Arboricultural impact analysis

Phase 2 works comprising
New Pavilion
Associated external works

at

Coram Comunity Campus
Mecklenburgh Square
London
WC1N 2QA

for

The Coram Foundation
(Dr Carol Homden)

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1. Introduction

1.1 The Coram Campus masterplan received full planning consent on 23.04.12 (Application No. 2011/4725/P) and the application was accompanied by an arboricultural impact assessment (see *Skerratt – Arboricultural Impact Assessment - Proposed development comprising New entrance building, New pavilion and Improvements to western boundary and southern boundary footpath [12.09.11]*)

1.2 The first stage of the masterplan, the new entrance building, together with improvements to the western boundary and to the southern boundary footpath is now practically complete.

1.3 This impact analysis considers the next stage of the plan, the Coram Pavilion, in detail. Background information relating to the analysis is the same as that contained in the original assessment dated 12.09.11 and has not been repeated here.

2. The proposed development

2.1 The building considered in this report has the same footprint and elevations as the one for which consent has been granted and the proposed method of construction remains substantially the same.

2.2 However, it is proposed that the finished floor level (upper surface of floor coverings) will be 20.84 requiring excavation below existing ground level.

2.3 Between the northern and southern edges of the footprint, the existing ground surface rises by 400mm from 20.60 to 21.00. The chosen finished floor level is intended to establish the best practicable fit between the new building and the immediately surrounding topography without unacceptable adverse impact upon retained trees.

2.4 In this respect, step and ramp-free access has been a particular priority.

2.5 New surface and foul water drainage connections will also be required within and immediately adjacent to the proposed footprint.

3. Discussion

3.1 Trees affected by the proposal

3.1.1 The Root Protection Areas (RPAs) of London Plane Trees 011, 012 015, 018 and 020 overlap the footprint and the associated surface and foul water drainage layout of the proposed Pavilion.

3.2 On –site studies: root investigation

3.2.1 An investigation was carried out in July 2013 to establish the rooting pattern of the trees within and immediately adjacent to the footprint of the proposed new building. The full report of this investigation is included in **Appendix c** of this report.

Root investigation: summary of findings

3.2.2 A total of 10 trial pits were carefully opened up at different points around the footprint of the proposed new building. The length of the pits totalled about 14m, 15% of the building's circumference.

3.2.3 In 2 cases, Trial Pits 5 and 6, the location of the excavations were considerably closer to the stems of retained trees (T011 and 012) than the nearest edge of the proposed footprint would be.

3.2.4 In 4 cases, Trial Pits 7 to 10 inclusive, the trial pit locations were slightly further away from retained trees (T015) than the nearest edge of the proposed footprint would be.

3.2.5 In all trial pits, a surface layer of made ground of at least 500mm depth was exposed. This corresponds with the findings of a geotechnical study undertaken in April 2010 in the immediate vicinity of the proposed Pavilion site (see *Proposed development at Coram Community Campus, Mecklenburgh Square London WC1N 2QA – Ground Investigation Report: Soiltechnics Limited* dated April 2010). This report identified a surface layer of made ground of variable composition with a minimum depth of 1.6m, in all the trial pits and bores opened up in the course of that investigation.

3.2.6 Similar sub-surface conditions were uncovered elsewhere in the Coram Community Campus in the course of investigations to establish the feasibility of constructing Phase 1 of the masterplan (the new entrance building) and a new nursery unit on the northern side of the existing building complex (see *Skerratt: Tree Root Investigation, Trees at Coram Comunity Campus, Mecklenburgh Square London WC1N 2QA* dated 31.05.10 and *Skerratt: Tree Root Investigation, Trees at Coram Comunity Campus, Mecklenburgh Square London* dated 25.01.12).

3.2.7 Similar sub-surface conditions were also exposed in the course of the excavations for the construction of the recently completed entrance building.

Root investigation: summary of likely constraints to development below ground

3.2.8 Taking the evidence referred to above into account, it is considered that the sub-surface conditions within and immediately adjacent to the footprint of the proposed Pavilion will be made ground of variable quality to a depth of at least 600mm below existing ground level, within which there will be patchily distributed fine root growth (up to 10mm diameter) from adjacent trees, occasional roots in the size range 25-50mm and very few or no larger diameter roots.

3.2.9 To the south of the footprint of the proposed building, in the immediate vicinity of T018 (Trial Pits 1- 4 inclusive), the made ground is particularly hostile to the normal growth of vegetation and there is a corresponding absence of root activity in that area.

