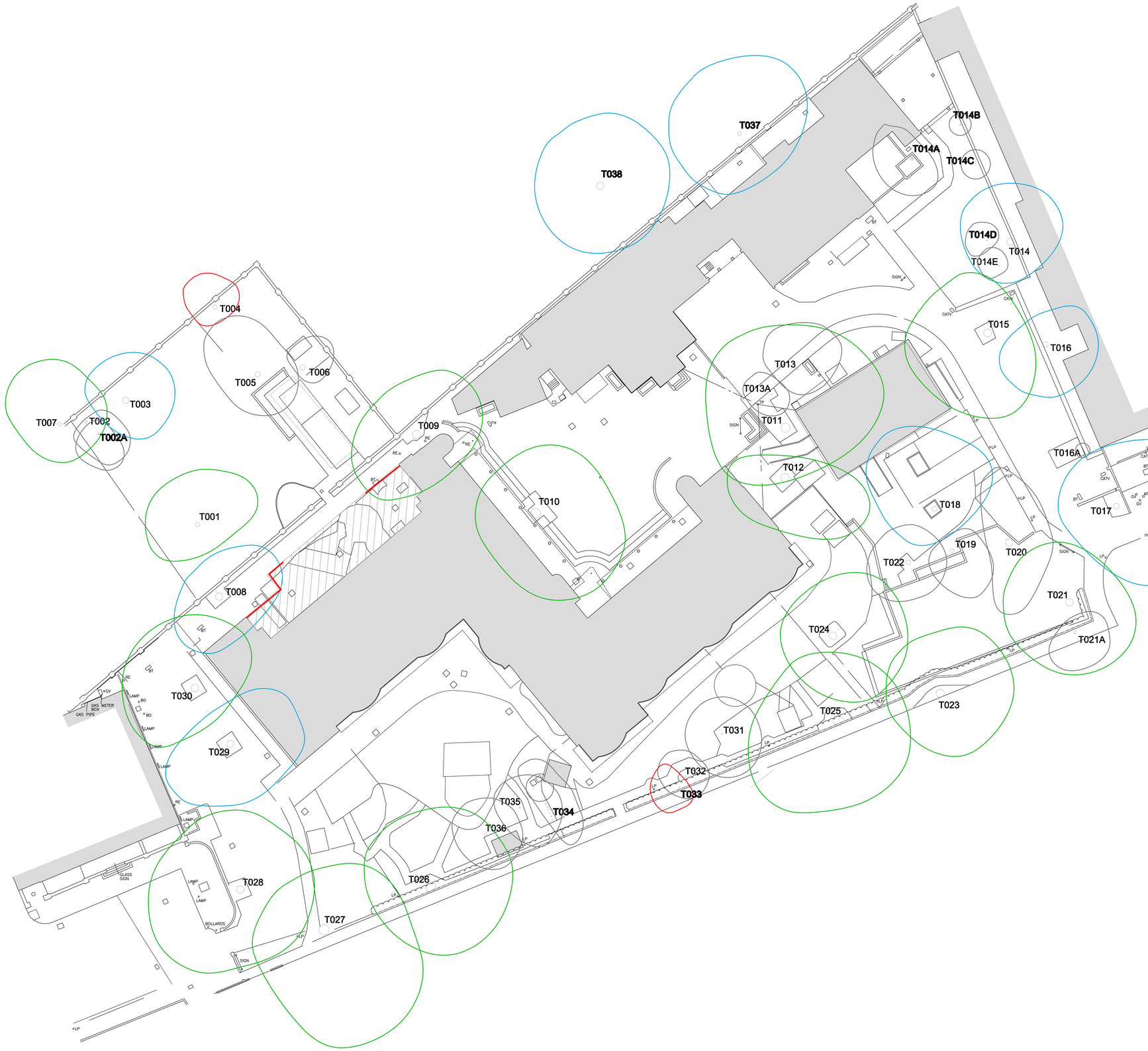
1 Mainly arboricultural value (that is individual aesthetic characteristics)
2. Mainly landscape value
3. Of historical, conservation or other cultural value

Tree No.	Species	Height (m)	Diam (cm)	Crown Spread (m)				Crown Height (m)	Age	Physiological Condition	Structural Condition	Comments	Recommendations	Life Expectancy	Retention Category	Retention Sub-category
				N	E	S	W									
001	Sycamore (*Acer pseudoplatanus*)	23	60	7	9	4	7	6	M	G	G	Single stem: stands in open ground: forks sharply at 4m into 2: reduced to 15m in the past:	No action required	40+	B	1
002	Sycamore (*Acer pseudoplatanus*)	20	35	0	3	7	3	9	SM	G	F	Single stem: stands in open ground: narrow crown	No action required	40+	C+	1/2
002A	Sycamore (*Acer pseudoplatanus*)	10	14 max	2	2	5	4	2.5	SM	F	P	Two stemmed: suppressed and one sided: stands in open ground	No action required	20-40	C	2
003	Sycamore (*Acer pseudoplatanus*)	20	90 @ gl	6	7	6	4	3	M	F	F	Squat single stem forks into 3 at 0.8m: well balanced crown: wet pocket at junction of main stems but no signs of major pathogens	Review (general condition)	20-40	B	1
004	Sycamore (*Acer pseudoplatanus*)	14	60 @ gl	5	4	2	3	4	SM	F	P	Squat single stem forks into 2 at 0.5m: stands close to wall and causing structural damage: epicormic growth	Remove (damage to adjacent wall)	10-20	R	1/2
005	Lime (*Tilia x europaea*)	22	70	9	5	6	5	8	M	F	G	Single stem: severe vertical bark wound on north side from 0.3m to 2m heigh (callusing well): in open ground but rise in level within crown spread (250mm high sleeper wall): previously reduced to 15m	Review (general condition)	10-20	C+	1/2
006	Lime (*Tilia x europaea*)	18	65	3	5	3	1	9	M	P	P	Single stem: crown severely reduced in the recent past with short regrowths: trunk burrs (typical of species) and extensive epicormic growth: very one sided	No action required	20-40	C	1/2
007	Lime (*Tilia x europaea*)	26	85	9	7	5	5	2	M	G	G	Single stem by wall : slightly one sided: nesting box attached to main stem: stands off-site on adjacent land	No action required	40+	B	2
008	London Plane (*Platanus x hispanica*)	23	103	5	9	6	8	9	M	G	G	Paving extends to base of stem on all sides: close to existing wall and buildings: reduced in distant past to about 10m height: below average for this species on this site	Review (general condition)	20-40	B	1
009	London Plane (*Platanus x hispanica*)	29	114	7	10	7	10	8	M	G	G	Single stem: stands in paved area: close to existing wall and buildings: crack in wall: cable and spotlight attached to main stem:	Review (general condition)	20-40	A	1
010	London Plane (*Platanus x hispanica*)	31	130	8	10	13	8	6	M	G	G	A massive well balanced crown on a single stem: stands in a paved area with stepped change in level within crown spread: forks at 4m into 2: cable and spotlight attached to main stem: callused growth at 9m on subsidiary stem	Review (general condition)	20-40	A	1
011	London Plane (*Platanus x hispanica*)	33	126	14	15	7	10	5	M	G	G	011 and 012 make up an interdependent key group; single stem: stands in a small patch of open ground surrounded by tarmac:: close to buildings: telephone wires run below the crown spread	No action required	20-40	A	1

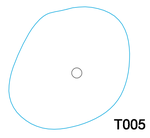
Tree No.	Species	Height (m)	Diam (cm)	Crown Spread (m)				Crown Height (m)	Age	Physiological Condition	Structural Condition	Comments	Recommendations	Life Expectancy	Retention Category	Retention Sub-category
				N	E	S	W									
012	London Plane (*Platanus x hispanica*)	24	114	8	3	12	7	9	M	G	G	See 011: single stem with one sided crown : stands in tarmac area: close to buildings	No action required	20-40	A	1
013	Beech (*Fagus sylvatica*)	12	35	6	7	4	3	2	SM	G	F	Single stem with squat crown: stands in fenceline: cable attached to stem:: suppressed (012): paving extends to base of main stem	No action required	40+	C+	1/2
013A	Purple Leaved Plum (*Prunus cerasifera 'Atropurpurea'*	8	16	4	2	3	3	1.5	EM	F	P	Two stemmed: suppressed and one sided: epicormic growths	No action required	20-40	C	2
014	London Plane (*Platanus x hispanica*)	30	101	8	8	5	6	6	M	G	F	Single stem with slight curvature (sweep): close to boundary wall and buildings: stands in open ground: large subsidiary branch originates at 2.5m: 014 -016 inclusive make up a significant east boundary group	Remove subsidiary branch: Review (general condition)	20-40	B	1
014A	Fig (*Ficus carica*)	10	20 max	6	2	5	5	2.5	SM	G	F	5 stemmed clump in 600mm high brick container: damage to container wall: telephone wires pass through crown	Review (remove to prevent further wall damage)	10-20	C+	1
014B	Holly (*Ilex aquifolium*)	4	ms 6 av	2	2	2	2	0	Y	G	G	Three stemmed: attractive columnar shape: useful low level screening: stnads in open ground	No action required	40+	C	1/2
014C	Holly (*Ilex aquifolium*)	6	9	2	2	2	2	1.2	Y	G	G	Useful low level screening: single stem: well balanced: stands in open ground: see 014B	No action required	40+	C	1
014D	Holly (*Ilex aquifolium*)	6	15	3	2	1	2	1	SM	G	F	Single stem: stands in open ground: useful low level screening: suppressed (014): see 014B	No action required	20-40	C	1/2
014E	Holly (Ilex aquifolium)	6	15	3	2	1	3	1.5	SM	G	F	Similar to 014D	No action required	20-40	C	1/2
015	London Plane (*Platanus x hispanica*)	36	107	9	5	11	11	7	M	G	G	Single stem: stands in tarmac: metal bracket embedded in main stem: telephine wires pass below crown: see 014	No action required	40+	A	1
016	London Plane (*Platanus x hispanica*)	29	75 est	4	7	7	7	10	M	G	F	Single stem: stands outside boundary fence: very close to retaining wall and adjacent buildings: see 014	No action required	40+	B	1
016A	Holly (Ilex aquifolium)	4	<5	1	1	1	1	1	Y	G	G	Single stem: suppressed: useful low level screening	No action required	20-40	C	1/2
017	London Plane (*Platanus x hispanica*)	24	80	8	11	12	7	2	M	G	F	Single stem forks at 2m into 2: stands in small patch of open ground surrounded by tarmac: by access gate: long, spreading limb (cable braced) over access restricts headroom:	Review: (general condition)	20-40	B	1

