



RUGBY FOOTBALL UNION

Arboricultural Impact Assessment

Twickenham Stadium – East Stand Extension

June 2016



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Report Caveats

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Specific - Trees

All tree inspections, unless specified, have been undertaken from ground level and using non-invasive techniques. Comments contained within the report on the condition and risk associated with any tree relate to the condition of the tree at the date and time of survey. Please note that the condition of trees is subject to change. This change may occur, but is not limited to biological and non-biological factors as well as mechanical/ physical changes to conditions in the proximity of the tree. Trees should be inspected at intervals relative to identified site risks and in accordance with relevant HSE and Central Government guidance. Environmental Services can provide further information on this matter if required.

Please note no statutory control checks have been undertaken (unless specified). Where tree surgery works have been identified these works are based on the assumption that planning is approved, no tree works should be undertaken prior to determination of this application without up to date confirmation of the Tree Preservation Order / Conservation Area Status of the vegetation. All works should be undertaken in accordance with the appropriate Duty of Care. This should include, for example, site specific risk assessments and due diligence inspections for the presence of protected species.

Any comment relating to 3rd party trees has been made without full access to the tree(s). Should these trees have any impact on the proposed development we would advise you to instruct us to contact the 3rd party and undertake further inspection work.

1.0 Introduction

- 1.1 Environmental Services have been appointed by RFU (Rugby Football Union) to provide advice on the arboricultural issues relating to the proposed development of the above site.
- 1.2 We undertook a Pre-Development Tree Condition Survey (see Appendix 1), on 7th April 2016.
- 1.3 This survey assessed the condition of the tree resource, categorised the trees and provided the Root Protection Area (RPA) information according to the BS5837:2012 “*Trees in relation to design, demolition and construction – Recommendations*”.
- 1.4 Following preparation of our Tree Condition Survey we received a copy of the layout drawing showing the development proposal for the site.
- 1.5 Our detailed check with the Local Planning Authority has confirmed that none of the identified trees are subject to statutory protection: All trees identified within this report are located within the street and therefore under the control of / ownership of the Local Authority.

	A	B	C	U
Tree Preservation Order	N/A	N/A	N/A	N/A
Conservation Area	N/A	N/A	N/A	N/A
Planning Condition	N/A	N/A	N/A	N/A

- 1.6 The Eastern boundary of the site, along Rugby Road, is understood to be within a designated area for new tree planting.
- 1.7 There are a number of TPO protected trees on the opposite side of Rugby Road.
- 1.8 From our assessment on site, we can confirm that these trees will not be affected by the construction and operation of the proposed extension and have therefore not been included within this report.
- 1.9 The tree numbers used in this report refer to the tree numbers used in our Tree Condition Survey.

2.0 Executive Summary

- 2.1 The site is a large Rugby Football stadium (owned and managed by the Rugby Football Union (RFU)), located within a mixed residential / light commercial sub-urban area of West London.
- 2.2 The site contains the stadium centrally to the site with parking provision to the north and west of the stadium. The Duke of Northumberland River runs South-West to North-West, West of the car parks and stadium. To the South is Whitton Road (B361) and the East, Rugby Road.

- 2.3 The immediate and distant landscape character is one of mixed residential, commercial and stadium associated buildings interspersed with a mixed age range of primarily deciduous trees which contribute to the immediate landscape character both individually and as groups (see site images).
- 2.4 The development proposal is for a five-storey extension to the East stand, with additional floor space for hospitality.
- 2.5 There are two 'B' category trees which stand 3m off the Eastern boundary with the stadium (identified in this report as T2 (Plane (London)) and T3 (Plane (London))).
- 2.6 The above two trees have been identified for removal; extensive crown pruning would be required to facilitate the construction of the 5-storey extension and some degree of root damage should be expected (irrespective of mitigation works).
- 2.7 It should also be stressed that removal of these trees has also been suggested due, in part, to the obvious trip-hazard that surface roots emanating from these trees currently present.
- 2.8 Given the significant level of pedestrian traffic which would be anticipated on match days, these trees offer a clear trip hazard, which removal would ameliorate; crown reduction would offer no mitigation of this hazard.
- 2.9 A summary of the affected trees is detailed in the table below:

Impact	Reason	A	B	C	U
Trees to be removed	To facilitate the development or due to their condition (U cat)	N/A	T2 & T3	N/A	N/A
Trees with RPA encroachment	To facilitate construction	N/A	T2 & T3	N/A	N/A
Retained Trees to be pruned	To address identified defects/ facilitate construction	N/A	N/A	N/A	N/A

