Arboricultural Assessment & Method Statement

Teddington Sports Field, Udney Park Road, Teddington, London

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18 August 2017

16050-AA-MW

Site location and approximate boundaries

This aerial image is provided courtesy of Google. The yellow line indicates the approximate site boundary and is illustrative only.

Report purpose

This is a BS 5837 compliant arboricultural assessment report providing sufficient information for the Local Planning Authority ("LPA") to consider the effect of the proposed development on local character from a tree perspective. It includes an analysis of how trees will be affected and an arboricultural method statement describing how retained trees will be protected and managed during the development activity. It is fully in line with the BS 5837 advice relating to the planning application stage of the process highlighted in Table B1 reproduced below:

Table B. 1 Delivery of tree-related information into the planning system

Stage of process	Minimum detail	Additional information
Pre-application	Tree survey	Tree retention/removal plan (draft)
Planning application	Tree survey (in the absence of pre-application discussions)	Existing and proposed finished levels
	Tree retention/removal plan (finalized)	Tree protection plan
	Retained trees and RPAs shown on proposed layout	Arboricultural method statement - heads of terms
	Strategic hard and soft landscape design, including species and location of new tree planting	Details for all special engineering within the RPA and other relevant construction details
	Arboricultural impact assessment	
Reserved matters/ planning conditions	Alignment of utility apparatus (including drainage), where outside the RPA or where installed using trenchless method	Arboricultural site monitoring schedule
	Dimensioned tree protection plan	Tree and landscape management plan
	Arboricultural method statement – detailed	Post-construction remedial works
	Schedule of works to retained trees, e.g. access facilitation pruning	Landscape maintenance schedule
	Detailed hard and soft landscape design	

Validation statement

For LPA validation purposes, this report includes:

- a **BS 5837 compliant tree survey**, including a tree protection plan showing the location of the existing trees, their categorisation, the location of the new structures and hard surfacing, the trees to be removed, and the tree protection measures;
- an **arboricultural assessment** in Section 1, which describes how the development proposal will affect local character from a tree perspective;
- an **arboricultural method statement** in Section 2 describing the tree protection and management measures, and how they should be implemented; and
- two **appendices** in Section 3 setting out the background administrative information and a schedule of tree information.

The tree protection plan

More specifically, the tree protection plan is based on the provided information and it should only be used for dealing with the tree issues. It shows:

- the existing trees numbered, with high/moderate categories (A & B) highlighted in green triangles and low/unsuitable categories (C & U) highlighted in blue rectangles;
- the circular interpretation of root protection areas ("RPA") of category A, B and C trees (grey circles);
- the trees to be removed indicated by a red number and crown outline;
- the location of the construction exclusion zone ("CEZ"), which is the area of restricted access, to be protected by temporary barriers (fencing and/or ground protection); and
- the location of precautionary areas outside the CEZ where limited, but careful access is permitted.

Summary

1. The development proposal

The proposed scheme will see the former Imperial College London Private Ground on Udney Park Road, Teddington, London, TW11 9BB, regenerated for a mixed-use development that will deliver high-quality sports and community facilities, alongside new public open space and affordable, care led accommodation for older people and a new GP surgery. This triple approach secures a sustainable, inclusive future for the site, the benefits of which underpin national and local planning policy.

With the creation of the Teddington Community Sports Ground Community Interest Company, three areas will be established:

1. Assisted living, extra care, residential development and new GP surgery;
2. Open parkland with community orchard and outdoor gym;
3. Community sports facilities.

The proposed community sports facilities will comprise of the following:

- A full-size third generation artificial grass pitch (3G AGP)
- Natural grass playing pitch provision
- Tennis courts / MUGA
- Community pavilion containing changing rooms, kitchen, bar and server, flexible-use community rooms and crèche

2. Background administrative information

Our instructions, how we prepared this report and other relevant background information is explained in Appendix 1. All the trees that could be affected were inspected and that information is listed in Appendix 2.

3. Table 1: Summary of category A, B and C trees to be removed, pruned or protected using special precautions

	British Standard 5837 Category		
	A (High quality)	B (Moderate quality)	C (Low quality)
Remove	-	8, 9, 12, 13, 14, 18, 19, 41, 42	10, 11, 28, 39, 40, H49 (part), G79 (part)
Prune	-	80, 81	
Protect using special precautions	-	4, 22, 38, 43, 44, 80, 81	16, 20, 24, 25, 26, G31, 72, 73

H = Hedge; G = Group

Note: Category U trees (69, G71 and G74) are in such poor condition they would be removed irrespective of development and they are not included in this summary.

4. Table 2: Summary of the impact on local character of tree removal and pruning, and proposed mitigation

	Tree number(s)	Impact on local character	Mitigation
Remove	10, 11, 28, 39, 40, H49 (part), G79 (part)	low impact	New tree planting
	8, 9, 12, 13, 14, 18, 19, 41, 42	Moderate impact	New tree planting
Prune	80, 81	No impact	Limited pruning of tertiary and secondary branches for access

5. Table 3: Extra precautions in addition to primary protection using barriers (fencing and ground protection)

Activities requiring extra precautions	Tree number(s)
Pollution control near retained trees	All trees
Installation of new surfacing and/or upgrading of existing surfacing in RPAs	4, 22, 43, 44, 80, 81
Installation of new structures in RPAs	G31, 81
Installation of new services and/or upgrading of existing services in RPAs	16, 24, 25, 26, G31, 72, 73
Upgrading existing soft landscaping or replacing existing surfacing and/or structures with new soft landscaping	38, 43

Note: The detailed analysis explaining how these trees will be protected is provided in Section 2 of this report. The approximate locations of the protective measures are shown on the tree protection plan. It is likely that some details of the tree protection will need to be refined in response to a planning condition, once consent is issued.

6. Enhancement through new tree planting

In order to increase the contribution of trees to local character, a comprehensive new landscaping scheme is proposed by Barton Willmore, including new heavy-standard and semi-mature trees to be planted around the site in sustainable locations. The new trees would have the potential to reach a significant height without excessive inconvenience to adjacent occupants, representing an overall enhancement of tree cover in the area.

7. Overall assessment of how the development proposal will affect local character from a tree perspective

This proposal will result in the loss of several trees that are all low category because of their poor condition or small size. Some moderate category trees will also need to be removed within parts of the highway to provide adequate visibility for new access points but these losses can be mitigated with new sustainable tree planting around the site. As part of a comprehensive new landscaping scheme, heavy standard and semi-mature stock will be included as part of the proposal. The size of these new trees and their future growth will significantly enhance the contribution of this site to local character and more than compensate for the loss of existing trees. The construction activity may affect further trees if appropriate protective measures are not taken. However, if adequate precautions to protect the retained trees are specified and implemented through the arboricultural method statement included in this report, the development proposal will have no significant impact on the contribution of trees to character in the wider setting.

Section 1
Arboricultural assessment

This arboricultural assessment has taken account of all the recommendations set out in 5.4 of BS 5837 (reproduced courtesy of BSI below).

5.4 Arboricultural impact assessment

5.4.1 The project arboriculturist should use the information detailed in **5.2** and **5.3** to prepare an arboricultural impact assessment that evaluates the direct and indirect effects of the proposed design and where necessary recommends mitigation.

5.4.2 The assessment should take account of the effects of any tree loss required to implement the design, and any potentially damaging activities proposed in the vicinity of retained trees. Such activities might include the removal of existing structures and hard surfacing, the installation of new hard surfacing, the installation of services, and the location and dimensions of all proposed excavations or changes in ground level, including any that might arise from the implementation of the recommended mitigation measures. In addition to the impact of the permanent works, account should be taken of the buildability of the scheme in terms of access, adequate working space and provision for the storage of materials, including topsoil.

NOTE Scaled cross-sections and other drawings might be required to demonstrate the feasibility of the proposals (see Annex B).