Tree No.	Species	Height (m)	Diam (cm)	Crown Spread (m)				Crown Height (m)	Age	Physiological Condition	Structural Condition	Comments	Recommendations	Life Expectancy	Retention Category	Retention Sub-category
				N	E	S	W									
018	London Plane (*Platanus x hispanica*)	25	68	12	10	4	6	8	M	G	G	Trees 018 - 025 inclusive make up a very prominent interdependent group in the south eastern corner of the campus: individual crowns overhang existing buildings, an access road and open grass: single stem: larger than average for group; forks at 3m into 3; stands in a small raised enclosure within tarmac	No action required	20-40	B	1/2
019	London Plane (*Platanus x hispanica*)	25	55	2	4	7	4	12	M	G	F	See 018: single leaning stem:high, narrow, unbalanced crown: changes in level within crown spread (250-300mm high sleeper wall)	No action required	20-40	C+	2
020	London Plane (*Platanus x hispanica*)	26	102	10	6	10	3	12	M	G	F	See 018: forks at 3m into 3: stands in open ground adjacent to tarmac: small change in level within crown spread area: large branch stub from major limb breakage	Review (general condition)	10-20	C+	2
021	London Plane (*Platanus x hispanica*)	29	104	9	7	10	9	6	M	G	G	See 018: single stem: a key boundary tree: floodlight adjacent: public footpath and lamp standard below: small cavity at 6m (no signs of significant structural decay)	No action required	40+	A	1/2
021A	Lime (*Tilia x europaea*)	16	40	2	3	5	5	3	M	F	P	Single stem forks at 3m into 2: suppressed (021) and leaning: severely reduced in recent past: epicormic growths: overhangs public footpath		10-20	C	2
022	London Plane (*Platanus x hispanica*)	26	63	5	5	5	6	12	M	G	F	See 018:single stem with slight lean: in tarmac area: subsidiary stem originates at 3m	Review (general condition)	20-40	C+	1/2
023	London Plane (*Platanus x hispanica*)	33	110 est	8	10	9	7	8	M	G	G	See 018: a key single stem boundary tree: stands outside community campus fence in enclosure on south edge of public footpath: cable brace in crown: 4m high sports pitch fence adjacent	No action required	40+	A	1
024	London Plane (*Platanus x hispanica*)	36	102	7	10	10	7	6	M	G	G	See 018: single stem: stands in nursery outside space: rubberised surface to base: well balanced crown	Review (general condition)	20-40	A	1
025	London Plane (*Platanus x hispanica*)	31	145	10	9	11	14	6	M	G	G	See 018: a key single stem boundary tree: cable brace in crown: floodlight and 4m sports pitch fence adjacent: public footpath below	Review (general condition)	40+	A	1

Tree No.	Species	Height (m)	Diam (cm)	Crown Spread (m)				Crown Height (m)	Age	Physiological Condition	Structural Condition	Comments	Recommendations	Life Expectancy	Retention Category	Retention Sub-category
				N	E	S	W									
026	London Plane (*Platanus x hispanica*)	31	1400	10	11	10	8	3	M	G	G	Single stem forks at 3m into 3: a key boundary tree: large lateral limb overhangs adjacent 4m high sports pitch fence: lamp standard below	No action required	40+	A	1
027	London Plane (*Platanus x hispanica*)	31	140	8	11	16	10	5	M	G	G	Single stem forks at 3m into 2: a key boundary tree: lamp standard below: cable brace in crown	Review (general condition)	40+	A	1
028	London Plane (*Platanus x hispanica*)	27	102	11	10	10	13	6	M	G	G	Single stem: stands in tarmac: close to buildings	No action required	20-40	A	1
029	London Plane (*Platanus x hispanica*)	30	95	5	10	8	10	6	M	G	G	Single stem: stands in tarmac car park: high narrow crown: close to buildings	No action required	40+	B	1
030	London Plane (*Platanus x hispanica*)	31	102	10	10	5	10	12	M	G	G	Single stem forks at 2.5m into 2: : stands in tarmac car park: close to buildings	No action required	40+	A	1
031	Flowering Cherry (*Prunus 'Kanzan'*)	5	20 est	5	5	6	5	1.5	SM	G	G	Single stem: well balanced crown	No action required	20-40	C+	1
032	Field Maple (*Acer campestre*)	7	18 max est	4	3	3	3	2	Y	G	F	Single Field Maple srem intertwined with single Hawthorn stem: 032 has good potential	Remove Hawthorn	40+	C	2
033	Sycamore (*Acer pseudoplatanus*)	8	22	4	1	3	4	3	Y	G	F	Single stem of natural seedling origin by boundary fence: competing with 032	Remove (future management problem)	40+	R	2
034	Willow (*Salix species*)	7	16 max	7	4	6	1	2	Y	G	F	7 rather one sided stems in a line: useful as a group feature	No action required	10-20	C	2
035	Kashmir Birch (*Betula jacquemontii*)	4	25 @ 1m	4	5	6	3	2.5	SM	G	G	Single stem with a rather squat, one sided crown	No action required	20-40	C	1
036	Cherry (*Prunus species*)	5	33 max	5	5	5	4	2	SM	F	F	Short single stem forks at 0.3m into 2: well balanced crown: vertical (callusing) split on main stem	No action required	10-20	C	1
037	Ash (*Fraxinus excelsior*)	23	55	10	11	7	9	4	M	G	G	Probably pollarded to 3m many years ago: single stem forks into 3 at 3m: minor dead wood and epicormic growth: 1.5m from boundary wall	Remove dead wood	20-40	B	1
038	London Plane (*Platanus x hispanica*)	28	99	9	10	9	9	4	M	G	F	Previously pollarded at 8m: significant cavity on south side of main stem close to main branch fork: single stem forks at 7m into 2 main and several minor stems	Review (general condition)	20-40	B	1



KEY



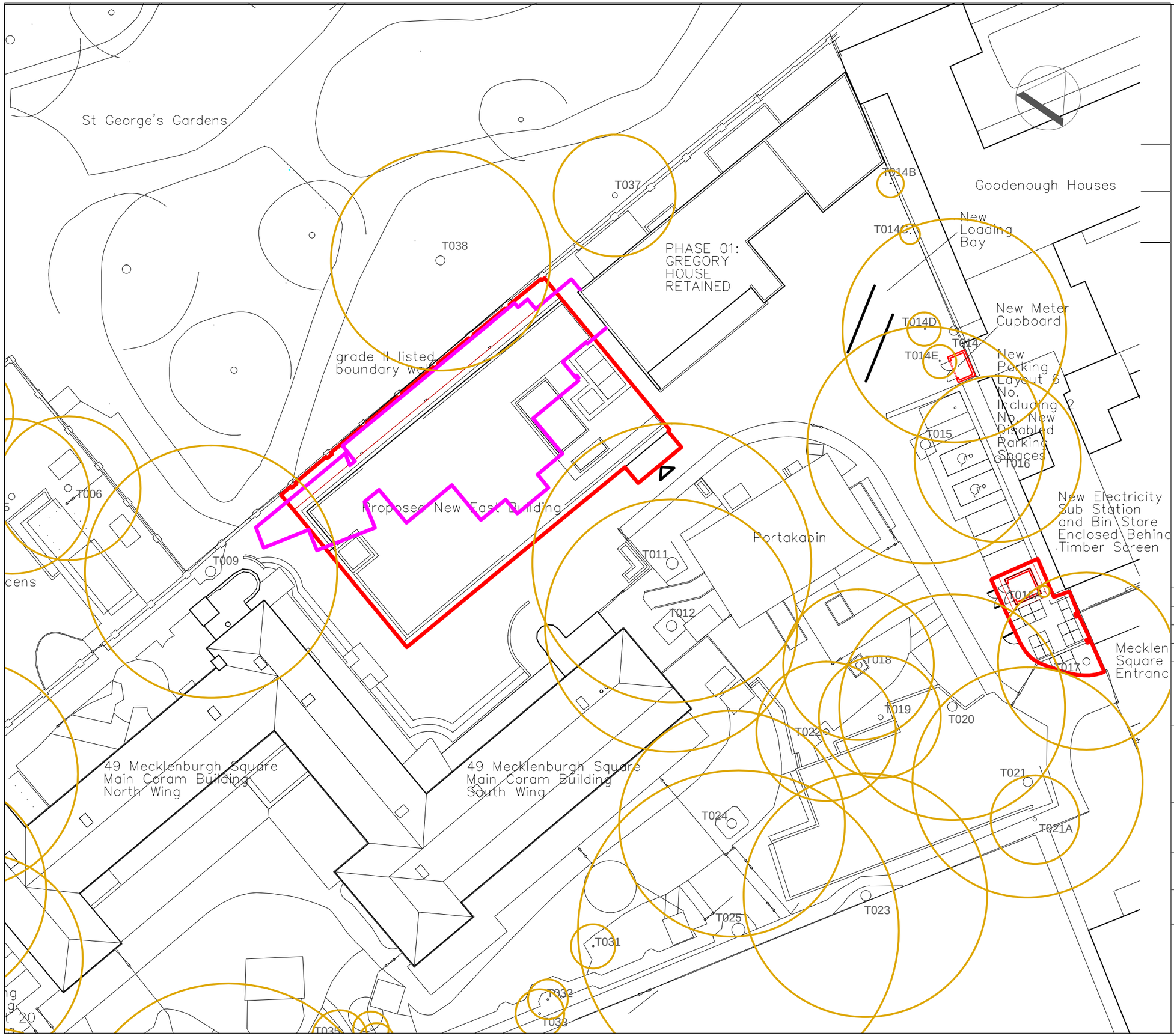
EXISTING TREE

TREES ARE COLOURED ON PLAN TO CORRESPOND TO THE RETENTION CATEGORY RECOMMENDATIONS OF BS5837:2005 TREES ON DEVELOPMENT SITES - RECOMMENDATIONS AS FOLLOWS:

CATEGORY A - GREEN
CATEGORY B - BLUE
CATEGORY C - GREY
CATEGORY R - RED

Client: THE CORAM FOUNDATION	Drawing Title: TREE SURVEY PLAN	
Site: CORAM COMMUNITY CAMPUS MECKLENBURGH SQUARE LONDON WC1N 2QA	Date: 10.02.10	Scale: 1:200 (A0)
	Drawing Number: 128.01.01A	Drawn by: RS

Skerratt
arboricultural advice
GREENMOUNT 36 PRIESTTHORPE ROAD BINGLEY
WEST YORKSHIRE BD16 4LL 01274 566539