3.3 The proposed foundations: characteristics

General characteristicss

3.3.1 Because of the nature of the subsoils on which the new building will be founded, the chosen foundation construction method is a cast-in-situ slab supported on piles.

3.3.2 More than one slab and piling option was considered in the course of designing the building and the approach referred to in this analysis is the result of an iterative process of refinement.

3.3.3 A number of measures to mitigate the impact of foundation construction upon retained trees are therefore incorporated in the chosen design. These measures are referred to in more detail in the analysis that follows.

3.3.4 The preferred option – the Abbey Pynford Comdeck system - represents the best achievable compromise between pile diameter and frequency on the one hand and slab thickness on the other as well as minimising impacts during construction.. A fact sheet summarising the principal elements of the system is attached in **Appendix b** of this analysis

Floor slab characteristics

3.3.5 A cross-section through the proposed floor is included in **Appendix b.**

3.3.6 The preferred design minimises the depth of the structural slab by eliminating the need for perimeter and internal ground beams.

3.3.7 In total, the floor construction from finished floor surface (20.84) to the underside of the 50mm piling working surface will be 670mm deep requiring excavation to a depth of 20.17.

Piles

3.3.8 The piling grid layout in **Appendix b** may vary in the course of final design calculations immediately prior to construction, but gives a representative picture of the number of piles and their spacing.

3.3.9 Individual pile locations can be varied by up to 500mm in plan if necessary to avoid or minimise damage to tree roots, This flexibility also applies to piles along the periphery of the footprint, allowing limited scope for cantilevering parts of the perimeter of the slab where retained trees are at their closest.

3.3.10 Piles will be 250mm diameter and will be sleeved with cardboard sleeves to a depth of 3000mm below ground surface to reduce the possibility of leachate from curing concrete escaping into the rooting zones or retained trees.

Construction method

3.3.11 The maximum excavation depth of 670mm referred to above allows for the placing of a 50mm layer of concrete – referred to in this analysis as the piling working surface -which remains in situ after construction is complete and upon which all construction operations are carried out after excavation to reduced levels has been completed. The concrete is placed by pouring and/or spraying.

3.3.12 It is proposed to use a 13 tonne CFA piling rig to bore and backfill each pile in two separate stages, in order to allow the placing of cardboard protective sleeves in between these operations.

3.3.13 A fact sheet for the proposed piling rig is included in **Appendix b.** The ground bearing pressure for the machine referred to in the fact sheet (Klemm KR709-1) is approximately 0.47kgf/cm^2 compared with a value of between 0.3 and 0.4kgf/cm^2 for a mini-rig.

3.3.14 Excavators and dumpers removing spoil from the working area are unlikely to exceed the ground bearing pressure of the rig

3.3.15 The piling boom has an overhead clearance of just under 9000mm

3.3.16 The rig can operate within a working limit of the proposed footprint plus 500mm around its complete perimeter.

3.3.17 The slab is formed upon plywood shuttering the horizontal surface of which remains in situ after casting.

3.4 The proposed foundations: likely impacts

Excavation to reduced levels

3.4.1 The **Tree constraints plan** in **Appendix a** shows the outline of the proposed footprint overlaid over the existing topographical survey. To this base information has been added the proposed surface and foul water drainage layout, and the locations and sizes of the root investigation trial pits referred to in 3.2 above.

3.4.2 Approximate contours have been derived from the spot heights recorded on the the topographic survey plan and these have also been added to the **Tree constraints plan.**

3.4.3 **Table 1** below shows the depth of excavation required to the under-surface of the floor slab and also to the under-surface of the piling working surface (20.17 = the **maximum excavation depth**) for a given contour value, assuming a finished floor level of 20.84.

Contour level (m AOD)	Depth of excavation to underside of floor slab (20.46) (mm)	Depth of excavation to formation leve (20.17) (mm)
21.00	540	830
20.82	360	650
20.78	320	610
20.72	280	550
20.65	190	480
20.60	140	430

Table 1: Excavation depths for floor slab construction

3.4.4 Assuming that there are no roots of significant diameter to a depth of 600mm (see 3.2.8 above), below existing ground surface it is only at existing ground levels about 20.78, that there is a risk of encountering large diameter roots during excavation to reduced levels.

3.4.5 **Table 2** overleaf shows the percentage of the total area of each retained tree's RPA hat will be affected by excavation to a depth of more than 600mm below existing ground level. Part or all of some of the affected areas are situated where the made ground is particularly deep and hostile to root growth (see 3.2.9 above).