3.0 Scope of Tree Survey

- 3.1 To carry out a tree condition survey on the trees and hedgerows at and immediately adjacent to the site, identifying any hazard trees and making recommendations for those trees to be retained and low amenity value and hazard trees to be replaced.
- 3.2 To undertake the tree survey in accordance with the principles of BS5837: 2012 '*Trees in relation to design, demolition and construction – Recommendations*'.
- 3.3 To produce a tree constraints plan (TCP), showing the location of surveyed trees, their BS5837: 2012 categorisation and the theoretical Root Protection Areas (RPA) required.
- 3.4 To carry out an arboricultural impact assessment on the effect of the new development at the site identifying the construction exclusion zones (CEZ) shown on the tree protection plan (TPP). This will also show the locations for tree protective fencing, any temporary ground protection required and identify 'No-Dig' zones for RPAs shown outside of CEZs.
- 3.5 The purpose of this report is to comment on the arboricultural implication of the proposed development and to aid the preservation of trees to be retained at and adjacent to the site during the construction works by setting out the tree protection methods, construction techniques and working practices that are to be adopted on this site.
- 3.6 If the guidelines and principles outlined in this report are not adhered to, as with all development sites there is a risk that the construction activities will result in damage to and potentially the death of the retained trees. Damage to the trees will significantly increase the risk of their health declining and may increase the risk of their complete or partial failure.

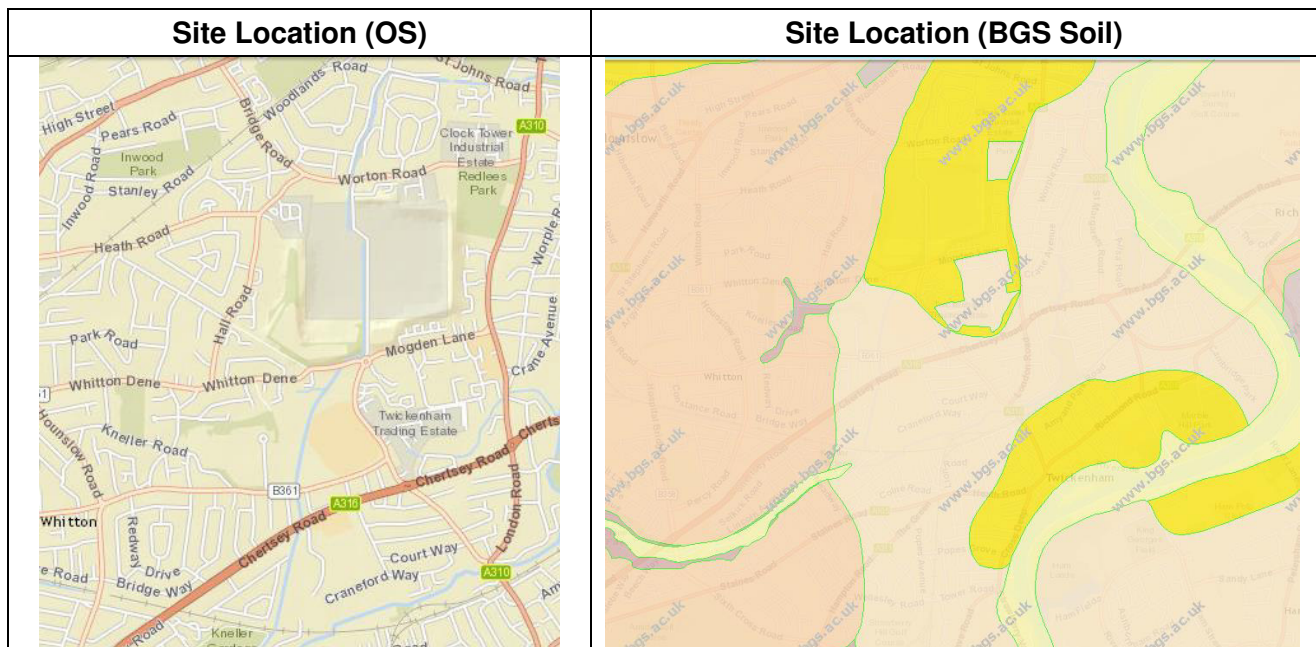
4.0 Terms of Reference

4.1 Reference Documents:

- BS5837:2012 '*Trees in relation to design, demolition and construction – recommendations*'
- BS3998:2010 '*Tree work – recommendations*'
- NJUG 4 – National Joint Utilities Group "Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees. Volume 4, issue 2. London: NJUG 2007"
- BGS Open Source Soil Data <http://www.bgs.ac.uk/nercsoilportal/maps.html>

5.0 Description of Site and Proposed Works

- 5.1 The site consists of a large Rugby Football stadium located within a largely residential sub-urban area of West London with associated car parking and pedestrian hard landscaping located to the North, South and West of the stadium.
- 5.2 The immediate and distant landscape character is one of mixed residential, commercial and stadium associated buildings interspersed with a mixed age range of trees which contribute to the immediate landscape character.
- 5.3 The development proposal is for the construction of a new five-storey extension to the East stand; we understand that the extension will add 14m to the footprint of the current East stand.
- 5.4 The topography of the site is mainly level with no adverse topographical features



Summary

Reference to the 1:50 000 scale map indicates that the superficial deposits underlying the site are: Kempton Park Gravel Formation - Sand And Gravel overlaying a bedrock geology of London Clay Formation - Clay And Silt.