5.4.3 As well as an evaluation of the extent of the impact on existing trees, the arboricultural impact assessment should include:

a) the tree survey (see **4.4**);

b) trees selected for retention, clearly identified (e.g. by number) and marked on a plan with a continuous outline;

c) trees to be removed, also clearly identified (e.g. by number) and marked on a plan with a dashed outline or similar;

d) trees to be pruned, including any access facilitation pruning, also clearly identified and labelled or listed as appropriate;

e) areas designated for structural landscaping that need to be protected from construction operations in order to prevent the soil structure being damaged;

f) evaluation of impact of proposed tree losses;

g) evaluation of tree constraints (see **5.2**) and draft tree protection plan (see **5.5**);

h) issues to be addressed by an arboricultural method statement (see **6.1**), where necessary in conjunction with input from other specialists.

8. Relevant background information that has influenced this assessment – strategic and policy considerations

The Climate Change Act (2008) sets out a statutory strategic need to adapt to climate change at a national and local level, which is reiterated through the emphasis on sustainability in the National Planning Policy Framework. It is now widely accepted that trees offer significant climate adaptation benefits to the built environment where people live and work. These benefits include, amongst others, the buffering of temperature extremes and the buffering of rainwater runoff, which can significantly reduce the adverse impacts of climate change.

Additionally, there is an increasing body of research providing reliable evidence that trees impart other significant health-related benefits to the people that live and work near them. These benefits include, amongst others, the potential to improve psychological wellbeing by reducing stress and anxiety through the relaxing nature of their presence. It seems that access to greenspace and trees makes people happier and encourages them to take more exercise, which has a direct and positive impact on physical health and wellbeing. On a subtler level, the ecological enhancement that can be achieved through appropriate tree management makes a positive contribution to environmental sustainability.

These concepts are explored and set into a built-environment context in the recent Trees and Design Action Group's publications *Trees in the Townscape: A Guide for Decision Makers* and *Trees in Hard Landscapes: A Guide for Delivery*. Furthermore, specific advice on planting new trees is provided in British Standard 8545 (2014) *Trees: from nursery to independence in the landscape – Recommendations*. We have given significant weight to the guidance set out in these documents, which is reflected in the analyses in this report.

In line with these references, we agree with and support the general principle that more and bigger trees will deliver more benefits from their presence. Although this must be applied with balance and intelligence, it nonetheless remains an important guiding principle in the planning process and it has been an influential consideration in our analysis on this site.

9. Relevant background information that has influenced this assessment – future pressure to fell

If trees are retained or planted too close to occupied buildings and/or garden amenity space, it is sometimes claimed that they can cause excessive shade or anxiety, which interferes with the normal use of the property. In extreme cases, this can result in pressure from future owners to fell or severely prune, thus reducing the long-term contribution of the trees to local character. However, in our experience, these problems are extremely rare and there is very little evidence that such pressures ever result in any significant harm to the wider setting. Indeed, there is an increasing body of evidence that the benefits from trees close to occupied areas significantly outweigh any disadvantages caused by shade or anxiety. Furthermore, important trees can be protected using tree preservation orders, which come with an overarching presumption to retain protected trees unless the normal use of the property is harmed to a significant extent. To our knowledge, there is no published evidence to support that trees are being lost to the detriment of local character for these reasons. We have considered these concerns in our analysis for this site and in this case, there are no trees close enough to proposed occupied buildings where they are likely to interfere with their normal use.

10. Trees to be protected through the use of special precautions (4, 16, 20, 22, 24, 25, 26, G31, 38, 43, 44, 72, 73, 80, 81)

All the retained trees will be protected from damage using barriers (fencing and ground protection). Additionally, in the precautionary area shown on the tree protection plan with the yellow highlighting, special precautions relating to the management of existing and new structures, surfacing, landscaping and services will be required. These precautions are explained in the arboricultural method statement in Section 2 of this report. If the precautions set out in

this arboricultural method statement are implemented as described, these trees can be successfully retained without any adverse impact on them or on visual amenity.

11. Table 4: The impact of tree removal on local character

Tree number(s)	Impact of tree removal
8, 9, 12, 13, 14, 18, 19, 41, 42	As part of the highway proposals, these trees will possibly need to be removed to provide adequate visibility splays for the new access points. Although collectively these trees provide some visual amenity within the street scene, they are not individually special or prominent. Several of these trees have been pollarded or heavily pruned in the past, containing some decayed areas at the old pruning points so they will need continual management to maintain acceptable levels of risk over the highway, bringing with them an added maintenance burden for the local authority. Their loss will be noticeable in the immediate vicinity in the short term but I do not believe there will be a significant impact on local character in the wider setting because the retained trees (3, 4, 6, 7, 15, 16, 17, 20, 21, 37, 38, 43, 44, 46 and 48) will help to buffer the losses along the road edge. In addition, the removal of these nine trees offers an opportunity to plant many more new trees around the site in more sustainable locations that will have the potential to ultimately contribute more canopy cover to the local amenity over the longer term.
10, 11, 28, 39, 40, H49 (part), G79 (part)	These trees are small or in poor condition so they have limited ability to significantly contribute to amenity. Despite having the potential to provide some visual benefit along the boundaries, they are unsustainable for the longer term and would be better replaced with trees that have the ability to contribute to the surrounding amenity in the longer term.

Note: Trees categorised as U (69, G71 and G74) are in such poor condition that they have been assessed as needing removal for management reasons irrespective of any development proposals. Removal of any category U trees will be a management decision; the loss will not be caused by this proposal and it should not be considered as a direct impact.

12. The impact of tree pruning on local character

Although trees 80 and 81 may need pruning to accommodate vehicular access, such works can be limited to pruning secondary and tertiary branches which is unlikely to have a significant adverse impact on tree health. Also, because the profiles from public viewpoints would remain relatively unchanged, there will not be a significant impact on local character.

13. New tree planting to mitigate tree removals

To mitigate the loss of trees, a comprehensive new landscaping scheme is proposed by Barton Willmore, including new heavy-standard and semi-mature trees to be planted around the site in sustainable locations. The new trees would have the potential to reach a significant height without excessive inconvenience to adjacent occupants, representing an overall enhancement of tree cover in the area.

14. Summary of the impact on local character

This proposal will result in the loss of several trees that are all low category because of their poor condition or small size. Some moderate category trees will also need to be removed within parts of the highway to provide adequate visibility for new access points but these losses can be mitigated with new sustainable tree planting around the site. As part of a comprehensive new landscaping scheme, heavy standard and semi-mature stock will be included as part of the proposal. The size of these new trees and their future growth will significantly enhance the contribution of this site to local character and more than compensate for the loss of existing trees. The construction activity may affect further trees if appropriate protective measures are not taken. However, if adequate precautions to protect the retained trees are specified and implemented through the arboricultural method statement included in this report, the

development proposal will have no significant impact on the contribution of trees to character in the wider setting.

Section 2
Arboricultural method statement

This arboricultural method statement has taken account of all the recommendations set out in 6.1 of BS 5837 (reproduced courtesy of BSI below).

6.1 Arboricultural method statement

6.1.1 A precautionary approach towards tree protection should be adopted and any operations, including access, proposed within the RPA (or crown spread where this is greater) should be described within an arboricultural method statement, in order to demonstrate that the operations can be undertaken with minimal risk of adverse impact on trees to be retained.