KEY

T005

ROOT PROTECTION AREA as defined in *BS5837:2012 Trees in relation to design, demolition and construction - Recommendations*

PROPOSED DEVELOPMENT

EXISTING BUILDING

REVISION	CHCK'D	APP'D	DATE

Client:

THE CORAM FOUNDATION

Job Title:

PHASE 3 DEVELOPMENT
CORAM COMMUNITY CAMPUS
MECKLENBURGH SQUARE
LONDON
WC1N 2QA

Drawing Title:

TREE CONSTRAINTS PLAN

Drawing Number:	Scale:
216.02.00	1:400 (A3)
Date:	Drawn by:
23.08.13	RS

Skerratt
arboricultural advice

158 MALDEN ROAD, LONDON NW5 4BT
01274 566539

St George's Gardens

grade II listed boundary wall

PHASE 01: GREGORY HOUSE RETAINED

Goodenough Houses

New Loading Bay

New Meter Cupboard

New Parking Layout 6 No. Including 2 No. New Disabled Parking Spaces

New Electricity Sub Station and Bin Store Enclosed Behind Timber Screen

Mecklenburgh Square Entrance

Proposed New East Building

Portakabin

T014A

T013

T013A

T010

49 Mecklenburgh Square Main Coram Building North Wing

49 Mecklenburgh Square Main Coram Building South Wing

KEY

T013

TREE TO BE REMOVED

PROPOSED DEVELOPMENT

EXISTING BUILDING

REVISION	CHCK'D	APP'D	DATE

Client:

THE CORAM FOUNDATION

Job Title:

PHASE 3 DEVELOPMENT
CORAM COMMUNITY CAMPUS
MECKLENBURGH SQUARE
LONDON
WC1N 2QA

Drawing Title:

TREE REMOVALS PLAN

Drawing Number:	Scale:
216.03.00	1:400 (A3)
Date:	Drawn by:
23.08.13	RS

Skerratt
arboricultural advice

158 MALDEN ROAD, LONDON NW5 4BT
01274 566539

Appendix b

Root investigation reports

Tree Root Investigation

TREES
at

Coram Comunity Campus
Mecklenburgh Square
London
WC1N 2QA

for

The Coram Foundation
(Dr Carol Homden)

Skerratt
"Greenmount"
36 Priestthorpe Road
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BD16 4LL

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job no.: 128

document rev. no.:

date: 31.05.10

1 introduction

1.1 The main purpose of the investigation described in this report is to help develop a picture of the rooting patterns of 2 mature trees standing in close proximity to a proposed extension to the existing building complex within the Coram Community Campus, so that its impacts on trees can be accurately quantified.

1.2 The development consists of a single storey extension of the existing building complex.

1.3 The secondary purpose is to consider whether the information gathered has relevance to the assessment of development impacts on trees elsewhere within or adjacent to the Coram Community Campus

1.4 The investigation took place on the evening of Monday 24 May 2010 in warm sunny conditions.

1.5 The investigation was commissioned by Dr Carol Homden, Chief Executive of The Coram Foundation (the client).

1.5 In addition to the findings of the investigation described in this report, reference has also been made to two other reports, namely:

- *Proposed development at Coram Community Campus, Mecklenburgh Square London WC1N 2QA – Ground Investigation Report* by Soiltechnics Limited dated April 2010, hereafter referred to as the Soiltechnics report

- *Report on condition of trees at Coram Fields, Brunswick Square London WC1 with respect to new development* by Dr P G Biddle dated 09 July 1991, hereafter referred to as the Biddle report. A copy of this report is included in **appendix b.**

2 background information

2.1 layout, boundaries and topography

2.1.1 The Coram Community Campus is wedge shaped with its longest axis running approximately south west to north east. An additional rectangular area of green space, Collingham Gardens, abuts the main campus on its north western boundary

2.1.2 The combined site is level throughout.

2.1.3 The campus is enclosed on all boundaries with security fencing of varying types and materials, with exception of the north west boundary, which is defined by a (Listed) brick wall

2.1.4 There are two vehicular accesses to the site, one in the south west corner and one in the north east corner of the main campus.

2.1.5 The **tree location plan** in **appendix a** shows the existing site configuration.

2.2 geology and soils

2.2.1 Underlying conditions are described in some detail in the Soiltechnics report and specific reference is made to its findings in **sections 5** and **6** of this report.

2.2.2 In the briefest outline, the Soiltechnics report (see **1.5** above), covering a geotechnical investigation of the north east corner of the Community Campus, adjacent and to the east of the area to which this report relates, identifies a surface layer of Made Ground of variable composition with a minimum depth of 1.6m, throughout the area investigated.

2.2.3 Below the Made Ground the Soiltechnics site investigation (a combination of trial bores and trial pits) recorded either Lynch Hill Gravel, a sandy/gravelly clay associated with the post-diversionary River Thames extending to a maximum depth of about 5m below ground surface, or London Clay (extending to about 20m below surface.

2.2.4 Where Lynch Hill Gravel deposits occur, they are underlain by London Clay.

2.3 planning constraints

2.3.1 The site is in the Bloomsbury Conservation Area.

3 methodology

3.1 The investigation methodology was very simple and consisted of the opening up of strip trenches 450mm wide and between 600 and 800mm deep in the locations shown on the **trial trench location plan** in **appendix a**

3.2 The excavation was undertaken with an Air Spade, a high-pressure air lance that removes soil and larger aggregate sized particles but leaves roots, cables, pipes and other rigid structures undisturbed and undamaged.

3.3 The trenches were located along the outer limits of the floor slab of the proposed extension, at the closest points to existing trees. As far as possible the trenches were orientated so that they were tangential to the crowns of adjacent trees, that is running at right angles to the assumed radial spread of their root systems.

4 findings

4.1 The investigation results are set out in the **root investigation plans (drawings no. 128.03.03 and 128.03.04**) in **appendix a,** together with the photographs that accompany them.

4.2 **trench 1**

4.2.1 Trench 1 is just over 4m distant, at its nearest point, from the centre of Tree 009, a large London Plane. Tree 009 stands to the north east of the trench.

4.2.2 Below the open-jointed concrete slab paving into which the excavation was made, there is a layer of bedding sand and below that, Made Ground to the full depth of the trench along its complete length.

4.2.3 The Made Ground consists of silt and sand with a significant proportion of larger aggregate sizes ranging from gravel and rubble in the range 10-30mm to larger than 250mm diameter.

4.2.4 No roots larger than 25mm were uncovered within this trench. The majority were in the size range 1-5mm diameter.

4.2.5 A 600mm deep concrete footing was uncovered along the north western side of the entire length of the excavation.

4.2.6 Electricity and telecommunications cables run along the long axis of the trench close to its base, for part of its length (see **photographs 1** and **2**).

4.2.7 There is a shallow network of fine roots in the 100mm depth immediately below existing ground level. This has clearly developed to take advantage of run-off percolating through the open-jointed concrete slab paving into which the excavation was made. No root of larger diameter than 20mm was uncovered in this surface layer. Most were less than 5mm diameter.

4.2.8 Four roots of between 10 and 25mm were uncovered at or below 600mm. One of these (Root C) originates at 600mm but grows upwards and into the bedding sand layer immediately below the surface concrete paving slabs.

4.3 trenches 2 and 3

4.3.1 Trenches 2 and 3 are each about 4m distant from the centre of Tree 008, another large London Plane to the north west of both trenches.

4.3.2 As with **trench 1**, below the open-jointed concrete slab paving into which the excavations were made there is a layer of bedding sand and below that, Made Ground to the full depth of both trenches along the complete length of each one.

4.3.3 The made ground consists of silt and sand with a significant proportion of larger aggregate sizes ranging from gravel and rubble in the range 10-30mm to larger than 250mm diameter.

4.3.4 No roots larger than 5mm were uncovered within these trenches. The majority were less than 2mm diameter.

4.3.5 As with **trench 1,** there was a shallow network of fine roots in the 100mm depth immediately below existing ground level. These roots have clearly developed to take advantage of run-off percolating through the open-jointed concrete slab paving into which the excavations were made.

4.3.6 Roots of up to 5mm diameter were uncovered at or below 600mm.

5 discussion

5.1 The Made Ground uncovered in all the trenches excavated in the course of this excavation corresponds with the findings of the investigation carried out by Soiltechnics Limited in the north east corner of the Campus (see **1.5** and **2.2** above). It is possible that Made Ground covers a significant part of the total extent of the Coram Community Campus, particularly the northern half.

5.2 In the case of Tree 009, new development (an entrance lobby and staircase added to the north east corner of the existing (1950s) building complex) has been built within 2 m of its main stem within the last 20 years, and both 008 and 009 have been subjected to surface disturbance (replacement paving for example) within that time period.

5.3 Trees 008 and 009 are both referred to in a 1991 report by Dr P G Biddle (see **1.5** and **appendix b**) before the disturbance referred to in **5.2** above took place.

5.4 The trees (numbered 5 and 6 in that report) were both healthy at that time. Both trees have increased significantly in height and stem diameter in the intervening 19 years and both were still healthy and vigorous at the time of the investigation referred to in this report.

5.5 No roots of larger than 25mm diameter were uncovered in any of the three trenches excavated in the course of this investigation despite the close proximity of all three trenches to Trees 008 and 009. Most roots uncovered were in the range 1-5mm diameter.

5.6 The Bore and Trial Pit Logs in the Soiltechnics Limited report (see **1.5** and **2.2** above) and the photographs accompanying them also show the presence of small roots and rootlets, but no large diameter roots. However, these boreholes and trial pits are much further away from mature trees than is the case with excavations referred to in this report (13m or greater separation distance).

5.7 A very large diameter root (200mm plus at point of origin) originating on the south east side of the main stem of Tree 009 (see **photograph 13**) extends above ground level for a short distance in a north easterly direction before going underground at the base of the brick boundary wall separating the Coram Community Campus from St George's Gardens.

5.8 Based on the evidence of the three trenches referred to in this report and, to a lesser extent, on the general findings of the Soiltechnics report, the Made Ground appears to be freely draining and deficient in organic matter.

5.9 The Soiltechnics report concludes that, with regard to the area that it covers, it is unlikely that groundwater will be encountered in excavations extending to depths of up to 2.5m (paragraph 7.2.8 of that report).

5.10 It is likely that this material is very permeable to small roots but difficult for large roots to develop within.

5.11 The 600mm deep concrete footings uncovered in **trench 1** are an effective shallow root barrier. It is possible that there are other structures below ground within the Campus, that will limit the extent of tree roots.