Tree No.	RPA Area (sqm)	Area affected by excavation to >600mm below ground level	Notes
011	718	2.6	3% of RPAaffected at periphery
012	588	1.9	3% of RPAaffected at periphery
015	255	12.3	4.8% of RPA affected
018	209	28.0	13.4% affected
020	470	2.36	5% affected

Table 2: Extent of impacts: excavation to a depth of >600mm belowexisting ground level

3.4.6 To mitigate the possible impacts summarised in **Table 2,** it is proposed to retain larger diameter (75mm or greater) roots if these are uncovered within the depth of the heave protection zone , the upper surface of which is no deeper than 540mm below existing ground level (see **Table 1**).

Installing the piling working surface

3.4.7 The construction of a 50mm layer of concrete by pouring or spraying over the complete working area (the footprint plus 500mm around the complete perimeter) will generate only a small amount of leachate while curing and once in place will offer a significant level of protection to the root zone below.

3.4.8 If roots of 75mm or greater diameter are uncovered within the heave protection void during excavation to reduced levels, they can be protected with a geo-textile layer of appropriate thickness prior to the installation of the piling working surface thus forming a (permissible) local irregularity in the working surface, which can be broken out after piling has been completed but prior to the casting of the slab.

Piling and casting operations

3.4.9 The headroom requirement of the proposed piling rig will necesstitate the removal of up to 4 lateral branches from Trees 012 and 015 none of which has a diameter at point of origin of more than150mm. This increase in headroom can be achieved without major adverse impact upon the visual quality or future safe life of any retained tree.

3.4.10 The proposed piling rig bearing pressure is 50% more than that of the lightest available mini-excavator but the rigidity of the proposed piling working surface will counteract some of the negative impact of this increase.

3.4.11 Breaking the piling process into 2 main stages - drilling and backfilling - allows protective sleeves to be installed and will minimise or eradicate one of the key disadvantages of CFA piling, uncontrolled slumps of concrete as backfilling of each pile nears completion. The continuous piling working

surface will also provide protection from the adverse effects of any such slump.

3.4.12 Casting the floor slab on plywood formwork 225 mm above the piling working surface will very significantly reduce the likelihood of adverse construction impacts at that stage of the operation.

3.5 The proposed development: surface and foul drainage

3.5.1 With regard to surface water drainage, there are 3 locations within the RPAs of retained trees (T012 and T018) where the installation will require excavation to a lower depth than the maximum excavation depth (20.17).

3.5.2 These locations are proposed inspection chambers S2, S3 and S4 where the clearance below the invert levels of the pipes connecting to them plus the chamber base will require excavation to depths of approximately 19.60 (S2), 19.95 (S3) and 20.05 (S4).

3.5.3 The excavation for each inspection chamber will be about 1000 x1000mm square in plan.

3.5.4 S2 and S3 are close to the outer limits of the RPAs of the nearest adjacent retained trees (Trees 012 and 018 respectively) and it is considered that their construction is unlikely to have a significant adverse impact upon these two trees.

3.5.5 In the case of S4 the total excavation depth is very close to that required for the construction of the adjacent slab and its underlying heave protection layer.

3.5.6 In general interconnecting pipe runs will require excavation to no deeper than the maximum excavation depth but in the immediate vicinity of S4, interconnecting pipe runs will extend below this level. The affected section is towards the outer limit of the RPA of T012

3.5.7 The central point of the proposed foul drainage system is located in the narrow space between the eastern edge of the RPAs of Trees T011/12 and the western edge of the RPA of T015.. Connecting pipe runs into the RPAs of these trees but the, in most cases, in a direction that is more or less radial to their main stems.

3.5.8 Bearing in mind that pipe falls and access chamber depths are dictated by the existing system into which connections have to be made, it is considered that the layout of the new system will have the lowest practically achievable impact on retained trees.

4. Conclusions

4.1 Taking into account the sub-surface conditions and the feasibility of retaining large diameter tree roots within the ground heave protection void, it is considered that the proposed floor slab level can be achieved without unacceptable disruption to retained trees.

4.2 It is considered that the merits of the proposed design and construction method (Abbey Pynford Comdeck system) – simplicity of execution, the smallest practicable pile diameter, no requirement for ground beams, the robustness of the piling working surface and the level of protection that it offers to the rooting zone below – substantially outweigh its disadvantages – the increased ground bearing pressure of the proposed piling rig and its headroom requirement compared with a mini-rig,

4.3 It is important that retained trees are separated from the construction area with protective fencing complying with *BS5837:2012* and that ground works are carried out using appropriate equipment and working procedures.