6.1.2 The arboricultural method statement should be appropriate to the proposals and might typically address some or all of the following, incorporating relevant information from other specialists as required:

a) removal of existing structures and hard surfacing;

b) installation of temporary ground protection (see **6.2.3**);

c) excavations and the requirements for specialized trenchless techniques (see **7.7.2**);

d) installation of new hard surfacing – materials, design constraints and implications for levels;

e) specialist foundations – installation techniques and effect on finished floor levels and overall height;

f) retaining structures to facilitate changes in ground levels;

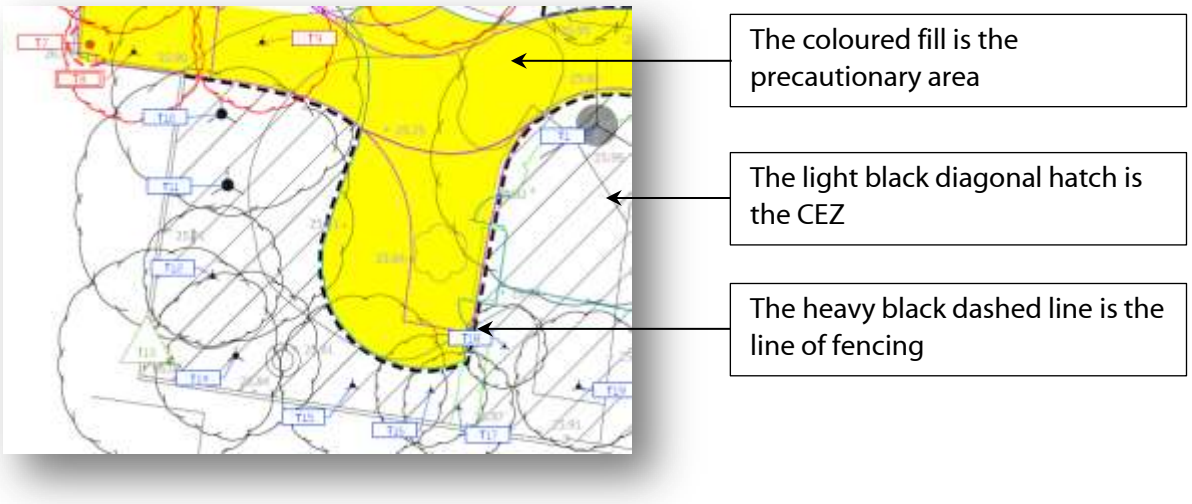
g) preparatory works for new landscaping ;

h) auditable/audited system of arboricultural site monitoring, including a schedule of specific site events requiring input or supervision.

Section 2: Arboricultural method statement

15. Identification of areas to be protected

The tree protection plan (typical annotation illustrated below) shows all the areas where protective measures are necessary. The construction exclusion zone ("CEZ") boundary is shown on the plan as the heavy dashed black line, with the lighter diagonal hatching behind. If necessary, further precautionary areas outside the CEZ are shown on the plan as a coloured fill, where a high level of care is required.



16. Construction method statement (heads of terms summary)

The day-to-day running of the site will take full account of the tree protection measures set out in this document, a copy of which will be kept on site at all times. All site personnel will be briefed on the tree protection requirements as part of the site induction procedures. More specifically, the practical measures set out in the preliminary construction method statement enclosed as Appendix 3 prepared by Quantum Group will be observed to minimise any disturbance to retained trees.

Any further details of how the site will be managed are construction and contractual matters that can only be finalised once the post-consent detailed planning begins. For that reason, at this stage in the planning process, it is only possible to list a heads of terms summary of the issues that will require more detailed consideration once consent is issued. The issues that may require further clarification on this site include:

1. The order of work on site, including demolition, site clearance and building work.
2. Erection and maintenance of security hoarding near trees.
3. Who will be responsible for protecting the trees on site.
4. How accidents and emergencies involving trees will be managed, including accidental damage to roots and their treatment.
5. Details of facilitation pruning and access into site. What size vehicles will be used under canopies and will large machinery be lifted over trees.
6. The parking arrangements for workers and visitors.
7. A schedule of emergency contact numbers.
8. Areas for loading and unloading of materials and storage of materials and plant.
9. Where site facilities will be located and when will they be installed.
10. How machinery and equipment (such as excavators, cranes and their loads, concrete pumps and piling rigs) will enter, move on, work on and leave the site.
11. Wheel washing facilities near trees.
12. Measures to control the emission of dust and dirt during construction near trees.
13. Recycling and storage of waste near trees.

14. Details of earthworks, grading and mounding and removal of spoil, including any planned lowering or raising of ground levels.
15. Details of upgrading/removing/replacing existing surfacing and areas where this will happen, including detailed and precise cross-sections where no-dig surfacing is to be installed.
16. How and when any temporary surfacing will be laid and removed.
17. Precise services locations, including the method of excavation when near trees.
18. Proposed locations of site facilities/crane location/material storage/loading bays etc.
19. How post-construction damage through compaction to soil near existing trees and new trees will be ameliorated.

Note: It is not our role as arboricultural consultants to detail the timing and implementation of these measures, although we can input into the process and will need to confirm that the final proposals will not adversely affect retained trees.

17. Arboricultural supervision

An arboricultural consultant should be appointed by the developer to advise on the tree management for the site and to attend:

- a pre-commencement meeting before any work starts;
- regular supervision visits to oversee the agreed tree protection; and
- further supervision visits as necessary to oversee any unexpected works that could affect trees.

More specifically, the form and purpose of the supervision should be as follows:

- **Pre-commencement meeting:** A pre-commencement meeting should be held on site before any of the site clearance and construction work begins. This would normally be attended by the site manager, the arboricultural consultant and a local planning authority ("LPA") representative. In the event that a LPA representative declines to be present, the arboricultural consultant should inform the LPA in writing of the details of the meeting. All tree protection measures detailed in this document should be fully discussed so that all aspects of their implementation and sequencing are understood by all the parties. This should include agreeing the form and location of the most appropriate combination of fencing and/or ground protection to be used as barriers for the CEZ. Any agreed clarifications or modifications to the consented details will be recorded and circulated to all parties in writing. This meeting is where the details of the programme of tree protection should be agreed and finalised, which should then form the basis of any supervision arrangements between the arboricultural consultant and the developer.

- **General site management:** It is the developer's responsibility to ensure that the details of this arboricultural method statement and any agreed amendments are known and understood by all site personnel. Copies of the agreed documents should be available on site and the site manager should brief all personnel who could have an impact on trees on the specific tree protection requirements. This should be a part of the site induction procedures and written into appropriate site management documents.

- **Ongoing supervision of operations that could affect trees:** Once the site is active, the arboricultural consultant should visit at an interval agreed at the pre-commencement site meeting. This would normally be every two to four weeks for general supervision, but could be at a longer interval if agreed between the parties. The supervision arrangement should be sufficiently flexible to allow the supervision of all sensitive works as they occur. The arboricultural consultant's initial role is to liaise with the developer and the LPA to ensure that protective measures are fit for purpose and in place before any works start on site. Once the site is working, that role should switch to monitoring compliance with arboricultural planning conditions and advising on any tree problems that arise or modifications that become necessary.

Section 2: Arboricultural method statement

18. Summary of the tree issues to be project managed by the supervising arboriculturist

In overview, it is anticipated that arboricultural input is likely to be needed for the following operations:

1. Pre-commencement meeting
2. Preliminary tree felling and pruning
3. Installation of CEZ barriers (fencing and/or ground protection)
4. Pollution control near retained trees
5. Load restrictions near retained trees
6. Installation of new surfacing and/or upgrading of existing surfacing in RPAs
7. Installation of new structures in RPAs
8. Installation of new services and/or upgrading of existing services in RPAs
9. Upgrading existing soft landscaping or replacing existing surfacing or structures with new soft landscaping
10. Removal of protective measures
11. Tree planting and general landscaping

19. Table 5: Suggested programme of arboricultural supervision during the development process

Finalising tree management details after consent, but before work starts	
Action	**Arboricultural input**
Review of tree protection and any emerging design issues that may affect trees with the construction team	• Meeting/discussion with relevant members of the developer's team to explain the extent of the tree constraints • Review working space requirements to consider barrier and ground protection adjustments to improve site functionality • Review drainage proposals and identify potential conflicts with RPAs • Review any post-consent layout changes that may affect trees • Review all works within RPAs that may affect trees • Identify any potential conflicts and work towards resolutions • Preparation of working drawings, if necessary
Review consented tree protection proposals for discussion at pre-commencement meeting	If necessary: • prepare revised plans and specifications • liaise with LPA to discuss modifications
Briefing landscape architect on restrictions imposed on new landscape design by RPAs	• Advise landscape architect of the RPA locations, the restrictions to landscaping activity that applies and the details of agreed new tree planting • Review the final landscaping proposals to identify any conflicts between tree protection and landscaping
Pre-commencement site meeting with supervising arboriculturist, site manager and the LPA representative (if appropriate)	• Meeting on site • Agree detail of supervision requirements, i.e. frequency of visits and reporting • Review any updated proposals • Review tree protection, if already installed