- 5.5 The underlying soil at this site has been identified as sand and gravel, which decreases the risk of damage to the trees by way of site compaction as this soil type is less prone to compaction.
- 5.6 Trees in this soil type generally explore to a greater depth of soil horizons.
- 5.7 All comments regarding soils should be verified with onsite geotechnical investigations and laboratory testing with foundation depth and design undertaken by a structural engineer.

6.0 The Trees

6.1 There were 6 Individual trees, 0 groups, 0 woodland areas and 0 hedges surveyed immediately adjacent to the site boundary.

6.2 By BS5837:2012 categorisation individually there were; 0 'A' category trees, 3 'B' category trees, 3 'C' category trees. By group and Woodland Area there were 0 'A' category groups, 0 'B' category groups, 0 'C' category groups.

6.3 In total there were 0 'U' category individual and group trees which were identified as in poor condition or dead / in decline with less than ten years useful life expectancy; the trees can be summarized as follows:

BS 5837 Cat	A	B	C	U
Specific Trees	0	T2, T3, T6	T1, T4, T5	0
Total Number	0	3	3	0

6.4 These trees locations and a summary of their visual contributions can be summarized as follows:

BS 5837 Cat	A	B	C
Easter Boundary Contributing to the street scene from Rugby Road.	0	T2, T3, T6	T1, T4, T5
Internal contribution only	N/A	N/A	N/A
No visual contribution	N/A	N/A	N/A

6.5 We understand that the Eastern boundary of the site (along Rugby Road), is within a designated area for new tree planting (a view supported by the relatively high number of semi-mature trees noted within the street scene).

6.6 There are however, a small number of Early-Mature trees along the Eastern boundary of the stadium; these are identified as T2, T3 and T6, all Planes (London). A general presumption should be made to favour retention of existing trees wherever possible.

6.7 However, the maturing trees (identified as T2 and T3) stand in close proximity to / overhang the boundary palisade security fence; the proposed new extension will bring the flank wall of the Eastern side of the stadium within very close proximity to this boundary-line, thereby necessitating the reduction of all overhanging limbs if T2 and T3 are to remain.

6.8 The extent of linear crown reduction has been estimated to be in the order of between 6m and 7m on the South / South-West side of both trees (see image 1 below).

6.9 Whilst this work is relatively 'heavy', London Plane (*Platanus x hispanica*) is a robust species of tree

and should therefore be able to tolerate this work with no appreciable elevation in risk of instability or crown decline.



Image 1: Estimation of the extent of pruning required to reduce T2 to the boundary-line.

- 6.10 However, whilst this work may be sufficient to allow works to progress, it will not mitigate the obvious trip-hazards presented by the large and clearly visible surface roots (which are having an obvious / negative impact on the footpath adjacent to the gate for the East Stand (See Image's 2 and 3 below).
- 6.11 Given the high levels of anticipated pedestrian traffic during match days, these roots present a clear and obvious issue with regards to crowd safety and one which crown pruning cannot address.
- 6.12 Removal of T2 and T3 has therefore been suggested, as it will provide the most pragmatic option in this instance.



Image 2: Large surface root and obvious trip-hazard noted on T2 (Plane (London))



Image 3: Visible surface root and associated pavement damage from T3 - Plane (London)

7.0 Arboricultural Impact Assessment

7.1 Tree Removals

7.1.1 The following trees should be removed to facilitate the proposed development and also to ensure safe pedestrian access to the stadium.

7.1.2 Given the high level of pedestrian traffic expected (on match days), tree removal will fully mitigate the obvious trip-hazard posed from the large and visible surface roots emanating from T2 and T3.

BS 5837 Cat	A	B	C
Tree to be removed	None	T2 and T3	None

7.1.3 However, to mitigate the tree loss proposed, the Local Planning Authority is invited to secure a detailed Landscaping Proposal by way of Planning Condition.

7.2 Root Protection Area (RPA) Incursions

7.2.1 The following incursions into the RPA's of trees to be retained have been identified:

BS 5837 Cat	A	B	C	Summary
No RPA Incursion	0	0	0	<i>There are no incursions into the RPA's of retained trees T1, T4, T5 and T6</i>

7.2.2 The root protection area and canopy spread of the retained trees on Rugby Road is modest and will fall outside the likely zone of areas to be utilised for construction access to the existing gate line.

7.2.3 Any construction activity within the site and / or the utilisation of existing access gates should not impact the RPA of any retained trees. The trees currently stand within an area of pre-existing hard surface (paving slabs and/or tarmac) and as such compaction of the sub-base will be limited; increased root damage due to construction traffic should not be anticipated.

7.3 Foundations

7.3.1 We understand that the 5-storey extension will be constructed off 25m deep piled foundations; the locations of the piles will correspond with the location of the current rear supports (albeit 14m distant).