6 conclusions

6.1 Based on the findings of this investigation and the supplementary information referred to in **section 5** above, it seems probable that the large diameter roots originating at the root collars of Trees 008 and 009 sub-divide into larger numbers of smaller diameter roots close to the main stem (probably within 3m measured to centre stem), in response to the composition of the Made Ground that covers or replaces the original site soils.

6.2 It is probable that this observation holds true for other large trees within the Campus, particularly those in the northern half of the site.

6.3 It seems probable that the smaller diameter roots referred to in 6.1 above grow downwards through the Made Ground layer to provide anchorage but also to reach ground water and nutrients.

6.4 Wherever there is access to direct precipitation or surface run-off (open jointed paving for example), a surface network of small diameter roots forms. This surface network shows clear signs that it can regenerate quickly if it is disturbed and is not likely to be of structural significance

6.5 The large diameter root referred to in **5.7** above, is another illustration of the ability of tree root systems to adapt to circumstances. It is also a strong indicator that the root systems of Trees 008 and 009 may not be evenly distributed in a horizontal plane.

6.6 In summary, the writer concludes that the root systems of Trees 008 and 009 (and possible those of other large trees within the Coram Community Campus) are likely to extend to considerable depth, be unevenly distributed in a horizontal plane and be composed mostly of small diameter (25mm or less) roots originating from very short large diameter major roots.

6.7 The implications of this investigation are applied to the proposed development referred to in **1.1** and **1.2** above in a separate arboricultural impact assessment.

appendix a

tree location plan
trench location plan
root investigation plans
photographs

PROPOSED EXTENSION

Extent of Trench Location Plan Drawing No. 128/03/02

T037
T038
T014B
T014A
T014C
T014D
T014
T014E
T015
T016
T016A
T017
T018
T019
T020
T021
T021A
T022
T023
T024
T025
T026
T027
T028
T029
T030
T031
T032
T033
T034
T035
T036
T001
T002
T002A
T003
T004
T005
T006
T007
T008
T009
T010
T011
T012
T013
T013A

KEY

EXISTING TREE

T005

CORAM COMMUNITY CAMPUS, LONDON WC1N 2QA.

Client: THE CORAM FOUNDATION	Drawing Title: TREE LOCATION PLAN		
Site: CORAM COMMUNITY CAMPUS MECKLENBURGH SQUARE LONDON WC1N 2QA	Date: 30.05.10	Scale: 1:200 (A0)	
	Drawing Number: 128.03.01	Drawn by: RS	

Skerratt
arboricultural advice
GREENMOUNT 36 PRIESTTHORPE ROAD BINGLEY
WEST YORKSHIRE BD16 4LL 01274 566539

T005

T006

T009

T010

T001

T008

RE

RE

RE

FH

BT

BT

TRENCH 1

TRENCH 2

TRENCH 3

PROPOSED EXTENSION

CORAM COMMUNITY CAMPUS, LONDON WC1N 2QA

Client: THE CORAM FOUNDATION	Drawing Title: TRENCH LOCATION PLAN		
Site: CORAM COMMUNITY CAMPUS MECKLENBURGH SQUARE LONDON WC1N 2QA	Drawing Number: 128.03.02	Scale: 1:200 (A3)	
	Date: 30.05.10	Drawn by: RS	

KEY

INVESTIGATION TRENCH

T005 EXISTING TREE

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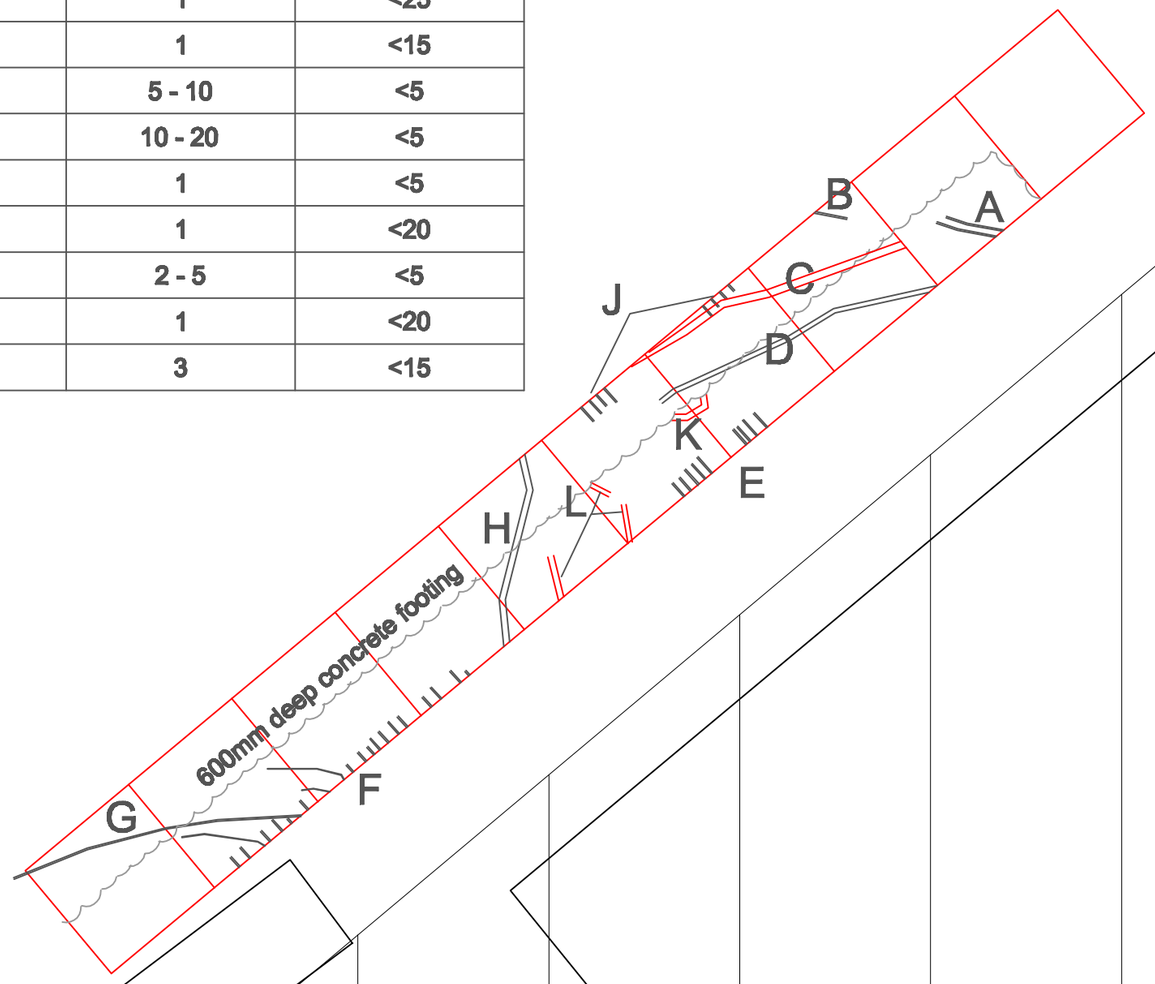
arboricultural advice
GREENMOUNT 36 PRIESTTHORPE ROAD BINGLEY
WEST YORKSHIRE BD16 4LL 01274 566539

Root Descriptions

Letter	Depth (mm)	Number	Diameter (mm)
A	50	2	<5
B	50	1	<5
C	600-50	1	<25
D	50-100	1	<15
E	50	5 - 10	<5
F	50	10 - 20	<5
G	50	1	<5
H	50	1	<20
J	50	2 - 5	<5
K	600	1	<20
L	600	3	<15



BT

CORAM COMMUNITY CAMPUS, LONDON WC1N 2QA

Client: THE CORAM FOUNDATION

Site: CORAM COMMUNITY CAMPUS
MECKLENBURGH SQUARE
LONDON WC1N 2QA

Drawing Title: ROOT INVESTIGATION: TRENCH 1

Drawing Number: 128.03.03

Scale: 1:200 (A3)

Date: 30.05.10

Drawn by: RS

KEY

INVESTIGATION TRENCH

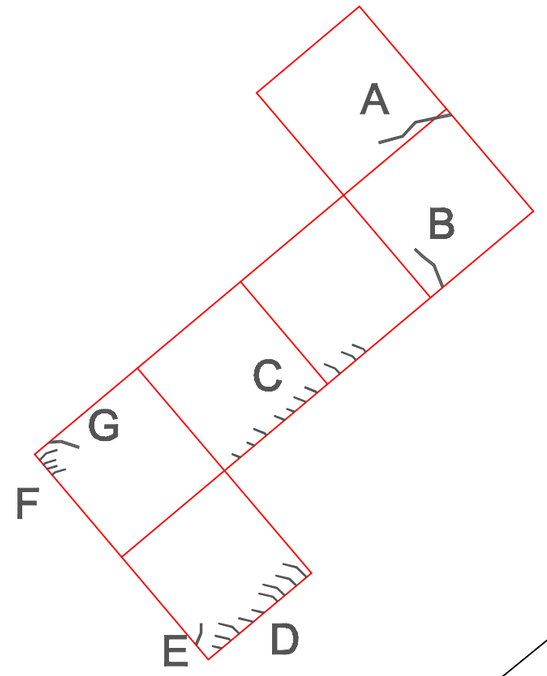
ROOT AT 50 - 100mm DEPTH

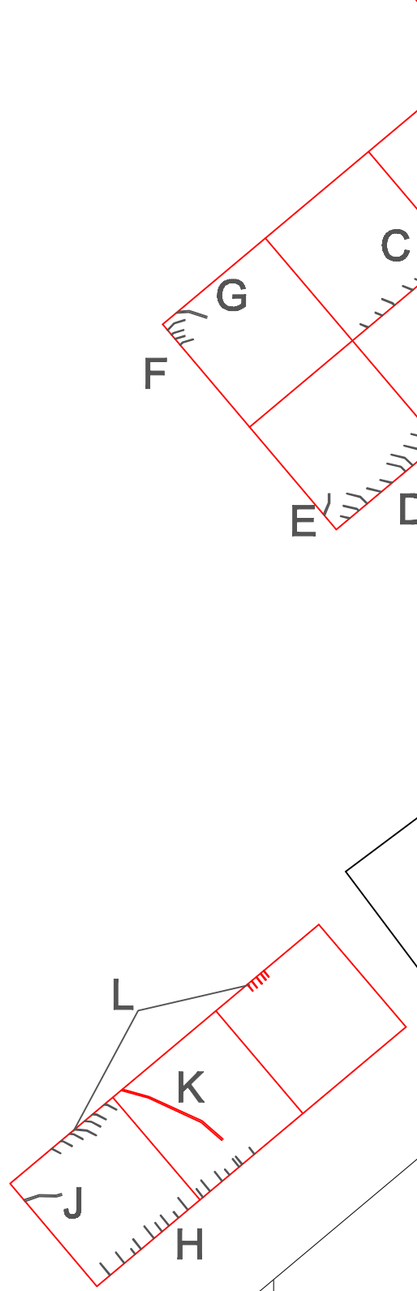
ROOT AT 600mm DEPTH OR LOWER

Skerratt
arboricultural advice
GREENMOUNT 36 PRIESTTHORPE ROAD BINGLEY
WEST YORKSHIRE BD16 4LL 01274 566539