Site operations before work starts on site	
Action	**Arboricultural input**
Tree works carried out	• Review the site requirements with the tree work contractor
Installation of tree protection for agreement by the LPA	• If appropriate, preparation of any revised plans and specifications for agreement by the LPA • Photographs showing relevant aspect of installed tree protective measures • Liaise with the contractor installing protection until satisfactorily completed
Demolition	• Liaise with the demolition contractor about tree protection

Operations that could affect trees during construction	
Action	**Arboricultural input**

Section 2: Arboricultural method statement

Operations that could affect trees during construction	
Action	**Arboricultural input**
Installation of new special surfacing within RPAs, but outside barriers	• Meeting with contractor for briefing before installation, with further supervision visits as necessary at the discretion of the arboricultural consultant
Installation of new structures	• Meeting with contractor for briefing before work starts, with further visits as necessary at the discretion of the arboricultural consultant
Removal of barriers and ground protection	• Meeting with contractor for briefing before work starts, with further visits as necessary at the discretion of the arboricultural consultant • **NOTE:** This should only be authorised once there is no risk of RPA damage from the construction activity
Installation of new custom designed structures inside barriers after barriers have been removed	• Meeting with contractor for briefing before installation, with further visits as necessary at the discretion of the arboricultural consultant
Installation of new services	• Meeting with contractor for briefing before work starts, with further visits as necessary at the discretion of the arboricultural consultant

Operations that could affect trees after construction is completed	
Action	**Arboricultural input**
New tree planting	• Check tree size, species, quality, handling, site preparation and planting comply with the specification
Soft and hard landscaping	• Meeting with contractor for briefing before work starts, with further visits as necessary at the discretion of the arboricultural consultant
Tree planting maintenance	• Liaise with landscape contractor to check maintenance complies with the specification

The precise order and timing of some of these operations may change due to site operating requirements, but all operations that could affect trees should remain under arboricultural supervision.

20. Tree works

In most situations, the tree works need to be carried out before the main construction activity starts. Tree works, based on our assessment of the proposal and the original site inspection, are set out in the work recommendations column of the tree schedule in Appendix 2. The location of each tree by number is shown on the tree protection plan and any to be removed are indicated with a red number and red crown outline. All tree works must be reassessed before any site activity starts as part of the standard risk management process.

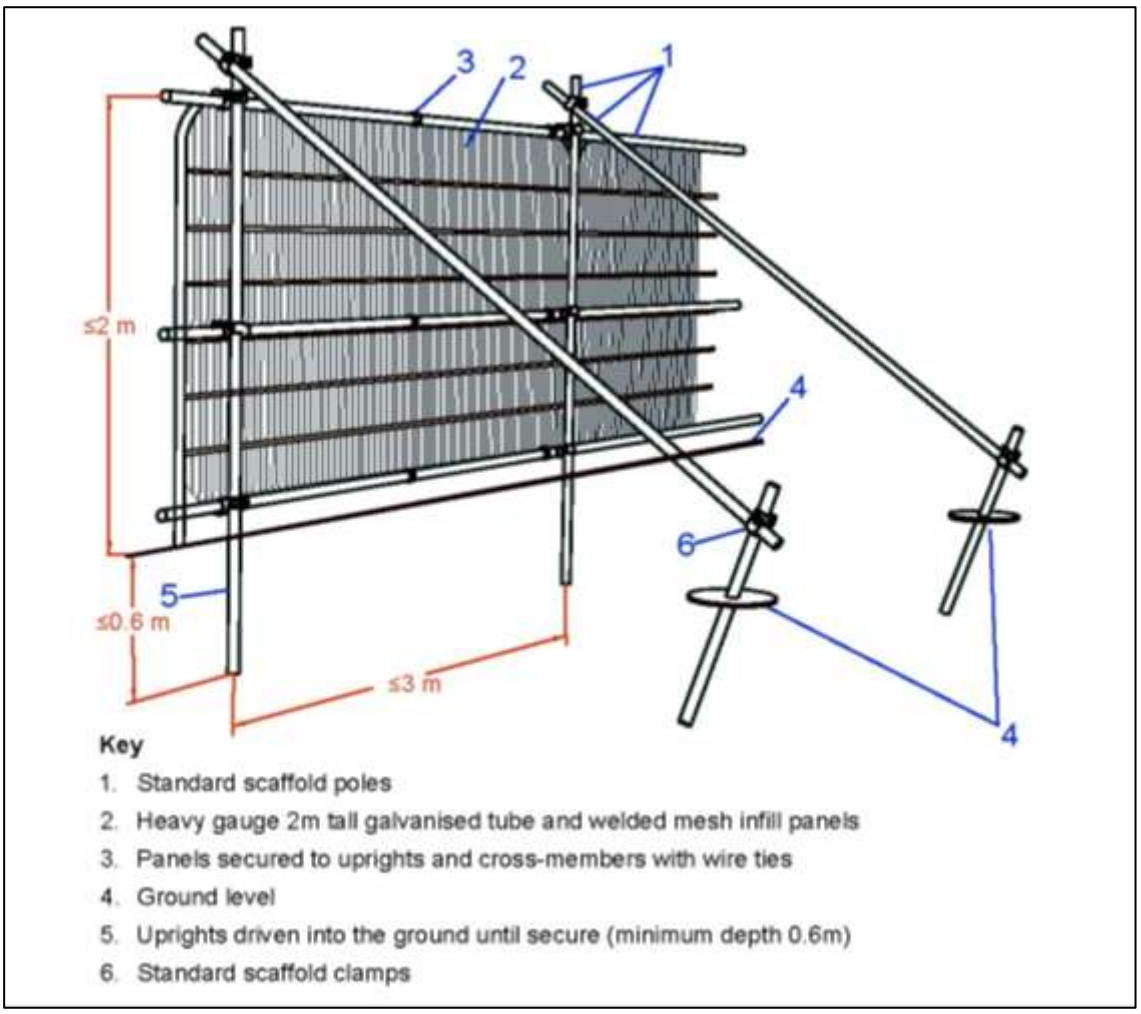
21. Primary tree protection using fencing

The CEZ is the RPA surrounding retained trees that must be protected from any disturbance by the construction activity. In practice, this can be done by any combination of fencing and ground protection, to be finalised and agreed at the pre-commencement meeting. Whether the CEZ is protected by fencing or ground protection, all the protective measures should be installed before the start of any site works that could affect trees. No protective measures should be removed or temporarily dismantled without consulting the supervising arboriculturist. Furthermore, the condition of all the protective measures should be regularly monitored to ensure they remain fit for purpose. The main means of preventing damage to trees and their RPAs in the CEZ are fencing, barriers and ground protection.

Protective fencing should be installed at the locations shown on the tree protection plan by the heavy black dashed line. If agreed with the LPA, fencing can be set back to improve access, provided the exposed ground is protected with ground protection. Various fencing options are illustrated in Fencing images 1–6. The minimum specification for the fencing should be as described in figure 2 of BS 5837 (Fencing image 1) or an equivalent design that effectively restricts access to the RPA it protects.

Section 2: Arboricultural method statement

The precise form of the fencing can vary, provided it is fit for purpose in that it effectively restricts access and damaging activities within the RPA that it encloses. More specifically, behind the fencing, there should be no vehicular access; no fires; no storage of excavated debris, building materials or fuels; no mixing of cement; no service installation or excavation; no raising or lowering of soil levels; and no excessive cultivation for landscape planting. Any variations to these restrictions should be agreed by the supervising arboriculturist.



Fencing image 1: Recommendations taken from figure 2 of BS 5837.

Fencing image 2: Heras fencing wired to scaffold braced posts is a robust and effective interpretation of the BS specification.

Fencing image 3: Close up of bracing detail, essential for increasing the stability of the vertical framework.

Fencing image 4: Board specification on secure wooden posts is a suitable alternative to the standard braced scaffold design.

Where individual trunks or branches are vulnerable to impact damage, a framework of scaffold or wood can be constructed to provide protection (Fencing images 5 and 6).