7.3.2 The foundations of the proposed extension would encroach into the RPA of trees *T2 and T3*; however, as we have suggested that these trees be removed, root damage (due to incursions into the RPA of T2 and T3) will no longer be an issue.

7.4 Services

- 7.4.1 The route of any services needs to be carefully considered so as to avoid unnecessary encroachment into retained trees RPA's.

7.5 Ground Levels

- 7.5.1 No changes to existing ground levels are proposed within the RPA's of retained trees.

7.6 Shading

- 7.6.1 No shading issues have been identified with the proposal on the basis of the orientation of the tree resource relative to the proposal.

7.7 Site Supervision/ Monitoring

- 7.7.1 Most damage to trees on developments sites is caused inadvertently and to ensure continued protection during development a system of site monitoring is proposed.
- 7.7.2 Basic checks will ensure that protective fencing remains intact. Any unforeseen issues can also be identified and discussed before damage to the tree(s) occurs.
- 7.7.3 The Local Planning Authority is invited to secure a monitoring schedule by way of Planning Condition. To be effective the Local Planning Authority must provide us with a copy of any formal Decision Notice to ensure we can then contact and follow up the proposed monitoring. A copy of the Decision Notice should be emailed to planning@innovation-environmental.co.uk . The number of proposed visits is driven by the scale of the proposal
- 7.7.4 A more detailed explanation of what will be assessed during the proposed monitoring visits is contained in Appendix 5.

8.0 Recommendations

- 8.1 The preliminary tree works recommended are included in the tree tables contained within this report and within the tree works schedule at Appendix 5.
- 8.2 That during the construction build phase, following current consultation with the arboriculturist, adequate provision is made for the protection of existing trees on site and the areas to be planted with new trees and shrubs.

- 8.3 Pre-commencement site meetings should be arranged to discuss the recommendations in this and subsequent reports and/or any method statements. Copies of all relevant arboricultural reports should be available on site.
- 8.4 That details of site inspection / supervision visits by the consultant arboriculturist are recorded and sent to the council tree officer with copies retained by the site manager.

9.0 Conclusions

- 9.1 The development site is the East stand of a large Rugby Football stadium (owned and managed by the Rugby Football Union (RFU)), located within a mixed residential / light commercial sub-urban area of West London.
- 9.2 2 'B' category individual trees constrain the proposed layout for the new East stand extension and are therefore in conflict with the proposed layout and will be required to be felled.
- 9.3 The trees identified for removal were noted to have significant surface root issues which, when considered in the context of the current site usage, and with due regard to the likely high level of pedestrian traffic (on match days) pose a significant risk for potential trip injuries.
- 9.4 Extensive crown reduction work would be required to enable the extension work to progress as planned; whilst T2 and T3 could withstand this work, the crowns of both trees would become heavily asymmetric.
- 9.5 In our opinion, the most pragmatic option in this instance would be to remove T2 and T3, thereby negating the need for heavy / sustained crown reduction works and also mitigating the obvious trip hazards associated with visible surface roots from these trees.
- 9.6 No pruning work will be required to the trees T1, T4 and T5 to enable to construction phase to proceed; all works will progress outside the RPA of these trees.
- 9.7 T6 is too remote for construction traffic to impact the roots of this tree.
- 9.8 Any tree works and landscape replacement tree planting will require agreement with the council officers.



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Consultant Arboriculturist
26th May 2016

10.0 Appendices

Appendix 1 Key to Survey Sheets

Appendix 2 Tree Survey Sheets

Appendix 3 Tree Constraints Plan

Appendix 4 Tree Works Schedule

Appendix 5 Site Inspection & Monitoring Schedule

Appendix 6 BS5837:2012 Tree Constraints & Protection Methods

Appendix 7 Tree Protection Fencing Specification

Appendix 8 Temporary Ground Protection Specification

Appendix 9 Photographs

Appendix 1 – Key to Tree Survey Sheets

Key

BS 5837 Cat	Description
A	Those of high quality and value: in such a condition as to be able to make a substantial contribution (> 40 years)
B	Those trees of moderate quality and value: those in such a condition as to make a significant contribution (> 20 years)
C	Those trees of low quality and value: currently in adequate condition to remain until new planting could be established (> 10 years)
U	Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed regardless of development

Note: Sub categories are denoted in the tree survey data (A1, B1, C2 etc.) You are referred to the BS for further detail if required.