Root Descriptions

Letter	Depth (mm)	Number	Diameter (mm)
A	100	1	<5
B	50	1	<5
C	50 -100	5 - 10	<2
D	50-100	5 - 10	<2
E	50	1	<5
F	50	4	<2
G	50	1	<5
H	50	20 - 30	<2
J	75	1	<5
K	400	1	<5
L	50-400	10 - 20	<2





Manhole

T008

CORAM COMMUNITY CAMPUS, LONDON WC1N 2QA

Client: THE CORAM FOUNDATION

Site: CORAM COMMUNITY CAMPUS
MECKLENBURGH SQUARE
LONDON WC1N 2QA

Drawing Title: ROOT INVESTIGATION: TRENCHES 2 & 3

Drawing Number: 128.03.04

Scale: 1:200 (A3)

Date: 30.05.10

Drawn by: RS

KEY

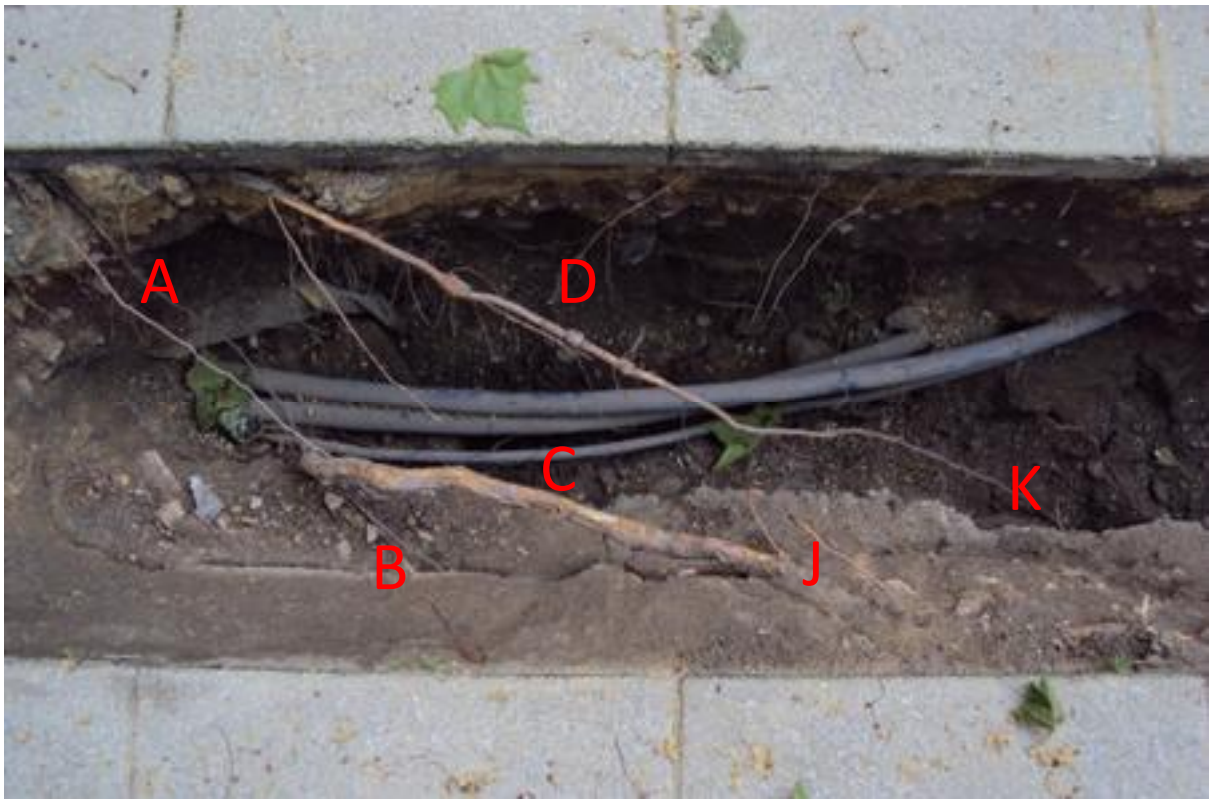
INVESTIGATION TRENCH

ROOT AT 50 - 100mm DEPTH

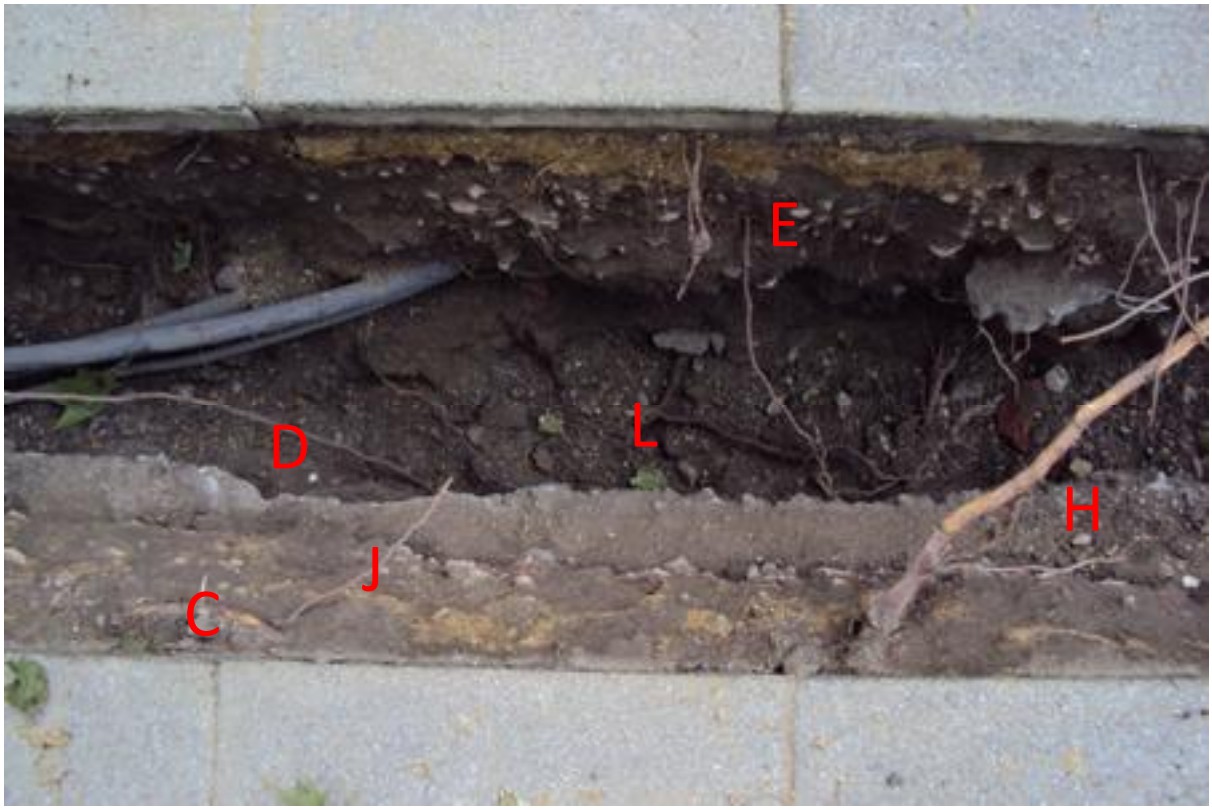
ROOT AT 400mm DEPTH OR LOWER

Skerratt
arboricultural advice
GREENMOUNT 36 PRIESTTHORPE ROAD BINGLEY
WEST YORKSHIRE BD16 4LL 01274 566539

Photograph 1: Trench 1 (1 of 6)



Photograph 2: Trench 1 (2 of 6)



Photograph 3: Trench 1 (3 of 6)

Photograph 4: Trench 1 (4 of 6)

Photograph 5: Trench 1 (5 of 6)

Photograph 6: Trench 1 (6 of 6)

Photograph 7: Trench 2 (1 of 3)

Photograph 8: Trench 2 (2 of 3)

Photograph 9: Trench 2 (3 of 3)

Photograph 10: Trench 3 (1 of 2)

Photograph 11: Trench 3 (2 of 2)

Photograph 12: Typical made ground below paving slabs bedding course

Photograph 13: Tree 009 - Large surface root

appendix b

Dr P G Biddle Report (1991)

P.G. Biddle

Arboricultural Consultant

Dr P G Biddle, M.A., D.Phil., F.Arbor.A.
Registered Consultant of the Arboricultural Association

WILLOWMEAD, ICKLETON ROAD, WANTAGE, OXON OX12 9LA - Telephone: Wantage (0235 57) 2478
Fax: (0235 65034

01235 762478

COPY

REPORT ON

CONDITION OF TREES

AT CORAM FIELDS,

BRUNSWICK SQUARE,

LONDON WC1.

WITH RESPECT TO

PROPOSED NEW DEVELOPMENT

Our ref: 1801
Your ref: C. Masters

9th July 1991

1. Instructions.

1.1 I am instructed by the Thomas Coram Foundation for Children to inspect the trees at Coram Fields, with special reference to the possibility of re-development of the site. Instructions were received in a letter of 25th February 1991, and I made a preliminary visit to the site on 28th February to discuss the requirements with Mr. C. Masters, the Director and Secretary to the Trust. I made a further visit to the site on 19th April 1991 to complete my inspection of the trees.

1.2 I understand that one of the main buildings on the site has suffered severe subsidence problems, and it is considered doubtful whether repairs are a viable proposition. Consideration is therefore being given to re-building, possibly on a more extensive scale. At present there are no details of such development as this may be influenced by the location and condition of the adjacent trees.

1.3 This report describes the existing condition of the trees, and provides general guidance on matters which need to be considered when incorporating these trees into any new development. Much of this is ed on the draft for the revision of BS 5837 "Trees in relation to construction". As I have been involved as Chairman of the drafting panel of this Standard, it inevitably reflects many of my current opinions on this subject. Rather than repeating such opinions in this report, I enclose as Appendix 4 a copy of the relevant sections of the final draft and refer to the relevant paragraph numbers. However, although this is the final draft which has been approved for publication, it must be emphasized that it has no official status at present. It merely reflects my opinions and the current state-of-the-art.