4.4 The accompanying **Arboricultural method statement (AMS)** sets out appropriate protective measures, working procedures and arrangements for supervision.

Appendix a

Tree constraints 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

SURFACE DRAINAGE
(EXISTING AND PROPOSED)

FOUL DRAINAGE
(EXISTING AND PROPOSED)

20.72

EXISTING CONTOUR

REVISION	CHCK'D	APP'D	DATE

Client:
CORAM FOUNDATION

Job Title:
CORAM CAMPUS MASTERPLAN - STAGE 2
PAVILION

Drawing Title:
TREE CONSTRAINTS PLAN

Drawing Number:	Scale:
204.02.00	1:200 (A3)
Date: 31.12.13	Drawn by: RS

Skerratt
arboricultural advice
158 MALDEN ROAD, LONDON NW5 4BT
01274 566539

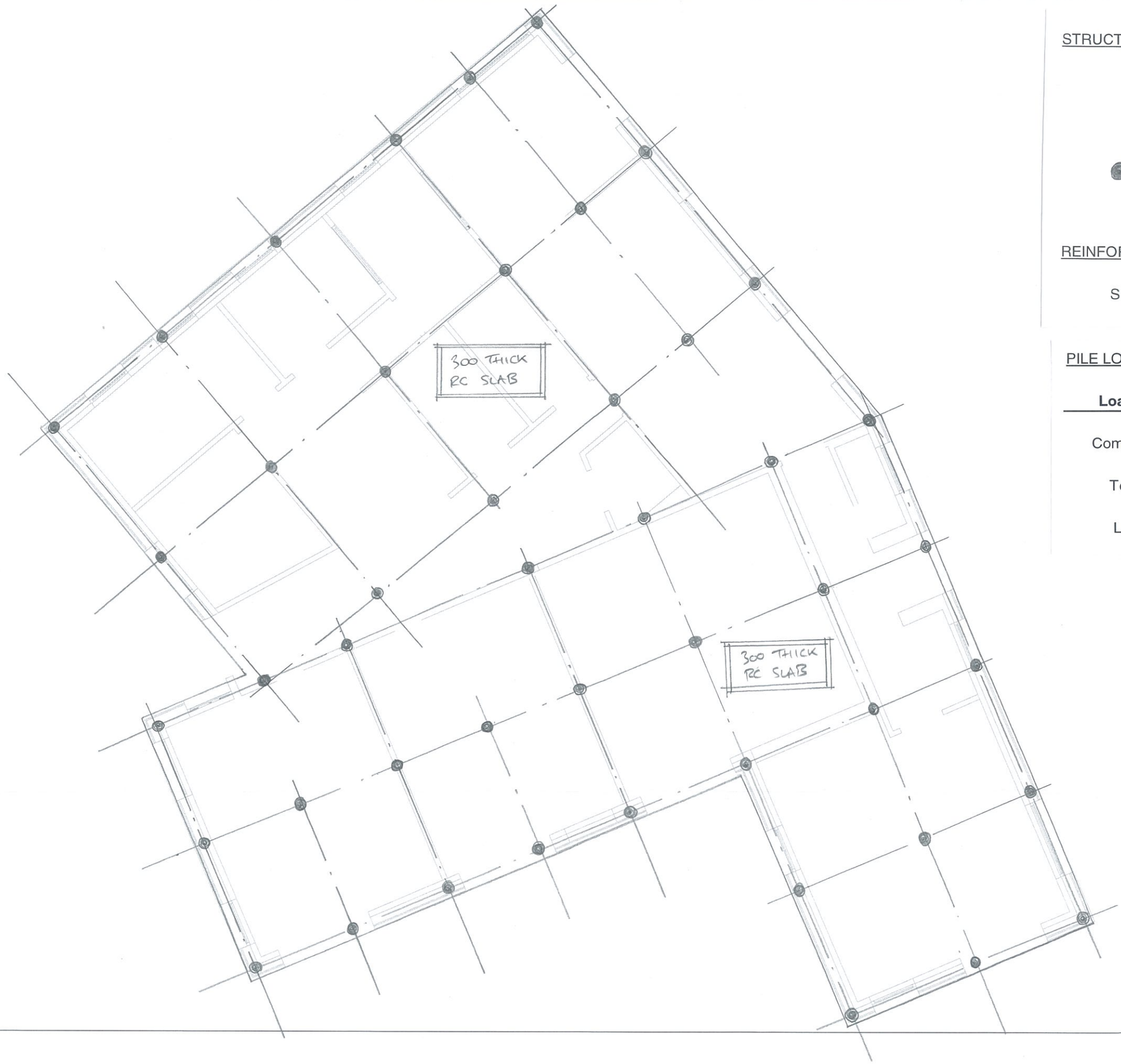
CORAM CAMPUS, LONDON WC1N 2QA

Appendix b

Slab and piling drawings

PRICE&MYERS
Consulting Engineers

Job No. 22146	Page SK-05	Rev A	
Date Aug '13	Eng. RB	Chd. -	
Job Coram Pavilion			



STRUCTURAL LEGEND

300 thick RC slab with Cellcore HX S 160mm Grade 9/13 heave protection under

300mm diameter pile

REINFORCEMENT ESTIMATIONS

Slab	150 kg/m³

PILE LOADS (TYPICAL)

Load Type	kN (SLS)	
Compression	350 kN	
Tension	-150	(10 No piles)
Lateral	50 kN	

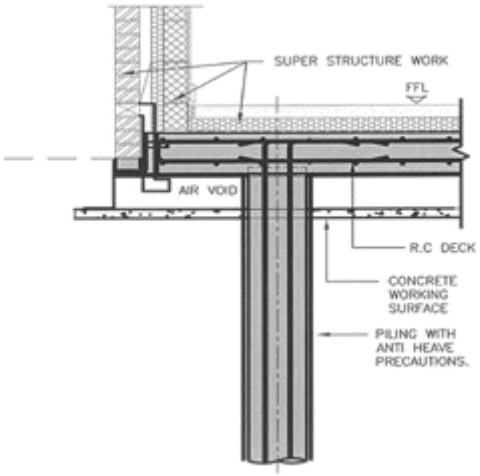
FOUNDATION PLAN

1:100 @ A3

Total Support from Beginning to End

Construction Sequence for Comdeck Voided Slab

- Comdeck
- Housedeck
- Basements
- Site Investigation
- Geothermal boreholes



Voided Comdeck

1. Lay concrete working surface (if rig <15 Tonnes)

- This is 50 mm 30 N Concrete.
- Our rigs are specially designed to work from this platform.
- It replaces the need for an Engineered piling mat in most cases.
- Site cleaner and safer.

2. Piling

- Rigs 1 tonne—15 tonnes.
- We offer all types of pile.
- We offer all types of pile testing
- We include trimming pile heads.

Abbey Pynford

IMEX
First Floor, West Wing
575-599 Maxted Road
Hemel Hempstead
HP2 7DX

Phone: 0870 085 8400

E-mail:
info@abbeypynford.co.uk

3. Lay support deck units

To create clear void under slab

Total Support

4. Lay the Sacrificial decking

This forms the slab soffit.

5. Fix steel and edge detail, make final adjustments

Forms shutter in temporary condition, external provides brickwork support.

6. Pour and finishing Concrete

Fine tamp finish.

7. Remove deck supports

It is possible to make visual check that void is clear. Not possible with alternative anti heave products.