Fencing image 5: A scaffold-braced framework surrounding the trunk reduces the risk of accidental impact.

Fencing image 6: Board secured to scaffold framework adds another layer of protection for vulnerable trunks and branches

22. Primary tree protection using ground protection

Where it is not practical to protect the CEZ by the use of fencing alone, BS 5837 (6.2.3) allows for the fencing to be set back and the soil protected by ground protection. This allows improved access during construction, with the ground protection preventing damage to the CEZ outside the protection of the fencing. A range of methods can be used, including retaining existing hard surfacing or structures that already protect the soil, installing new materials, or a combination of both. Whatever the choice of method, the end result must be that the underlying soil (rooting environment) remains undisturbed and retains the capacity to support existing and new roots. Ground protection images 1–8 illustrate a range of practical surface coverings that can effectively protect CEZs of retained trees.

Section 2: Arboricultural method statement

Ground protection image 1: Heavy-duty plywood set onto a compressible woodchip layer and pinned into position is suitable to spread the loading from pedestrian access.

Ground protection image 2: Spreading soil excavated from footings is an effective way of buffering the plywood surface from the wear of light vehicles.

Ground protection image 3: Plywood fixed to a wood frame is another effective method of protecting soil from pedestrian compaction.

Ground protection image 4: A scaffold framework attached to the main scaffold fencing can be used to support either scaffold planks or plywood to create an elevated platform with a gap beneath.

Ground protection image 5: Cellular products are a very effective means of providing ground protection where heavy vehicle use is expected. Here, it is being used to temporarily widen an existing road, to be removed once the construction is finished.

Ground protection image 6: Custom designed sectional tracks can be joined to support very heavy traffic use through sensitive areas.

Ground protection image 7: A combination of retaining existing surfacing and using temporary construction cabin accommodation can be a very effective means of preventing damage to sensitive areas.

Ground protection image 8: Steel plates can be an effective way of temporarily reinforcing weak surfacing over a construction access during the development activity.

On this site, all the precautionary areas annotated with yellow shading on the tree protection plan should be protected with ground protection while vulnerable to damage, in line with the above examples. Where appropriate, any existing hard surfacing can be retained and utilised. Any surfacing to be retained that is disrupted during the course of the construction activity can be replaced, reconditioned or upgraded as necessary. This work should be subject to arboricultural supervision.

23. Extra precautions – pollution control near retained trees

The following guidance should be applied wherever risk assessment identifies a significant risk of chemical pollution.

Spilt chemicals that can soak into RPAs will kill existing roots and may prevent new roots growing, so provision must be made to minimise the risk of contamination to soil within the normal risk management protocols for the site. This would normally include means of containing spillages and procedures for clearing them up if they occur (Pollution image 1). All cement mixing and vehicle washing points must be located outside RPAs, with provision to contain any spillages. Where the contours of the site create a risk of polluted water or toxic liquids running into RPAs, a precautionary measure of bunding or a frame, sealed with heavy-duty plastic sheeting sufficient to prevent contamination (Pollution image 2), must be used to contain accidental spillages.

Pollution image 1: Where fuel or other chemicals are stored on site, it is now standard practice to have emergency spillage kits available to restrict the environmental impact of accidents.

Pollution image 2: Soil bunding or a supporting framework covered in heavy-duty plastic sheeting is essential where there is a risk of spillages contaminating RPAs. This specifically applies to cement mixing areas and vehicle washing facilities.

24. Extra precautions – cranes near retained trees

Temporary construction cranes can also damage branches and provision should be made to ensure they cannot come into direct contact with tree crowns. On this site, this guidance will be applied to the installation, daily use and removal of the site crane.

25. Extra precautions – vehicle restrictions near retained trees

Abnormally high loads can damage low branches. This can be controlled by limiting the size of access vehicles with a height restriction bar across the access and unloading materials outside sensitive areas. On this site, this guidance will be applied to all vehicles entering the site through the main access routes.

26. Extra precautions – excavation in RPAs

Precautionary areas are RPAs outside the fencing, i.e. they are areas where construction activity can take place, but it must be carried out with care to avoid damaging the sensitive rooting environment. BS 5837 (7.2) makes provision for excavating in RPAs, explaining that all excavation must be carried out carefully using hand-held tools and preferably by compressed air soil displacement, taking care not to damage the bark and wood of any roots (Excavation images 1–4).

All soil removal must be done with care to minimise the disturbance of roots beyond the immediate area of excavation. Where possible, flexible clumps of smaller fibrous roots should be retained if they can be displaced temporarily or permanently beyond the excavation without damage. If digging by hand, a fork should be used to loosen the soil and help locate any substantial roots. Once roots have been located, the trowel should be used to clear the soil away from them without damaging the bark. Exposed roots to be removed should be cut cleanly with a sharp saw or secateurs 10–20cm behind the final face of the excavation. Roots temporarily exposed must be protected from direct sunlight, drying out and extremes of temperature by appropriate covering such as dampened hessian sacking (Excavation image 4). If necessary, roots less than 2.5cm in diameter can be cut cleanly without consultation with the supervising arboriculturist. Roots greater than 2.5cm in diameter should be retained where possible and only cut after consultation with the supervising arboriculturist.

Excavation image 1: Careful hand-digging using conventional tools is acceptable for exposing roots in RPAs.

Excavation image 2: Air spades are very effective at exposing roots and services with minimal damage.

Excavation image 3: Air spades are particularly useful where roots are very dense.

Excavation image 4: Exposed roots must be protected from light, drying out and extremes of temperature by covering with hessian sacking and boards until they can be covered back with soil.

27. Removal of existing hard surfacing and structures in RPAs

For the purposes of this guidance, the following broad definitions apply:

- **Hard surfacing:** Any hard surfacing used as a vehicular road, parking or pedestrian path including tarmac, solid stone, crushed stone, compacted aggregate, concrete and timber decking. This does not include compacted soil with no hard covering.
- **Structures:** Any man-made structure above or below ground including service pipes, walls, gate piers, buildings and foundations. Typically, this would include drainage structures, car-ports, bin stores and concrete slabs that support buildings.

Roots frequently grow adjacent to and beneath existing surfacing and structures, so great care is needed during access and demolition. Damage can occur through physical disturbance of roots and/or the compaction of soil around them from the weight of machinery or repeated pedestrian passage. This is not generally a problem whilst surfacing and structures remain in place because they spread the load on the soil beneath and further protective measures are not normally necessary. However, once that protection is removed and the soil below is newly-exposed, the potential for damage to roots becomes an issue. In summary, there should be no vehicular or repeated pedestrian access unless existing ground protection is retained or new protective measures are installed (Hard surfacing/structure removal image 1). All exposed RPAs must be protected until there is no risk of damage from the development activity.

Hard surfacing/structure removal image 1: Ground protection must be used where repeated foot or vehicle traffic could cause compaction in sensitive RPAs. It can be as simple as plywood for pedestrians, but must be more robust for vehicles.

Hard surfacing/structure removal image 2: Machines with a long reach can be used to lift out heavy surfacing and structures as long as the machine sits outside the RPA and the exposed surface is protected before there is any further access.

Removing existing surfacing and structures is a high-risk activity for any adjacent roots and the following guidance must be observed:

1. Appropriate tools for manually removing debris may include a pneumatic breaker, crow bar, sledgehammer, pick, mattock, shovel, spade, trowel, fork and wheelbarrow (Images 3 and 4 below). Secateurs and a handsaw must also be available to deal with any exposed roots that have to be cut.
2. Machines with a long reach may be used if they can work from outside RPAs or from protected areas within RPAs (Image 2 above), but they must not encroach onto unprotected soil in RPAs.
3. Debris to be removed from RPAs manually must be moved across existing hard surfacing or temporary ground protection in a way that prevents compaction of soil. Alternatively, it can be lifted out by machines, provided this does not disturb RPAs (Image 2 above).
4. Great care must be taken throughout these operations not to damage roots as set out in the above paragraph on excavation and dealing with roots.
5. If appropriate, leaving below ground structures in place should be considered if their removal may cause excessive root disturbance.