1.4 My qualifications and experience are summarised in Appendix 1.

2. Survey of trees.

2.1 The approximate location of the 35 main trees on the site is shown on the attached plan in Appendix 3. These locations have not been determined by accurate surveying, but the plan is sufficient to _ ovide an indication of their position relative to the main buildings. If precise tree locations are required, an accurate ground survey should be commissioned.

2.2 The attached Schedule in Appendix 2 lists, by reference to the numbers shown on the plan, the 35 trees which are present. It includes their estimated height (in metres) and trunk diameter at 1.5m height (in centimetres).

2.3 In accordance with the recommendations of para 5.2.2 of the draft revision of BS 5837, I assessed the category of each tree. These categories are defined by the British Standard as:-

(a)	trees whose retention is most desirable	high category	(green)
(b)	trees where retention is desirable	moderate category	(blue)
(c)	trees which could be retained	low category	(brown)
(d)	trees for removal	fell category	(red)

These categories are indicated on the attached plan by appropriate colour around the periphery of the crown spread.

2.4 The Schedule also includes comments as appropriate, particularly on the crown spread and branching height. The approximate maximum crown spread is shown on the plan, but the extent of this spread obviously varies at different heights, and cannot be accurately shown by plan.

2.5 In general terms it will be noted that the site is dominated by large old mature plane trees. The majority of these are in good condition, have been well maintained in the past, and are maintaining satisfactory growth. I am advised that many of these trees are at least 200 years old, and I confirm that their size is compatible with such age. Although these trees are fully mature, it can be anticipated that they should still have a considerable life expectancy (The ultimate life expectancy of this species, which is a hybrid, is not known. The earliest introductions to this country, which are now just over 300 years old, are still flourishing.)

2.6 The other main dominant species on the site is the common lime. As is common with this species, some have abundant epicormic shoots around the base of the tree, and all are liable to suffer from aphid stations, which can give rise to inconvenience from honey dew drip.

2.7 In addition to these dominant trees there are a number of smaller ornamental trees which provide a valuable function for low screening within the site but which are far less important from external views.

2.8 Two of the trees are potentially dangerous. These are:-

(i) Tree 17, Plane. Damage around 50% of the circumference at the base of this tree has been sufficient to effect the supply of water and nutrients to the crown, leading to extensive crown dieback. This damage has also allowed the entry of extensive decay into the main trunk. This decay will be extending rapidly, and is already sufficient to render the tree dangerous.

(ii) Tree 20, Weeping ash. This tree is very overmature. There are extensive cavities and the main stems are splitting and in imminent danger of collapse. The tree is dangerous and should be felled.

2.9 Apart from these two trees with these serious defects, and minor damage to tree 32 from the paving slabs which are growing into the base of the trunk, none of the other trees have significant defects. As noted in the Schedule, many of the trees have had cable braces inserted in the past, most of which now appear to be in poor condition and in normal circumstances should be replaced. However, as this cabling was unnecessary in the first place, there is no need for the replacement of these cables.

3. Incorporation of trees into new development.

3.1 For general guidance, attention is drawn to Section 6 of the draft revision of BS 5837, but attention is drawn to particulars matters below.

3.2 Many of the large dominant plane trees have developed a crown shape which is compatible with the existing adjacent buildings. They are considerably higher than the buildings, and the branch spreads overhang the existing roofline. If the buildings are replaced by structures of similar height, this will create no problem, but if it is proposed to use taller buildings there will be greater potential for conflict.

3.3 If necessary it would be possible to prune back the branches to provide clearance for the buildings. Plane trees in particular are remarkably resilient to such treatment, and can be cut back heavily and then allowed to re-grow. With suitable remedial pruning, they will eventually re-form a reasonable crown shape. However, in the short term the shape of the trees will be spoilt, and if they are in such close proximity to the building there are likely to be on-going problems as the trees regrow. Examples of excessively close juxtaposition of trees and buildings are seen on the east side of the site, where the new London University buildings are in very close proximity to trees 10, 11 and 12.

3.4 For these reasons I recommend that any new buildings are of such size and location as to avoid the n for pruning or removal of major branches.

3.5 The other main problem will be to avoid damage to the root system of the trees during the development works. Section 7 of the draft BS 5837, and in particular section 7.5, provides guidance. It will be essential to ensure that an area around each tree can be protected so as to exclude all building operations for the duration of all work. In particular it will be necessary to consider the route of all underground services, as well as the location of the buildings and access roads.

3.6 The minimum area for protection around each tree is shown in the final column of the schedule. This has been calculated on the basis of the size and vigour of each tree, in accordance with Table 1 of the draft. In accordance with para 7.5.5, it may be possible to reduce this distance by up to one third on one side only; this would not be advisable with the very large trees (>100cm diameter) or with trees which are leaning. Any reduction of this sort would need to be assessed on site. Where possible it would be advantageous for trees to be grouped together, with protection surrounding the whole group, rather than around individual trees.

3.7 It will be essential for all building work to be totally excluded at all times from this protected area around the trees by the erection of fencing in accordance with section 8 of the draft Standard. On a site of this sort with restricted space and access, I would anticipate that this would necessitate 2.4m high boarding on a scaffold framework, in accordance with para 8.2.3 and figure 5.

3.8 Although under normal circumstances the fencing should be on the periphery of the protected area, attention is drawn to para 8.3.2 and figure 6 of the draft. Where temporary works are needed, it can be possible to protect the underlying ground. This could be particularly applicable on this site where there are extensive existing areas of hard-standing. Provided this is left undisturbed and is sufficiently robust to withstand any equipment or machinery, it can provide adequate protection to the underlying roots and soil, and allow work directly off this surface. Fencing can then be limited to the immediate surrounds of the

tree trunks. It would, of course, be essential to ensure that no excavations are required into the hard-standing within the protected area around the trees.

4. Implementation.

4.1 As noted in para 2.8, I recommend that the two dangerous trees (No.s 17 and 20) should be felled, regardless of any proposals for the development of this site. I understand that Coram Fields is within a Conservation Area and notification of work on trees should therefore usually be given to the local planning authority. However, in my opinion the condition of these two trees is sufficient to make them dangerous within the meaning of Section 212 (4) of the Town and Country Planning Act 1990. Felling of these trees is therefore exempt and permission is not required. However, as a matter of courtesy I suggest that the local authority is notified of the intention to fell these two trees. Arrangements should then be made with a tree surgery contractor for this work.

4.2 Where trees in a Conservation Area are felled in this way, there is an obligation (under section 213 (1) (b) of T&CPA 1990) to plant another tree of an appropriate size and species as soon as you reasonably can - i.e next autumn. However, if development is likely to occur, I suggest that you ask the local planning authority to dispense with this requirement, as allowed under section 213 (2) of the Act. The replanting can then be included in the overall relandscaping of this site on completion of the works.

4.3 I assume that the architect for the project will now be considering a possible site layout, including consideration of building height and mass. If possible this should give preliminary consideration to the route of all underground services. Once this information is available, I would be pleased to give the proposals my further consideration on their likely effects on the existing trees, and to assist in any negotiations with the local planning authority.

4.4 Once the layout for the building and main structures is known, consideration will be needed for the landscaping of the site. This will need to include provision for the future well-being of the trees, with particular attention to ensuring suitable conditions for root growth. This may influence the type of surface finish in both hard and soft landscape areas.

4.4 I understand that the site is underlaid by London clay. In order to avoid problems of structural damage as a result of the changes in soil moisture content associated with root activity, it will be essential to take adequate precautions in foundation design. On this site, this is likely to involve piled foundations or the incorporation of a deep basement.

P.G. Biddle
9th July 1991

Appendix 1.

Qualifications and Experience of Dr. P.G. Biddle

Address: Willowmead, Ickleton Road, Wantage, Oxon

I have a degree in Forestry and a Doctorate of Philosophy from Oxford University.

I am a past Chairman of the Arboricultural Association, a Fellow and a Registered Consultant of the Association, and a holder of the Arboricultural Association Award.

I have acted as Consultant on the Department of the Environment Research Steering Committee into "Tree Roots and Built Developments", and for the National House-Building Council for the revision of Practice Note 3, "Building near trees".

Since 1978 I have been undertaking various research projects into the effects of trees on clay soils, on behalf of the Department of the Environment, National House-Building Council and Milton Keynes Development Corporation.

I represent the Arboricultural Association on the British Standards Committee for BS 5837 "Trees in relation to Construction", and I am Chairman of the panel which is currently revising this Code of Practice.

I am a member of the Department of Environment Arboricultural Advisory Board, and was a member of the arboricultural panel of the Forestry Research Co-ordination Committee.

I act for the Department of the Environment as an Inspecting Officer for Tree Preservation Order appeals by written submissions, and have acted as a technical assessor at a Public Inquiry.

I am a member of the British Academy of Experts.

I have lectured to many professional bodies on the problems of trees and buildings, and have written articles in several books and journals, including Geotechnique, on this subject.

I have been involved in Forestry and arboriculture for 27 years. From 1972 to 1989 I was Managing Director of Tree Conservation Ltd., but I am now self employed. Work in both these capacities has been in arboricultural consultancy with particular reference to problems of structural damage to buildings.

APPENDIX 2.

SCHEDULE OF TREES.