Tree No.	T (tree), G (group), H (hedge), W (woodland) + Ref No.
Species	Common Name
Ht (m)	Measured height in metres
DBH (m)	Diameter at 1.5m above ground level
Branch Spread	In m to cardinal points
Cr Ht Clearance (m)	Overall height of lowest branches from the ground level on side of proposed development
Life Stage	Young, Semi-Mature, Early-Mature, Mature, Over-Mature
General Observations	Observations on the condition of the tree(s)
Tree Work Specification	Proposed tree works in accordance with BS3998
BS Cat	See above
Life Exp	Estimated remaining contribution in years.
RPA Radius(m)	Radius of the trees Root Protection Area measured from the trunk to the edge of the RPA circle in metres
RPA (m2)	Overall Root Protection Area in m2
*	Indicates where tree data may have been estimated as tree was offsite / restricted access / dense vegetation hindering full inspection

Appendix 2 – Tree Survey Sheets

Tree No.	Species	DBH	No of Stems	Ht (m)	N	E	S	W	BS Cat	Age Class	Life Expect	Cr Ht (m)	Observation	Recommendations	RPA (m2)
T1	London Plane.	18	1	7.5	2.5	2.5	2.5	2.5	C1	Semi-Mature	>40	3.5	Good form, shape and condition. Young newly established tree with no obvious defects.	No Works.	14.7
T2	London Plane.	65	1	19.5	9	9	9	9	B1	Early-Mature	>40	3.5	Average form, shape and condition. Tree located near to boundary of the site (3m off boundary fence). Offsite boundary tree with overhanging branches (encroach 6m -7m). Large surface roots damaging footpath (c8m in length). Evidence of previous limb loss.	Fell to ground level.	191.2
T3	London Plane.	64	1	19	9.5	9.5	9.5	9.5	B1	Early-Mature	>40	3	Average form, shape and condition. Tree located near to boundary of site (3m off boundary fence). Offsite boundary tree with overhanging branches (encroachment 6m -7m). Large surface roots damaging footpath (c3m in length). Evidence of previous limb loss.	Fell to ground level.	185.3
T4	Norway Maple.	29	1	0	4.5	4.5	4	4	C1	Early-Mature	>40	3.5	Average form, shape and condition. Subject to crown management - Lifted / Thinned / Cleaned.	No Works.	38.1
T5	Crab Apple.	23	1	0	3	3	3	5	C1	Early-Mature	10_19	3	Average form, shape and condition. Dense crown, low crown deadwood.	No Works.	23.9
T6	London Plane.	71	1	19	7.5	7.5	7.5	7.5	B1	Early-Mature	>40	5.5	Good form, shape and condition. Subject to crown management - Lifted, Thinned / Pollarded.	No Works.	228.1

Appendix 3 – Tree Constraints Plan

Tree No	Species	DBH(m)	No of Stems	Ht (m)	BS Cat
T1	London Plane.	18	1	7.5	C1
T2	London Plane.	65	1	19.5	B1
T3	London Plane.	64	1	19	B1
T4	Norway Maple.	29	1	0	C1
T5	Crab Apple.	23	1	0	C1
T6	London Plane.	71	1	19	B1

scale bar 1:500 5m 0 10m 50m

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Tree Survey Drawing Key

See Innovation Environmental Tree Survey for Individual Tree Details

KEY

Please refer to Innovation Environmental arboricultural report for details

- Category A - high quality and value
- Category B - moderate quality and value
- Category C - low quality and value
- Category U - removal

○ RPA - root protection area as defined by Table 2 BS 5837:2012

○ Category U - removal

innovation group environmental services

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REV AMENDMENTS DRAWN DATE AUTHD