Hard surfacing/structure removal image 3: Careful lifting of cemented-in sets round this tree allowed them to be re-laid on a permeable sand base, improving the water input into the soil around the trunk.

Hard surfacing/structure removal image 4: These trees had impermeable surfacing right up to their trunks, which had to be removed by hand before installing new structures.

28. Extra precautions – installation of new surfacing in RPAs

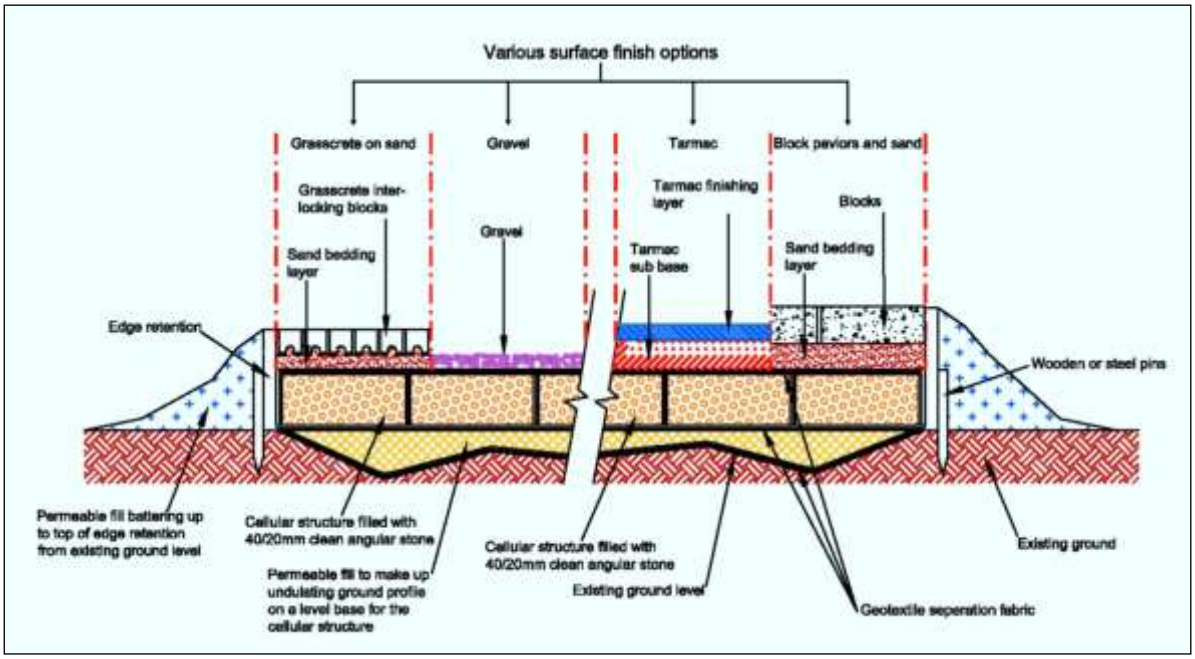
The following guidance will be applied to trees **4, 22, 43, 44, 80 and 81** which are shown on the tree protection plan.

BS 5837 (7.4) confirms that new surfacing can be installed within RPAs, but it has to be carried out with care. These operations are potentially damaging to trees because they may require changes to existing ground levels, resulting in localised soil structure degradation and/or disrupt the efficient exchange of water and gases in and out of the soil. Older trees are much more prone to suffer from such changes than young and maturing trees. Adverse impact on trees can be reduced by minimising the extent of these changes in RPAs. Generally, the most suitable surfacing will be relatively permeable to allow water and gas movement, load spreading to avoid localised compaction and require little or no excavation to limit direct damage. The actual specification of the design is an engineering issue that needs to be considered in the context of the bearing capacity of the soil, the intended loading and the frequency of loading. The detail of product and specification are engineering issues and must be provided by appropriate specialists.

Cellular confinement systems

BS 5837 (7.4.2.) sets out that no-dig, three dimensional cellular confinement systems can be used as the basis for extending hard surfacing into RPAs. It is our experience

(www.barrelltreecare.co.uk/case-studies/SurfacingNearTrees.pdf) that this type of surfacing can be installed in the majority of situations without any significant adverse impact on adjacent trees, provided that proper consideration is given to all the circumstances. Most of our experience is with the CellWeb system supplied by Geosynthetics Ltd (www.geosyn.co.uk) and because of its sustained good performance over time, this is our preferred choice of product. The product is made from heavy-duty plastic that can be pulled apart to open into cells. These are then filled with washed stone, after the product is spread over the ground and pinned in place. This forms a base layer that acts as a floating raft, spreading the load across the whole construction width. The base layer can be topped with a variety of finishes as illustrated in New surfacing image 1. New surfacing images 2 and 3 show the product spread over the ground and then filled with stone to produce the base layer.



New surfacing image 1: This conceptual cross-section illustrates the structural elements of the system and the multiple surfacing options that can be used with it.

New surfacing image 2: The three-dimensional cells are opened up, spread across the area to be surfaced and pinned in place ready for the stone filling.

New surfacing image 3: The stone-filled cells spreads the load of traffic and the geotextile membrane on the ground prevents migration of the stone into the soil profile.

Dealing with undulating surfaces and establishing a tolerable level of excavation

The precise location and depth of roots within the soil is unpredictable and will often only be known when careful digging starts on site. Ideally, all new surfacing in RPAs should be no-dig, i.e. requiring no excavation whatsoever, but this is rarely possible on undulating surfaces. New surfacing normally requires an evenly graded sub-base layer, which can be made up to any high

points with granular, permeable fills such as crushed stone or sharp sand. This sub-base must not be compacted as would happen in conventional surface installation. Some limited excavation is usually necessary to achieve this and need not be damaging to trees if carried out carefully and large roots are not cut. Tree roots and grass roots rarely occupy the same soil volume at the top of the soil profile, so the removal of an established turf layer up to 5cm is unlikely to be damaging to trees. However, this may not be possible where there is no grass because tree roots may grow right up to the soil surface. In some situations, it may be possible to dig to a greater depth depending on local conditions, but this would need to be assessed by an arboriculturist if excavation deeper than 5cm is anticipated.

On undulating surfaces, finished gradients and levels must be planned with sufficient flexibility to allow on-site adjustment if excavation of any high points reveals large unexpected roots near the surface. If the roots are less than 2.5cm in diameter, it would normally be acceptable to cut them and the gradient formed with the preferred minimal excavation of up to 5cm. However, if roots over 2.5cm in diameter are exposed, cutting them may be too damaging and further excavation may not be possible. If that is the case, the surrounding levels must be adjusted to take account of these high points by filling with suitable material. If this is not practical and large roots have to be cut, the situation should be discussed with the supervising arboriculturist before a final decision is made.

Sub-base and finishing layers

Once the sub-base has been formed, the load spreading construction is installed on top without compaction. In principle, the load spreading formation will normally be cellular and filled with crushed stone, although the detail may vary with different products. Suitable surface finishes include washed gravel, permeable tarmac or block paviours set on a sand base (New surfacing image 1). However, for lightly loaded surfacing of limited widths (<3m) such as pedestrian paths, pre-formed concrete slabs may be appropriate if the sub-base preparation is as set out above.

Edge retention

Conventional kerb edge retention set in concrete-filled excavated trenches is likely to result in damage to roots and should be avoided. Edge retention in RPAs must be designed to avoid any significant excavation into existing soil levels (BS 5837, 7.4.3) and there are a number of approaches that are fit for this purpose. For block paviours, the use of pre-formed edging secured by metal pins is effective and can be reinforced by concrete supports as long as there is no excavation into the soil (New surfacing image 4). Railway sleepers (New surfacing image 5) pinned in place or wooden boards (New surfacing image 5) are two options, depending on the expected loading of the surfacing. A permeable soil fill can then be used to batter the grade back down to the existing soil level.

New surfacing image 4: A conventional concrete haunching can be used to retain new surfacing as long as it is not dug into a trench - here it is placed on top of the CellWeb layer.