8. Fix geotextile membrane and job complete.

ABBEY PYNFORD

- Comdeck
- Housedeck
- Basements
- Site Investigation
- Geothermal boreholes

Abbey Pynford

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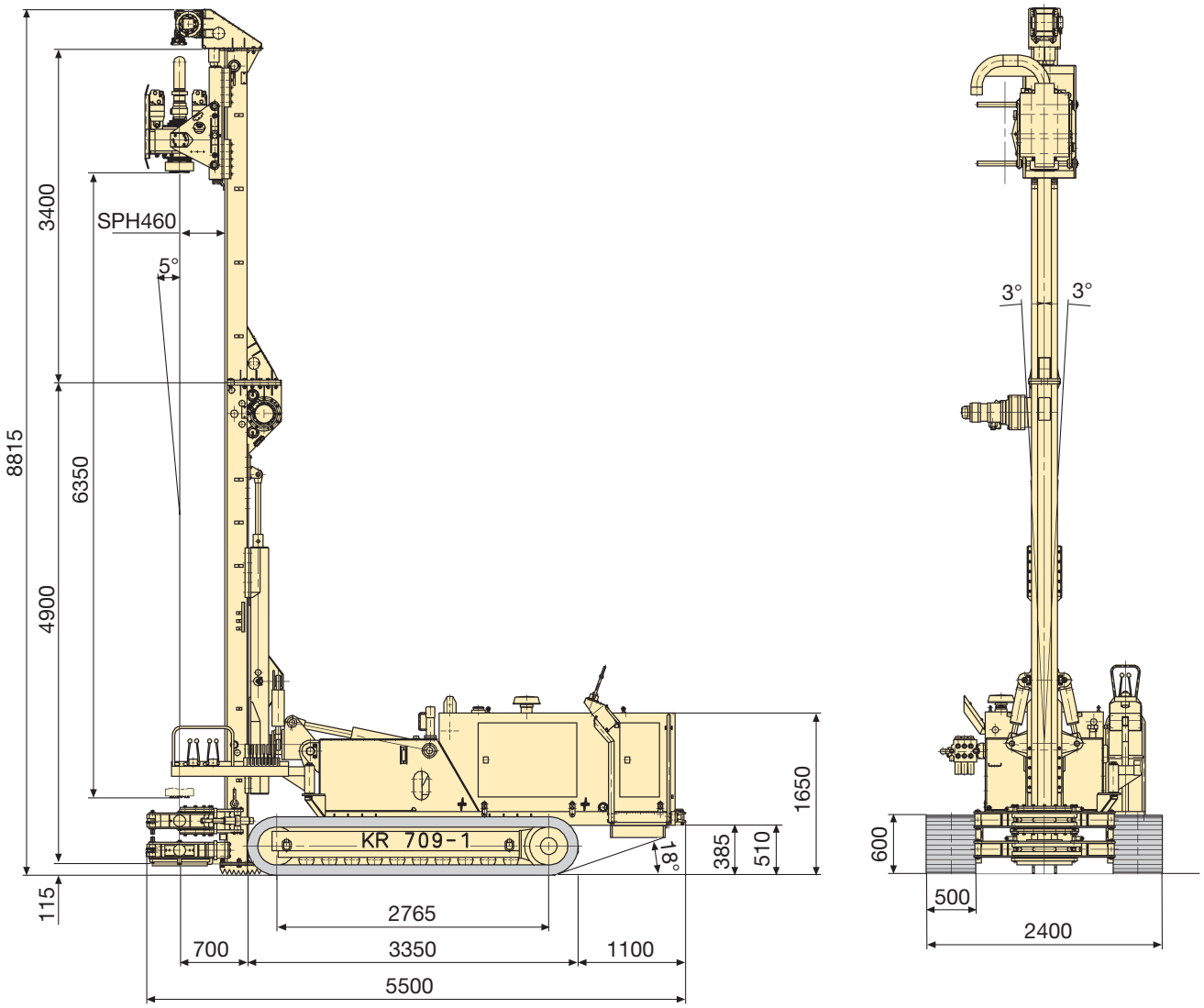
ABBEY PYNFORD

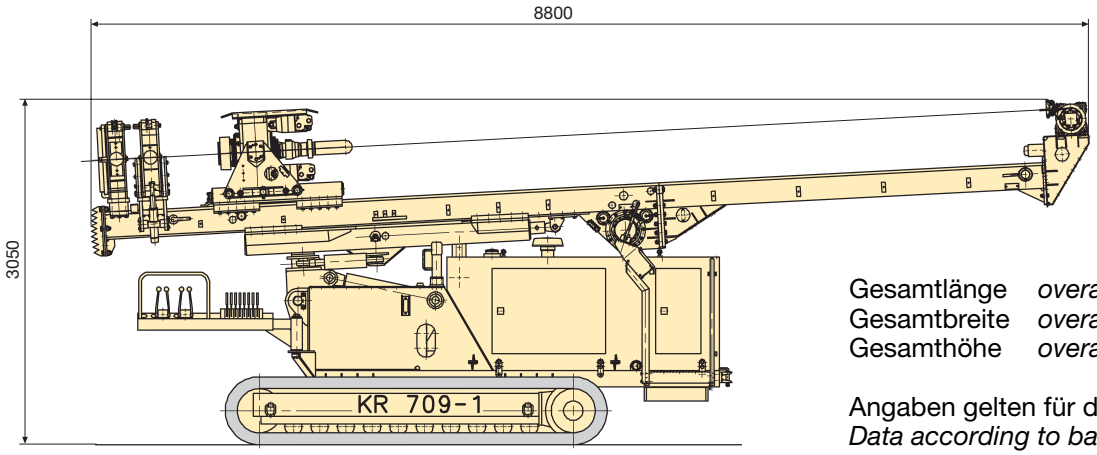
Total Support

Abmessungen / Dimensions KR 709-1

Lafette Typ 203/10 (8000 mm)
drill mast type 203/10 (8000 mm)