PROJECT

**RFU Twickenham Stadium,
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CLIENT

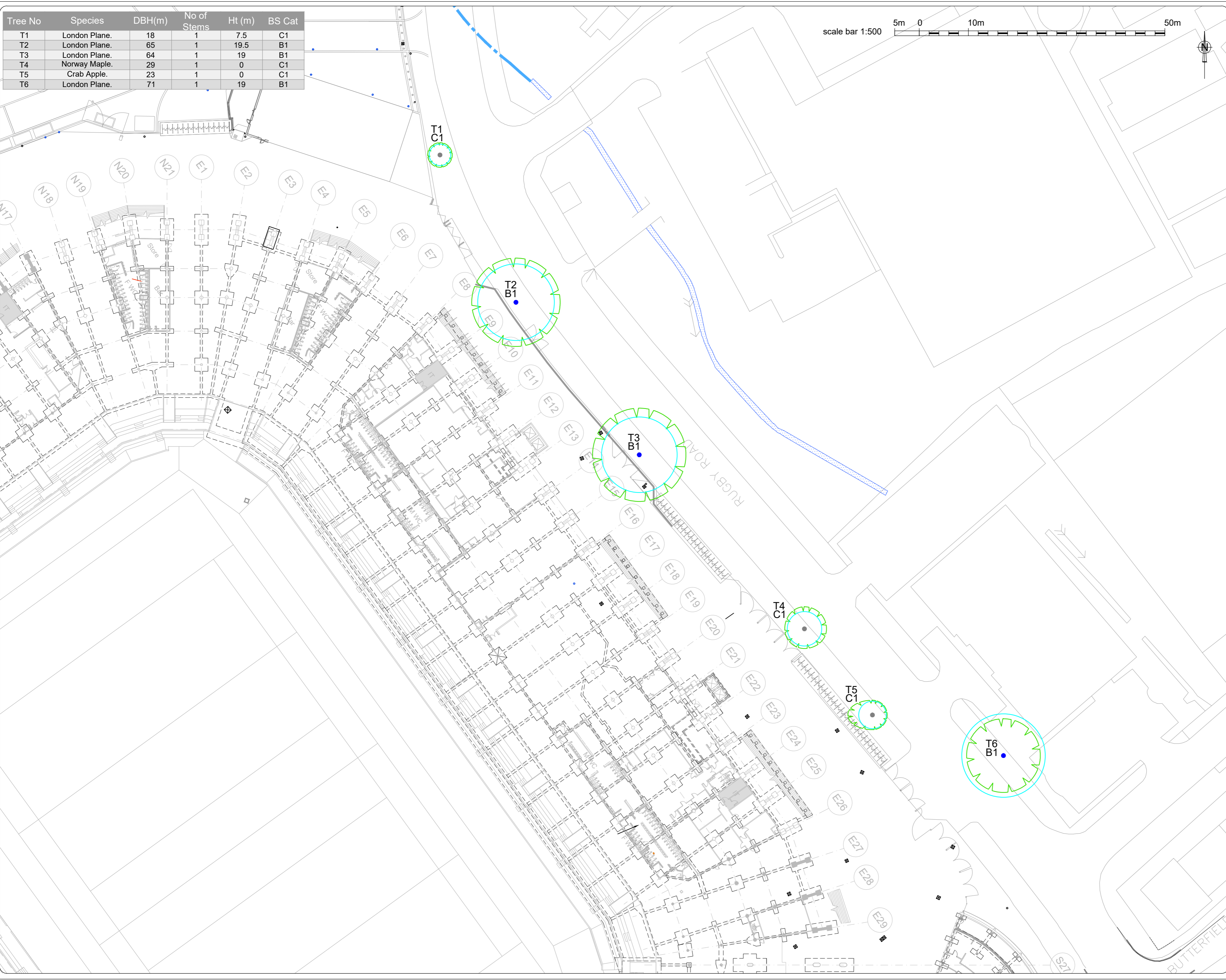
Rugby Football Union

TITLE

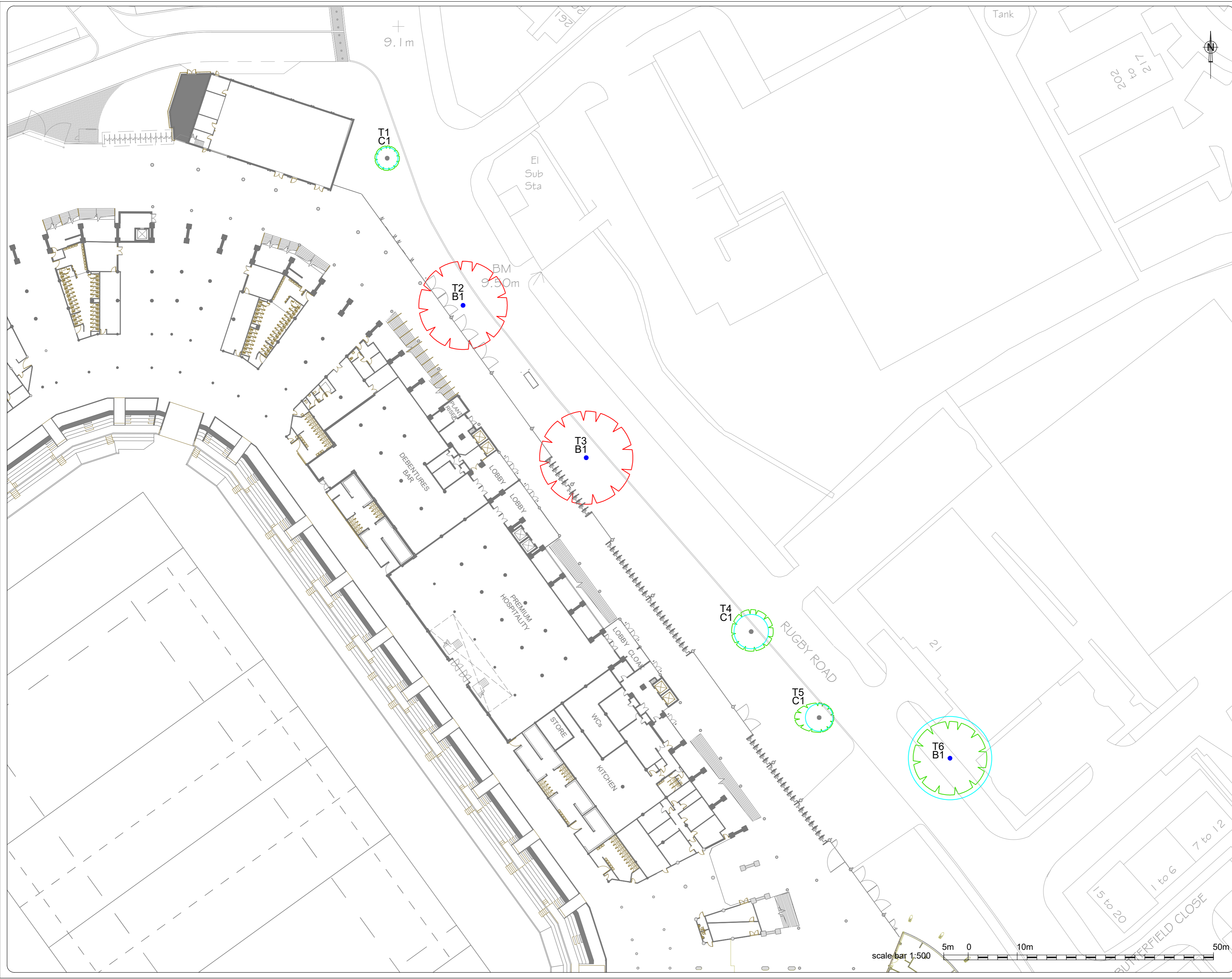
Tree Constraint Plan (TCP)