New surfacing image 5: Although this is only a temporary surface, railway sleepers pinned into the ground can be used to retain the edges of new surfacing.

New surfacing image 6: Wooden board pinned in place or held in position with backfilled topsoil can provide more informal and rustic surface edging.

New surfacing image 7: In some situations, it may be appropriate to cast a free floating concrete surface directly onto the soil surface provided provision is made to prevent soil contamination while the concrete is being poured, i.e. an impermeable membrane separating the concrete from the soil.

Footpaths and surfacing without a load-spreading base layer

In some situations, limited-width floating concrete rafts constructed directly onto the soil surface may be acceptable for both pedestrian (New surfacing image 7) and vehicular access (New surfacing image 8), but the design must not include any strip-dug supports. If concrete is poured directly, precautions must be taken to ensure that no toxic fluids can contaminate the adjacent soil. Alternatively, elevated paths supported on low impact frames or post supports allow a decking surface to cross sensitive areas (New surfacing images 9 and 10). Where paths are installed very close to trunks, provision must be made for distortion from future root growth by selecting flexible components for the supporting frame and surfacing (New surfacing image 11).

New surfacing image 8: This temporary access for heavy construction traffic on the outer edge of a RPA is a concrete slab cast above ground level and will be removed when the project is completed.

New surfacing image 9: Board walks supported on posts or a light frame are another way of providing pedestrian access across sensitive RPAs (photo courtesy of Philip van Wassenaer).

New surfacing image 10: New surfacing can be supported above the ground on posts leaving the soil surface beneath undisturbed.

New surfacing image 11: Where surfacing is needed close to rapidly growing buttress roots, a light metal frame with rubberised surfacing will allow the path to distort without cracking as the roots grow.

29. Extra precautions – upgrading of existing surfacing in RPAs

It is proposed to retain any existing surfacing for the duration of the main building works and upgrade them at the end of the project. It is likely that any new surfacing will be installed either directly on top of the existing, or a thin layer will be skimmed off the current level and the new surfacing installed on top of the existing sub-base. Normally, this will not result in significant excavation that could expose roots and so special precautions are not necessary. However, if roots are found, then they should be retained and worked around rather than cutting them. All these works will be carried out by hand taking care not to damage any existing roots.

In some instances, existing surfacing can be retained and used as a base for new surfacing. Normally, this will not result in significant excavation that could expose roots and so special precautions are not necessary. However, if large roots already protrude above the proposed sub-base level, then the precautions and procedures set out above must be observed. If the retained surfacing is impermeable, it may improve conditions for tree roots if it is punctured before the new surfacing is laid, but this is detail that should be agreed with the supervising arboriculturist.

30. Extra precautions – installation of new structures in RPAs

The following guidance will be applied to **group 31 and trees 43 and 81**, which are shown on the tree protection plan.

New structures in RPAs are potentially damaging to trees because they may disturb the soil and disrupt the existing exchange of water and gases in and out of it. Mature and over-mature trees are much more prone to suffer because of these changes than young and maturing trees. Adverse impact on trees can be reduced by minimising the extent of these changes in RPAs. This can be done by constructing the main structures above ground level on piled supports and redirecting water to where it is needed. The detailed design and specification of such structures is an engineering issue that should be informed and guided by tree expertise.

Small sheds, carports and bin stores

Light structures do not normally require substantial foundations and can have permeable bases. Ideally, their bases should be of a no-dig, load-spreading construction set directly on to the soil surface. They require a flat base and so an undulating site will need levelling to provide a suitable surface. Excavation of any high points by up to 5cm and filling depressions with permeable fill to provide a flat base will normally be acceptable provided no roots greater than 2.5cm in diameter need to be cut. If large roots are found, the preferred course of action would be to raise the base level of the structure by filling rather than cutting roots. However, if this is not practical and large roots have to be cut, the situation should be discussed with the supervising arboriculturist before a final decision is made. Light covering structures can be fixed onto a frame that can rise directly

from the base or be fixed to supports either banged into the ground or set in carefully dug holes (New structure image 1). Provided the supports are well spaced, i.e. greater than 1.5m apart, and of a relatively narrow diameter, i.e. not in excess of 15cm, it is unlikely they will cause any significant disturbance to RPAs (New structure image 2).

New structure image 1: These carports are formed by wooden posts above a three dimensional cellular no-dig and load-spreading surface of permeable crushed stone.

New structure image 2: This deck supported above the ground on small posts provides a low-impact alternative to conventional stone patio surfacing in RPAs.

New foundations for free-standing walls, gate piers, buildings and bridges

Conventional strip foundations in RPAs for any significant structure may cause excessive root loss and are unlikely to be acceptable. However, BS 5837 (7.5) confirms special engineered foundations can be used in RPAs. Damaging disturbance can be significantly reduced by supporting the above ground part of the structures on small diameter piles and beams or cast floor slabs set above ground level (New structure images 3 and 4). The design should be sufficiently flexible to allow the piles to be relocated if significant roots are encountered in the preferred locations (New structure images 5 and 6). Before the actual installation of the new structure starts, any vulnerable RPA should be protected by temporary ground protection as set out above (New structure image 6). At expected pile or gate pier locations, gaps in the ground protection should be left to allow access to the soil beneath. The preferred pile locations should be carefully excavated to a depth of 60cm to establish if there are any significant roots over 2.5cm in diameter that could be damaged. If significant roots are found, they should be dealt with as set out above or the pile location may have to be moved slightly (New structure image 5).

Once the piles have been installed, the ground protection is usually removed ready for the installation of the slab supporting the structure (New structure images 7 and 8). It is important to note that the lowest points of the new structure, i.e. the underside of the main slab and any pile-capping beam must be above the ground level between the piles and there should not be any further excavation. The supported structure base can be pre-cast and imported to the site ready to fix or can be cast in position using shuttering for the sides and a biodegradable void-former for the base (New structure image 9). BS 5837 (7.5.4) recommends that where impermeable structures cover significant proportions of RPAs, it may be necessary to provide water input through redirecting roof drainage beneath the supporting slab (New structure image 10).

Section 2: Arboricultural method statement

New structure image 3: Small diameter piles (less than 150mm) are an effective means of supporting structures in RPAs with minimal disturbance.

New structure image 4: It is possible to support very large structures on piles within sensitive RPAs without any significant adverse impact on tree roots.

New structure image 5: Where piles are proposed close to trunks, it is essential to excavate 50–75cm deep to see if there are any significant roots in the way, with provision to move the pile location if roots are found (note the pile was finally installed to avoid this root).

New structure image 6: Ground protection must be used to spread the load of the piling rig once excavation has confirmed that no substantial roots are in the preferred pile location.

New structure image 7: Once the piles have been installed (yellow tops), the ground protection to support the piling rig is removed ready to fix the void-former onto the bare soil, in advance of pouring the building slab.

New structure image 8: Piles can also be used to support bridges across sensitive RPAs, but the temporary ground protection has to be removed before the main structure is either imported in or cast on site.

New structure image 9: Where a slab is cast on site, a biodegradable void-former (red arrow) temporarily supports the weight of the liquid concrete until it sets. The void-former can then be wetted and washed away to leave a void or left to degrade naturally, both of which allow movement of air beneath the slab.

New structure image 10: This reinforced base slab for a double garage has drainage provision (red arrow) beneath the structure to redirect roof runoff to supply roots with water.

Gate piers generally require larger holes and have less flexibility for relocation if large roots are found. Localised loss of roots may be unavoidable, so each situation should be assessed on its own merits by the supervising arboriculturist once the careful excavations have been completed. When installing any of these structures, the ground protection must remain in place until the construction is completed and there is no risk of damage to RPAs.

Walls on existing foundations and retaining walls

A free-standing wall on an existing foundation is unlikely to require any additional excavation and so its construction should have no adverse impact on RPAs if the appropriate ground protection is in place while the new wall is being built. However, replacing existing walls or constructing new walls that retain the soil of RPAs normally requires some limited excavation back into the exposed soil face to provide a working space of at least 10–20cm behind the inside wall face. This should be done carefully and limited to no more than required to construct the new wall. Any roots found should be dealt with as set out above. Once the wall is completed, any voids behind it should be filled with good quality top soil and firmed into place, but not over compacted. Specific difficulties with large roots that are found during the course of the construction should be referred to the supervising arboriculturist.