No.	Species	Ht. (m)	Diam. (cm)	Category	Comments	Min. protection distance (m)
13	Plane	25	90	M	Some recent crown reduction and vigorous re-growth from cut branches. Should in due course re-form well shaped tree.	8
14	Plane	19	80	H	Shorter tree with broad spreading crown. Large low branch extends to south east at 3m. This has been cable-braced in the past. Cable now looks old, but is unnecessary so no requirement for replacement. Branch is heavily contorted, but no significant weakness.	8
15	Lime	17	40	M	Suppressed by adjacent plane resulting in lean of main trunk and most branch development to the south. Extensive epicormic growth around base prevents proper examination but no significant defects apparent.	6
16	Plane	30	100	H	Large well shaped tree. Main trunk forks at 7m with branches extending over site above 8m. Cable in upper crown is too small for branches of this size, but the fork is well shaped and the cable is unnecessary.	8
17	Plane	22	100	F	Extensive damage to base of trunk on east side extending around 50% of the circumference. Underlying wood now appears to be extensively decayed. Dieback present in upper crown. Tree is unsuitable for retention and should be removed regardless of proposed development.	-
18	Plane	24	120	H	Main trunk forks into two large stems at 4m. Broad spreading crown with pendulous branches to 3m. Generally well shaped upper crown structure.	8
19	Plane	25	140	H	Large lateral main rising stem at 5m supported by cable in upper crown; this cable too small but fork is well shaped and cable is unnecessary. Low branches at 6m extending over site and drooping to 4m.	8
20	Weeping ash	10	45	F	Main trunk forks at 4.5m. Eastern fork has a large cavity, with split in stem extending from this cavity down to the main trunk. Complete collapse of this stem likely in strong winds. Western fork has extensive old cavities and also liable to split. Likewise, main stem has large cavities forming potential weakness.	-
21	Lime	15	45	M	Untidy crown with mass of small branches above 3m. is in reasonable condition, but not a particularly attractive specimen.	6
22	Plane	30	120	H	Unnecessary cable in large low branch on north west side. Low branches to 8m on north west. Tree generally in good condition.	8
23	Plane	30	85	H	Main trunk has lean towards south east. Broad well shaped crown, with most branches forming above 15m.	8

No.	Species	Ht. (m)	Diam. (cm)	Category	Comments	Min. protection distance (m)
1	Lime	17	40	M	Partially suppressed by adjacent plane trees. Damage to base of trunk on north side but insufficient to affect stability of tree.	6
2	Plane	22	90	H	Fine dominant tree.	8
3	Plane	24	80	H	Main crown forms above 14m. Well shaped crown.	8
4	Plane	24	80	H	Well shaped fork at 3m to produce two equi-sized stems. Broad spreading crown forming above 14m.	8
5	Plane	16	80	H	Previously pollarded at 8m with broad spreading crown forming above that level and lower branches to 6m on west side.	8
6	Plane	25	80	H	Well shaped broad spreading crown, lower branches particularly on west side to 6m. Branches on south side above 15m. Main trunk has slight lean to south east.	8
7	Plane	28	110	H	Large branch on south side at 4m. Low branches on east side overhanging car park. Branches on west side pruned to clear adjacent roof. Extensive distortion of tarmac surface around base. This would be better stripped clear and surrounded with soil to form a clearly defined edge to the car park.	8
8	Crab apple	6	25	M	Appropriate tree in present location, but no particular merit.	4
9	Crab apple	5	20	M	Appropriate tree in present location, but no particular merit.	4
10	Plane	22	80	H	Main trunk has slight lean to east. Construction of new building closely adjacent to the east has required removal of main eastern fork at 10m. Remaining western fork gives tree a one-sided appearance. Trunk within 1.5m of windows of new building.	8
11	Plane	24	60	M	Thin etiolated tree as a result of mutual suppression by two adjacent planes. Slight lean towards east towards new building. Upper crown consists of two main stems, both of which have been heavily shortened back. These are re-sprouting vigorously. In due course, with appropriate surgery, these will re-form a crown above the roof of the building. Trunk within approximately 0.5m of balcony of new building.	6
12	Plane	24	75	M	Crown has been heavily reduced to accommodate construction of adjacent new building. Remaining new branches sprouting vigorously and will in due course reform reasonable tree.	8

No.	Species	Ht. (m)	Diam. (cm)	Category	Comments	Min. protection distance (m)
24	Lombardy poplar	10	30	L	Growing in small raised bed, the brickwork of which is extensively cracked. Unsuitable tree for location and of no particular merit.	3
25	Plane	30	100	H	Large well shaped tree with main crown forming above 18m.	8
26	Plane	30	100	H	Large well shaped specimen. Lowest branch on north side at 7m. Large branch has been removed from north west side at 3m in the past, with epicormic shoots developing around base. Associated decay should not be significant.	8
27	Purple-leafed plum	5	MS	M	Small tree, reasonable in its present location but of no particular merit.	3
28	Beech	6	30	L	Suppressed by lower branches of adjacent plane. Previous damage to main trunk but extensive callus so that this is not significant.	4.5
29	Beech	6	25	L	Partially suppressed by adjacent plane trees so that crown is becoming one-sided towards the east. Will continue reasonable growth, but will never make a particularly good specimen.	4.5
30	Cherry	6	15	L	Suppressed by adjacent plane trees. Contributes to low screen, but of no particular merit.	3
31	Plane	22	80	H	Younger than other trees on site, beginning to form reasonable shaped crown.	6
32	Plane	22	60	M	Pronounced lean of main trunk to south east. Forks at 4m producing one vertical rising stem and one stem continuing lean to south east. Main crown structure forms above 15m. Remove paving slabs growing into base of trunk.	6
3	Plane	20	60	L	Pronounced lean of main trunk to south east. Large branch has been removed in past at 5m on north west side; possible risk of future problems from decay associated with this branch removal.	6
34	Plane	20	65	M	Main trunk divides into three main rising stems above 5m. Stem on north west appears to have been damaged in the past and shortened back. This is re-sprouting, and will in due course re-grow so that the shape will improve, but it will never make a well shaped specimen. Main stem on south side shows evidence of damage from use of climbing irons, illustrating that such equipment should not used by tree surgeons if possible.	6
35	Plane	28	80	H	Fine well shaped specimen. Large well shaped crown, branches forming above 8m.	8

ST GEORGE'S GARDENS

CEMETERY (Closed)

Ruin

Brewery House

Appendix 3.

Site: Coram Fields, Brunswick Sq.

Tree survey

Retention Category

High	
Moderate	
Low	
Fell	

Scale -

Date 19.4.91

Ref: 1801

P.G. Biddle

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Arboricultural Consultant

Tree Root Investigation

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at

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for

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job no.: 204

document rev. no.:

date: 31.07.13

1. Introduction

1.1 The purpose of the investigation described in this report is to assess the rooting pattern of 5 mature trees standing adjacent to the footprint of a proposed new building at the east end of Coram Community Campus and to quantify what constraints this places on the its construction.

1.2 The development consists of a single storey pavilion with a small, attached 2 storey accommodation unit extending over most of the footprint of an existing temporary office building and beyond it to the south and east.

1.3 The Root Protection Areas (RPAs as defined in *BS5837:2012 Trees in relation to design, demolition and construction - Recommendations*) of 5 mature London Planes (referred to as T011, 012, 015, 018 and 020 in the tree survey accompanying the planning application relating to this proposal) overlap the proposed footprint (see the **Root investigation plan (**Drawing No. 204.01.00) in **Appendix a.**

1.4 The proposed development received full planning consent, subject to conditions and the completion of a Section 106 Agreement, from London Borough of Camden on 15 December 2011 (Application Number 2011/4725/P).

1.5 The investigation on which this report is based took place between Tuesday and Thursday 16 – 18 July 2013 in warm, sunny conditions

1.6 The investigation was commissioned by Matthew Barker of Gleeds on behalf of the client, The Coram Foundation.

1.7 In addition to the findings of the investigation described in this report, reference is also made to three other reports, namely:

- *Proposed development at Coram Community Campus, Mecklenburgh Square London WC1N 2QA – Ground Investigation Report* by Soiltechnics Limited dated April 2010, hereafter referred to as the Soiltechnics report

- *Tree Root Investigation, Trees at Coram Community Campus, Mecklenburgh Square, London WC1N 2QA* by R Skerratt BSc(For) dated 31 May 2010.

- *Tree Root Investigation, Trees at Coram Community Campus, Mecklenburgh Square, London WC1N 2QA* by R Skerratt BSc(For) dated 25 January 2012.

2. Background information

2.1 Investigation site: layout and topography

2.1.1 The investigation site and its immediate surrounds are shown on the **Root investigation plan** (Drawing No. 204.01.00) in **Appendix a.** This plan is based on a 2009 topographic survey of the Community Campus on which the footprint of the proposed new building (excluding external access ramps) has been superimposed.

2.1.2 The footprint of the proposed new building is on level ground with a variation in level (data derived from spot heights taken from the 2009 topographic survey referred to above) between 20.65 and 20.75.

2.1.3 A substantial part of the proposed footprint is currently occupied by a rectangular temporary office building.

2.1.4 With the exception of a small area (just under 10sqm) at the southern extremity of the proposed footprint (which has an area of about 340sqm in total) that is open ground or covered with paving slabs, the area outside the footprint of the temporary building is hard surfaced with tarmac or concrete.

2.2 Geology and soils

2.2.1 According to the British Geological Survey Sheet 256 (North London), the eastern half of the campus in which the investigation site is located, is situated close to the boundary between a surface deposit of Quaternary Lynch Hill Gravels - river terrace deposits associated with the post-diversionary River Thames – and the underlying older and much deeper London Clay stratum. Coram Community Campus is within an area also marked as worked ground.

2.2.2 Recent sub-surface investigations of different types and at different times within the campus as a whole, have all provided some information as to the nature and extent of this worked ground.

2.2.3 In particular, the Soiltechnics report (see 1.6 above), which reported on a geotechnical investigation of the north east corner of the Community Campus in 2009, identified Made Ground of variable composition with a minimum depth of 1.6m, throughout the area investigated.

2.2.4 An earlier non-destructive tree root investigation carried out in May 2010 (see 1.6 above) along the northern elevation of the existing central building complex and opposite the listed southern boundary wall of Collingham Gardens, revealed similar disruption including old wall foundations and Made Ground beneath what is currently a paved walk.

3. Methodology

3.1 The investigation methodology consisted of the opening up of 10 trial pits by hand (under supervision) at intervals around the perimeter of the proposed new building, or as close as it was possible to get to it. An excavator was used to remove spoil where prior hand digging uncovered no evidence of significant tree roots

3.2 The **Root investigation plan** in **Appendix a** shows the location of the 10 trial pits

3.3 In view of potential conflicts with current uses of the investigation area (temporary offices occupied day-to-day, access road and footpath to the Coram Campus on the eastern side of the footprint, current fire evacuation route running along part of the southern side of the proposed new building), it was not possible to open up continuous trenches along the accessible sections of the footprint perimeter.