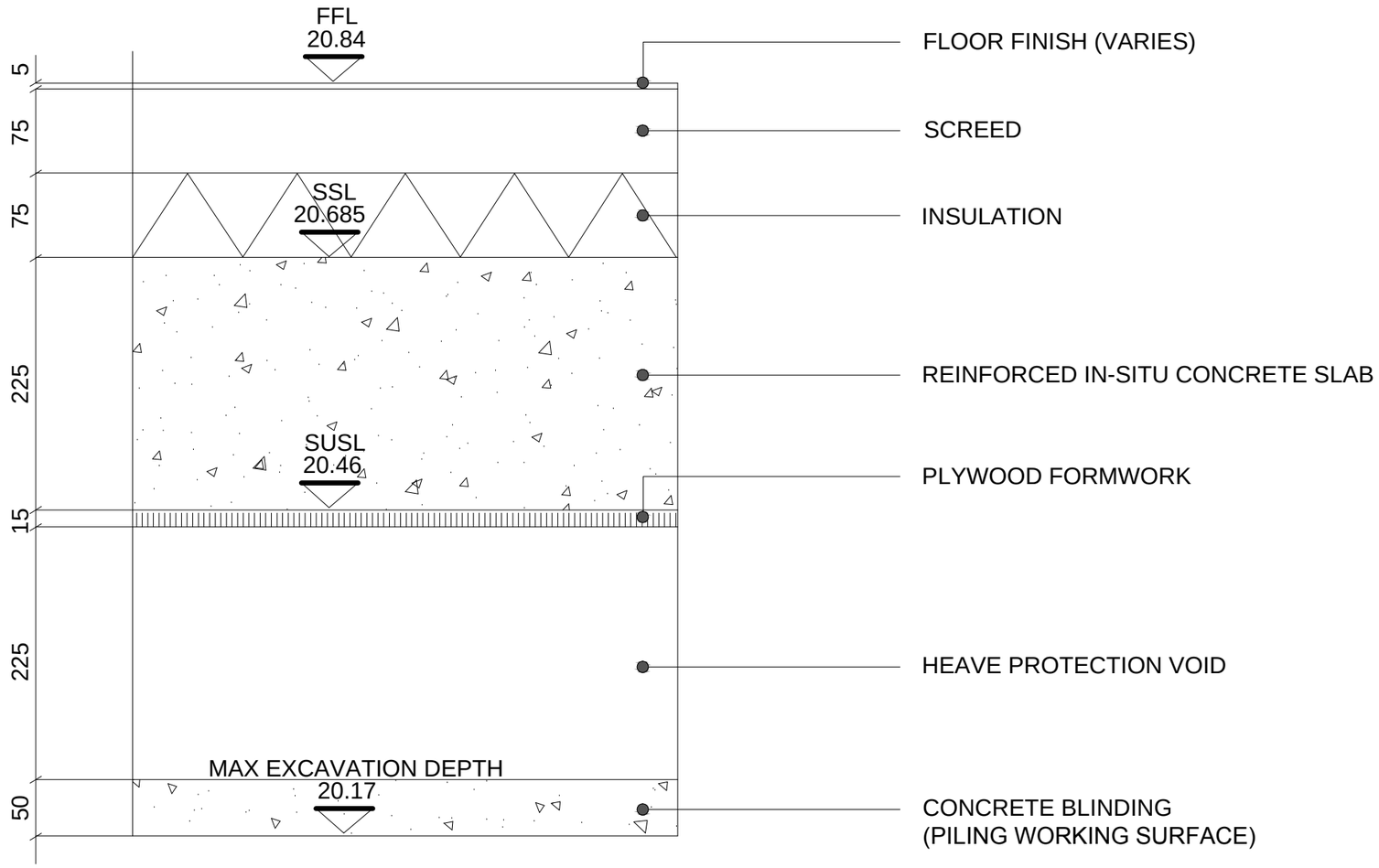


Transportabmessungen Transport Dimensions



Gesamtlänge	*overall length:*	8800 mm
Gesamtbreite	*overall width:*	2400 mm
Gesamthöhe	*overall height:*	3050 mm

Angaben gelten für die Basiskonfiguration.
Data according to basic configuration.