Job No D1003161311	Scale 1:500 @ A2	DRG NO 12729	Revision -
Date 08/04/16	Type MT.TCP.12729.v1		

Innovation Group



Appendix 4 – Tree Protection Plan



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Tree Survey Drawing Key

- Root Protection Area m2
- Tree Canopy Extent
- Stem Location / Coloured disc denotes BS: 5837 Category
- Tree Number

See Innovation Environmental Tree Survey for Individual Tree Details

KEY

- Tree to be retained
- Tree to be Pruned
- Tree to be removed
- Tree protective fencing
- No Dig Surface
- Supervised Excavations
- Construction Exclusion Zone
- Temporary Ground Protection



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REV	AMENDMENTS	DRAWN	DATE	AUTHD

PROJECT
**RFU Twickenham Stadium,
Whitton Road,
Twickenham, TW2 7BA**

CLIENT
Rugby Football Union

TITLE
Tree Protection Plan (TPP)

Job	Scale	DRG NO	Revision
D1003161311	1:500 @ A2	12729	-
Date	Type		
16/04/16	MT.TPP.12729.v1		

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Appendix 5 – Tree Works Schedule

NOTE: All tree works to be undertaken in accordance with BS 3998:2010 ‘Tree work - Recommendations’. All pruning cuts to be made at suitable growing points, in line with the principles of natural target pruning. < *(In accordance to the current proposed design layout provided)*>.

To Be Removed

Tree No.	Species	Proposed Tree Works	Observations	BS Cat
T2	London Plane.	Fell to ground level.	Average form, shape and condition. Tree located near to boundary of site (3m). Offsite boundary tree with overhanging branches. Large surface roots damaging footpath (c8m in length). Evidence of previous limb loss.	B1
T3	London Plane.	Fell to ground level.	Average form, shape and condition. Tree located near to boundary of site (3m). Offsite boundary tree with overhanging branches. Large surface roots damaging footpath (c3m in length). Evidence of previous limb loss.	B1

Appendix 6 – Site Inspection & Monitoring Schedule

In order to ensure that the principals of tree protection set out in the statement are adhered to, it is important to set out communication details for key individuals and tasks that require supervision. These details should be retained by all relevant parties and available on site at all times. Relevant parties will be advised of any changes in personnel or contractor during the development process.

To ensure that the construction process is undertaken with minimal disturbance to the retained tree stock, we recommend that an experienced Environmental Services arboricultural consultant be appointed to undertake regular inspections of the site according to a site inspection / supervision schedule below.

It is our experience that a mix of scheduled and unannounced site visits are appropriate these unannounced inspections will serve to identify any damage to the Tree Protection Fencing, poor working practices, potential problems and points of conflict between the construction process and the health of the trees. These reports will include recommendations for remedial action.

During these visits any changes to the proposed works will be discussed, their impact assessed and recommendations for best practice will be outlined. After each of these visits a copy of the report should be sent to the Site Agent, Local Authority Tree Officer and Client. The remedial action undertaken will be recorded on the next visit.

It should be noted that these visits will only be undertaken if a written instruction is received from the client prior to commencement of works on site.

With reference to relevant published guidance, the methodology of this statement follows a logical sequence essential to the efficacy of the protection measures. References may include: British Standard 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'; British Standard 3998:2010 'Tree Work - Recommendations' and National Joint Utilities Group 'Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees, Volume 4' 2007.

It is essential to the successful implementation of the principals set out in this document that effective supervision and enforcement are implemented from the outset as detailed in the following construction phases.