3.4 Each trial pit was photographed at different stages in its excavation and then re-filled on the same day.

4. Findings

4.1 The findings of the investigation are set out in **Table 1** below

TP No.	Dimensions LxWxD (mm)	Notes	Photographs
1	2000x500x800	Tarmac surfaced: made ground to full depth: ground below surface layer consisting of brick rubble, concrete and coarse sands and silts: no London Clay uncovered Fine roots in tarmac surface and sub-base to 250mm depth: 1 x 30mm root severed at 600mm depth: no other roots uncovered	1, 2, 3 , 4
2	2000x500x800	Tarmac and concrete surfaced ground: made ground to full depth below – similar to TP1 Fine root activity in surface layers (but significantly less than for TP1): no visible root activity below to full depth of trial pit	5, 6, 7
3	1000x1000x800	Sand pit with tarmac surfacing below: made ground below tarmac to full depth (similar composition to TP1 and 2) No root activity to full depth of trial pit	8, 9
4	2000x500x800	Tarmac surface with particularly hostile made ground below to full depth of pit Significant fine roots (up to 15mm) immediately below tarmace surface: no other root activity in made ground to full depth of pit	10
5	2000x500x600	Tarmace surface with made ground below: surface water drain and electric cable running along outer edge of pit (between nearest tree (T012)) and excavation Fine roots immediately below tarmac surface: one root up to 30mm diameter in top 500mm depth	11, 12
6	1000x400x600	Tarmac surface with made ground below: No significant roots encountered until 600mm depth when large (100mm) root uncovered	13, 14, 15
7	600x400x800	Tarmac surface with made ground below: No significant roots encountered within excavation	16, 17
8	1000x400x800	Tarmac surface with made ground below: Fine roots encountered immediately below surface layer: no larger roots to full depth of excavation	18, 19
9	1000x400x800	Tarmac surface with made ground below: No tree roots of any significance found to full depth of excavation	20, 21
10	1000x400x600	Tarmac surface with made ground below: Occasional fine roots uncovered in top 250mm: major root (75mm+) running along long axis of pit at 600mm depth	22, 23

Table 1: Trial pit investigation results

5. Discussion

5.1 Made ground was uncovered to the full depth of each trial pit. In some cases, particularly on the southern side of the proposed footprint (TP1-4), the material was very coarse and, possibly, contaminated.

5.2 I undertand from informal discussion with the archaeological supervisor for the entrance building project currently under construction at the west end of the campus that a considerable area of what is now Coram Community Campus was quarried for Brickearth (derived from wind-blown Loess deposits) and gravel (from the Lynch Hill Gravel surface deposits). It is possible that the made ground uncovered in the trial pits was backfill following quarrying.

5.3 Predictably, there was an opportunistic layer of fine root of variable depth and density immediately beneath the hard surfacing that covers each one of the trial pit locations, most notably in the vicinity of TP4 (close to T011).

5.4 There were very occasional larger diameter roots between the surface and 500mm depth (see TP1 and TP5 in **Table 1** above).) in the size range 15-30mm

5.5 The shallowest large diameter root (75mm+ in TP10) was at 500mm depth. 2 such roots were uncovered – in TP6 and TP10 at 600mm and 550mm depth respectively.

5.6 Trial pits TP5 and TP6 are 2000 and 3500mm respectively closer to the main stem of the nearest tree (T012) than will be the footprint of the proposed new building. It is probable therefore that root activity will be deeper and lower density along the edge of the footprint opposite these 2 pits than is shown by the trial pit results.

5.7 The area beneath the footprint of the existing temporary office building connot be investigated. It is anticipated that the immediately-sub-surface fine root layer observed in most of the trial pits will diminish within this footprint as no direct precipitation very little surface run-off reaches it.

5.8 The current design objective is for the finished floor level in the new building to be 20.84 (compared with a consented level of 21). Assuming a floor slab thickness of 800mm from undersurface of blinding layer to top surface of floor covering, this would necessitate a total excavation depth of 650mm.

5.9 Judging from the trial pit results large diameter roots would be uncovered within an excavation depth of 650mm, but almost certainly within the lowest 100mm depth and only in localised areas, particularly along the eastern and western elevations.

5.10 I understand that it is technically feasible to make local adaptions to the floor slab depth to accommodate large roots running along the base of a 650mm deep floor slab excavation, and if this is the case, the downward revision to the finished floor level could be achieved.

5.11 To be successful it would be necessary for the floor slab excavation to be carried out under supervision with preliminary investigation (by hand digging) in sensitive areas and for exposed roots to be protected immediately they are uncovered.

5.12 There is also a likelihood that there will be some damage to deep roots in the course of piling, but this is not quantifiable.

5.13 The rotary piling rig used in the construction of the entrance building floor slab was successful in achieving an outcome similar to the one required here, without visible adverse effects upon adjacent trees.

6. Conclusions

6.1 The surface layers and sub-soil conditions within the .footprint of the proposed new building are, to a considerable depth, hostile to normal tree root development.

6.2 There is strong evidence that the trees nearest to the proposed new building have developed significant root networks at 500mm below surface and lower, with only a thin, variable density surface root layer to take advantage of direct precipitation and surface run-off.

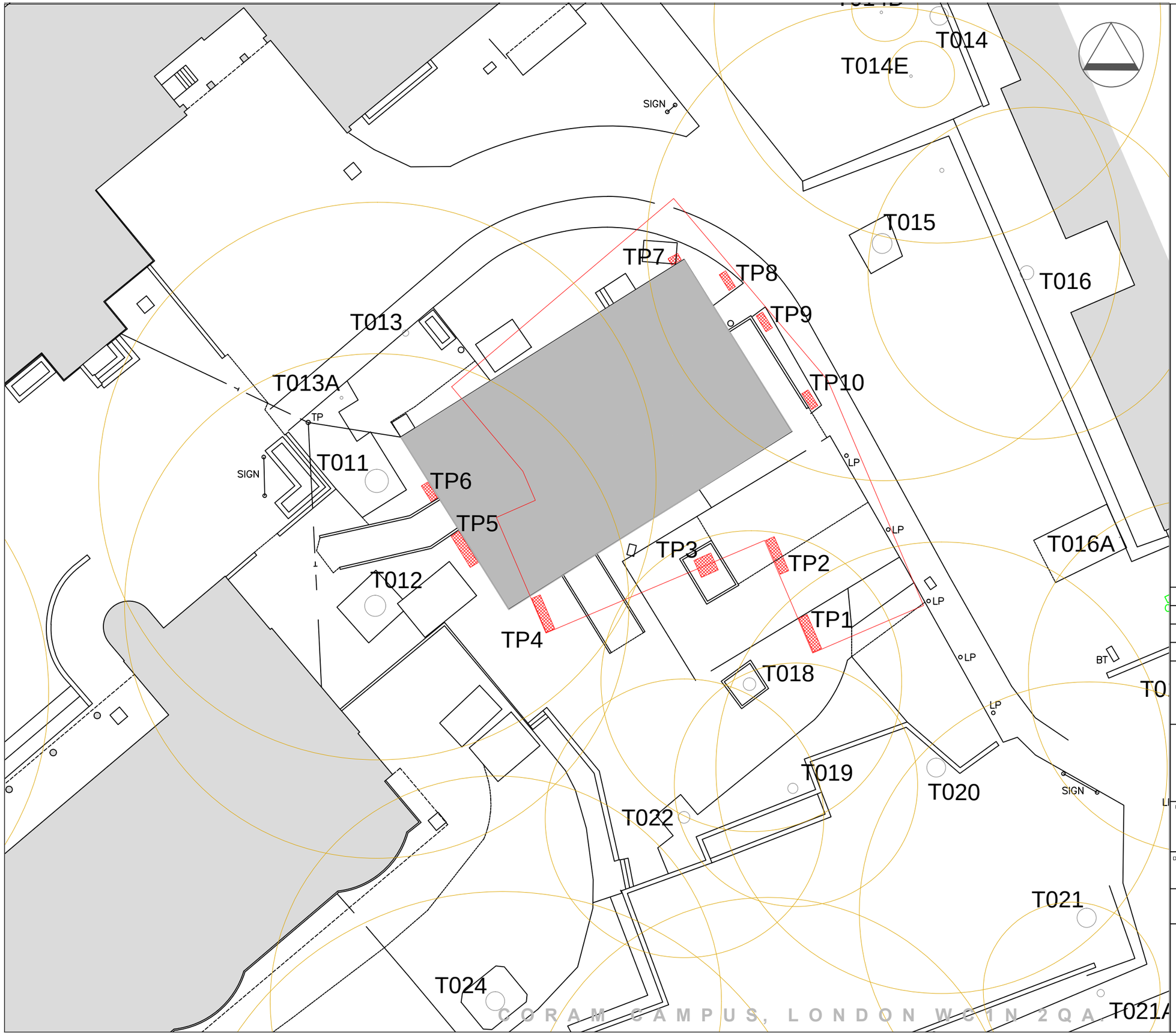
6.3 It is likely that within an excavation depth of 400mm, no significant roots will be uncovered. Below this depth the likelihood of encountering large diameter roots increases significantly.

6.4 To achieve 650mm excavation depth it will almost certainly be necessary to make local adaptions to the proposed floor slab to accommodate large diameter roots. It is understood that this is technically possible

6.5 It will be essential to prepare a detailed arboricultural method statement to manage the impact of excavation, piling and floor slab construction upon tree roots.

Appendix a

Root investigation plan



KEY

ROOT PROTECTION AREA as defined in *BS5837:2012 Trees in relation to design, demolition and construction - Recommendations*

T005

OUTLINE OF NEW BUILDING

TRIAL PIT LOCATIONS

TP2

REVISION	CHCK'D	APP'D	DATE

Client:

CORAM FOUNDATION

Job Title:

CORAM CAMPUS MASTERPLAN - STAGE 2 PAVILION

Drawing Title:

ROOT INVESTIGATION PLAN

Drawing Number:	Scale:
204.01.00	1:200 (A3)
Date: 30.07.13	Drawn by: RS

Skerratt
arboricultural advice

158 MALDEN ROAD, LONDON NW5 4BT
01274 566539

CORAM CAMPUS, LONDON WC1N 2QA

Appendix b

Photographs

Photograph 1: TP1

Photograph 2: TP1 – Fine surface roots and made ground below surface layer

Photograph 3: TP1 – Made ground close up

Photograph 4: TP1 – Severed root

Photograph 5: TP2

Photograph 6: TP2 – Surface layer and made ground in profile

Photograph 7: TP2 – Excavated material

Photograph 8: TP3 – Made ground profile

Photograph 9: TP3– Excavated material

Photograph 10: TP4 – Surface rooting

Photograph 11: TP5

Photograph 12: TP5 – Made ground and 20mm root end

Photograph13: TP6 – Profile

Photograph 14: TP6 – Large root at 600mm depth

Photograph 15: TP6 – Large root at 600mm depth

Photograph 16: TP7

Photograph17: TP7 – Excavated material

Photograph18: TP8

Photograph 19: TP8

Photograph 20: TP9

Photograph 21: TP9 – Excavated material

Photograph 22: TP10

Photograph 23: TP10 – Large root at 600mm depth