KEY

REVISION	CHCK'D	APP'D	DATE

Client:

THE CORAM FOUNDATION

Job Title:

CORAM COMMUNITY CAMPUS
PHASE 2

Drawing Title:

PROPOSED FLOOR SLAB SECTION
(ABBEY PYNFORD METHOD)

Drawing Number:	Scale:
204.05.01	1:5 (A3)
Date:	Drawn by:
31.03.14	RS

Skerratt
arboricultural advice

158 MALDEN ROAD, LONDON NW5 4BT
01274 566539

Appendix c

Root investigation report

Tree Root Investigation

TREES
at

Coram Comunity Campus
Mecklenburgh Square
London
WC1N 2QA

for

The Coram Foundation

Skerratt
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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.

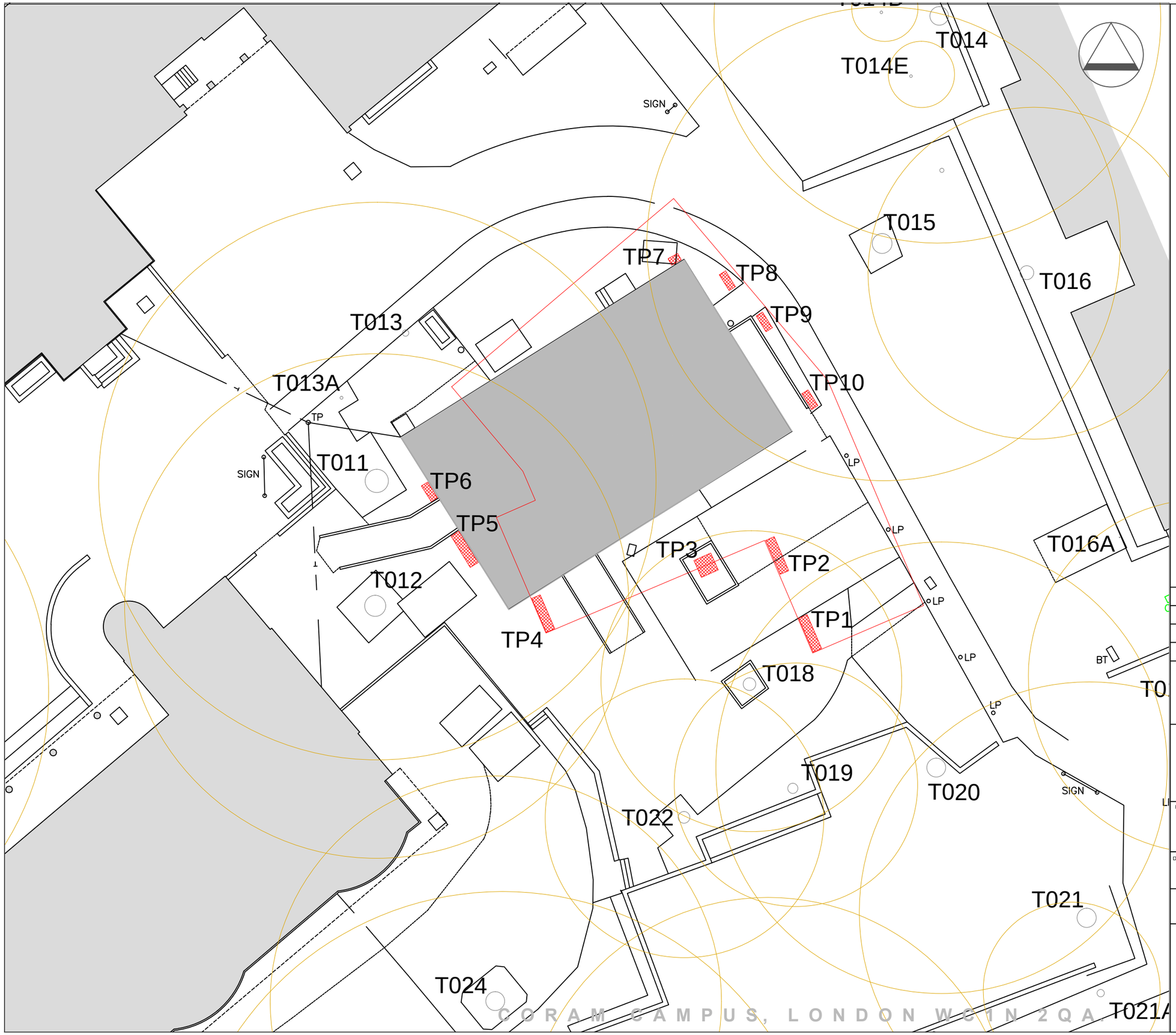
6.3 It is likely that within an excavation depth of 400mm, no significant roots will be uncovered. Below this depth the likelihood of encountering large diameter roots increases significantly.

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