**Arboricultural Impact Assessment
Twickenham Stadium
RFU (Rugby Football Union)**

Constraints Item	Site Supervision required	Number of Visits Expected	Timing of Site Visits	Actual Visit Date
Tree works operations	Optional	Visit 1	Prior to construction	
Pre-commencement meeting between relevant parties informing Council of development start date	Yes	Visit 2	Prior to site clearance	
Establishment & protection of Root Protection Areas (RPA) for retained trees to 'sign off' installed tree protection fencing and temporary ground protection	Yes	Visit 2	Prior to site clearance	
Location of temporary access route through / adjacent to the retained trees and for access for construction vehicles and avoidance of compaction to the RPA of retained trees	Yes	Visit 3	During construction phase	
Protection and prevention of damage to retained tree canopies during construction	Yes	Visit 3	During construction phase	
Excavation of services trenches in close proximity to retained trees	Possible	Visit 5	During construction phase	
Generic construction site constraints: 1 Site office / Welfare unit location 2 Temporary toilets 3 Location of contaminant storage and washout areas 4 Location of stripped topsoil	Yes	Visit 3	During construction phase	
Post construction site assessment for any required remedial tree works operations recommendations.	Yes	Visit 6	Post construction	

Appendix 7 – BS5837: 2012 Tree Constraints & Protection Methods

Phase 1 Pre-Construction Meeting

Prior to commencement of the works an onsite meeting will be held with all relevant parties including the site agent and appointed Environmental Services arboricultural consultant of works. The purpose of this meeting is to record site features including tree condition, agree tree works (See Tree Works Schedule, location of site storage and welfare facilities and the location of tree protection measures.

Phase 2 Tree Protection Measures

Subject to planning the Tree Protection Measures outlined in this report will be revisited in detail based on the working drawings, construction programme and method statement to be prepared.

Tree protection fencing should be installed prior to any demolition or ground-works commencing, remain in place throughout construction and be removed only after completion.

The provision of tree protection and light tree surgery will reduce the risk of direct damage to the retained trees. The demolition and construction process should not be commenced until the tree surgery works has been completed and the protective areas have been fenced off.

Tree protection will be installed as per the Tree Protection Plan which will be agreed with the Local Authority Tree Officer and with reference to the British Standard 5837 2012 ‘Trees in relation to design, demolition and construction – Recommendations’. Prior to commencing any demolition or construction works, the fencing will be inspected by the appointed Environmental Services Arboricultural consultant.

Within the fenced zone, no materials or chemicals should be stored at any time, no fires should be lit, no pedestrian or vehicle traffic, and level changes within these areas should be kept to an absolute minimum. Every effort should be taken to protect a maximum possible area of the root system.

Within the Root Protection Area no level changes or excavation within the RPA should be undertaken without the consent of the LPA Tree Officer.

Clear notices are to be fixed to the outside of the fencing with words such as ‘TREE PROTECTION AREA – NO ACCESS OR WORKING WITHIN THIS AREA’. See Appendix 8.

The site agent, all contractors and other relevant personnel are to be informed of the role of the Tree Protection Fencing and their importance. A copy of the Tree Protection Plan will be displayed on site at all times during construction.

Phase 3 Demolition and Enabling Works

Prior to any works commencing on site the Tree Protection Fencing will be erected. During demolition programme and enabling works the existing front access will be in use. Any plant or vehicles engaged in the demolition works will operate outside the fenced off No-Dig / Root Protection Areas.

Phase 4 *Locations of Site Offices Compound and Storage Area*

The site office, welfare facilities, storage yard and contractors parking area need to be located within an area of the site that is outside the Root Protection Area (RPA). The compound will remain at least 1 metre outside the RPA with access from the main access road.

All fuel storage and loose cement / sand to be batched and stored in the compound area.

Phase 5 *Groundworks, Level Changes, Foundations and Services*

All spoil, including excavated soil and demolition material will be removed from site or stored in a location remote from any tree protection barriers.

With regard to the drawings provided the construction of foundations for the new build is located beyond the Root Protection Area (RPA) of retained trees, therefore with regard to the health of the retained trees no specialised foundation design is required. If the subsoil is found to be plastic, the foundations will be specified to take into account the potential influence of the vegetation on the moisture content and volume of the subsoil.

We recommend that all drainage and underground service routes are located beyond the RPA of all the retained trees. If the service runs are to be located within the RPA, we recommend that this matter is dealt with by method statement secured by planning condition. If services are located within the RPA special implementation techniques such as moleing, airspade, or hand digging may be required by the LPA. In the majority of cases, however, careful excavation with a low tonnage mechanical excavator supervised by the Environmental Services consultant arboriculturist can adequately undertake services excavations. When tree roots are encountered, hand digging and root protection can then be undertaken as and when they are observed.

Phase 6 *Dismantling Protection Barriers*

Dismantling the protection barriers around retained trees may be required to allow completion of final surface treatments and landscaping. Supervision of this exercise and control of the landscaping thereafter will be administered by the appointed Environmental Services arboricultural consultant. The removal of the Tree Protection Fencing is not an opportunity for machinery to access the previously fenced off area.

No further excavation will be carried out during this process and soils levels will not be raised above that existing by greater than 100mm and not within 2m of the trunk. Any removal of existing structures within the Root Protection Area including gardens type walls or paths will be carried out by hand.