31. Extra precautions – installation of new services and/or upgrading of existing services in RPAs

The following guidance will be applied to trees **16, 24, 25, 26, G31, 72 and 73**, which are shown on the tree protection plan.

Excavation to upgrade existing services or install new services in RPAs may damage retained trees. Where possible, all services should be outside RPAs and installation in RPAs should only be chosen as a last resort. If installation within RPAs is being considered, as advised in 4.1.3 of the NJUG guidance, the decision should be made in consultation with the LPA or the supervising arboriculturist before any work is carried out. If service installation is agreed within RPAs, the NJUG protocol as set out in 4.1.3 of its guidance should be used to decide the most appropriate method. In summary, this sets out that "*Acceptable techniques in order of preference are; a) trenchless, … b) Broken trench – hand-dug … c) Continuous trench – hand-dug*". If trenchless methods are to be used, there is normally a starting pit and a finishing pit that have to be dug at each end of the service run and these must be outside RPAs (Services image 1). Where a hand-digging option is agreed (Services image 2), any roots discovered during the excavations should be dealt with as explained above. Where possible, backfilled material around excavated services must not be heavily compacted, with specific advice provided in 4.1.5 of the NJUG guidance.

Services image 1: If possible, thrust boring is the preferred option for installing service routes through the RPAs of important trees, but there has to be space at the start and finish to dig substantial working pits.

Services image 2: Continuous trenches dug by hand so that important roots can be retained (with the service ducting threaded beneath) is an effective means of minimising damage (note the ground protection boards with soil piled on top on the left).

32. Extra precautions – upgrading existing soft landscaping or replacing existing surfacing or structures with new soft landscaping

This guidance should be applied wherever new landscaping is installed near retained trees.

For the purposes of this guidance, soft landscaping includes the re-profiling of existing soil levels and covering the soil surface with new plants or an organic covering (mulch). It does not include the installation of new structures or compacted surfacing, which are considered as substantial works and covered in the preceding sections of this document.

Soft landscaping activity after construction can be extremely damaging to trees. No significant excavation or cultivation, especially by rotovators, should occur within RPAs. Where new designs require levels to be increased to tie in with new structures or the removal of an existing structure has left a void below the surrounding ground level, good quality and relatively permeable top soil should be used for the fill. It should be firmed into place, but not over compacted, in preparation for turfing or careful shrub planting. Ideally, all areas within 1m of tree trunks should be kept at the original ground level and have a mulched finish rather than grass to reduce the risk of mowing damage (Landscaping images 1 and 2).

Landscaping image 1: The RPA of this tree was not effectively protected during construction and excessive compaction of the soil meant it died soon after this turf covered up the damage.

Landscaping image 2: This tree had tarmac parking within its RPA that was removed and replaced with an organic mulch near the trunk and limited no-dig surfacing on the outer edges of its RPA.

33. Tree planting

For this site, a comprehensive new landscaping scheme has been designed by Barton Willmore that includes heavy standard and semi-mature trees. It would be appropriate for the precise detail to be agreed with the LPA through a planning condition.

All trees should be supplied, planted and maintained strictly in accordance with BS 8545. Any trees that die or progressively decline within five years will be replaced and those replacements will be maintained until independent in the landscape. More information on the supply of large trees can be found at www.hillier.co.uk, www.barcham.co.uk and www.civictrees.co.uk.

34. Structural tree soil

Structural tree soil is a man-made growing medium for trees with a high proportion of angular stone, which provides support for surfacing above while still maintaining voids that roots can grow in. It allows surfacing to be installed close to trees and for roots to establish beneath, making it suitable for growing trees in parking areas (Structural soil images 1 and 2). It is generally installed to a depth of about 1m, and filled in layers of about 300mm that can be progressively compacted to provide sufficient bearing for the new surfacing, without compromising future root growth. It is sometimes call tree sand or Amsterdam tree soil, and an internet search on either of these names will identify local suppliers. Three commercial suppliers can be found at www.landtechsoils.co.uk, www.treesand.co.uk and www.woodlandhp.co.uk.

Structural soil image 1: Structural tree soil retains sufficient structure for tree roots to grow, even when compacted.

Structural soil image 2: It allows trees to be successfully established in areas of extensive hard surfacing, with very little, if any, loss of parking space.

35. Soil cells and root deflectors

Section 2: Arboricultural method statement

It is possible to establish trees in fully paved areas using structural supports that protect the soil beneath the surface from being compacted. These are effectively large containers made of concrete or combinations of metal and plastic, which support the surface above and any loads it has to carry. They are filled with soil to provide a viable rooting environment for trees, allowing large trees to provide sustainable amenity in highly urbanised settings. Such systems also have the added advantage that they allow storage of rainwater, significantly reducing the rate of flow of water from paved areas during peak periods. One of the most widely used systems is the DeepRoot Silva Cell (www.deeproot.com) (Soil cell images 1–4), but other products are available.

Soil cell image 1: The individual Silva Cells can be assembled in layers and service ducting threaded through before filling with soil and fitting the reinforced tops.

Soil cell image 2: Drainage from adjacent buildings can be directed into Silva Cells, significantly buffering rainwater runoff from urbanised areas.

New trees planted near surfacing can cause distortion damage from root growth if the appropriate precautions are not taken. Problems of this nature can be significantly reduced by installing root deflectors around the rootballs of new trees at the time of planting (image 4 below). New roots growing out from the rootball meet the plastic profiled surface, deflecting them downwards, where they grow outwards at a lower level. Although they do eventually grow back near the surface, the onset of any damage is significantly delayed and it is usually far enough away from the trunk for remedial works to be carried out without seriously affecting the stability of the tree. However, these products are not suitable for all situations, especially on shallow soils, and so their use should always be considered very carefully in the context of individual site conditions. Try www.deeproot.com and www.greenleaftrees.co.uk, or internet search on 'root deflectors' for more information on products.

Soil cell image 3: The finished surfacing is profiled to leave the tree pit open, ready to be filled with good quality topsoil and the new tree.

Soil cell image 4: This excavated tree shows the root deflectors that were installed when it was planted seven years previously. The product has deflected roots downwards and prevented damage to the adjacent surfacing. Note that this is a permeable sandy soil and the roots were able to grow beneath the bottom of the deflectors.

36. Removal of protection

All protective barriers must remain in place until the construction activity is finished and there is no realistic risk of damage to the protected soil surfaces.

Section 3
Appendices

Appendix 1: Background administrative information, data collection and any additional relevant information

37. Table 6: Background administrative information

	Background administrative information
Report date & reference	18/08/17 – 16050-AA-MW
Tree protection plan reference	BT4
Our instructing client	Quantum Group
Our instructions	Visit the site, assess the relevant trees, prepare a schedule of their details, describe the impact of the proposal on those trees and identify the tree protection issues in an arboricultural method statement confined to the heads of terms
Provided documents	Topographical drawing LDS/13279-TP1, Layout, drawing number 900-P200 received by email 14 August 2017, drainage layout numbers 3336 005 Rev P3, 3336 006 Rev P3, 3336 007 Rev P3, and 3336 008 Rev P3 received by email on 14 August 2017. Section diagrams 3336 055 Rev P1 received by email on 18 July 2017.
Report author and credentials	Mark Wadey is a Chartered Forester (www.charteredforesters.org) and an AA Registered Consultant (www.trees.org.uk), and fully qualified to undertake the assessments in this report. Further details of his credentials can be found at http://www.barrelltreecare.co.uk/career-summaries/Mark%20CS.pdf.
Report limitations	We have not checked if the trees are protected. If any tree works are proposed before a planning consent is given, then the existence of any statutory protection must be checked with the LPA. This report does not consider ecological or archaeological issues, or any other matter beyond the assessment of the trees.
Technical references	In preparing the analysis in this report, detailed consideration was given to the guidance and advice in the following technical references: • Climate Change Act (2008) www.legislation.gov.uk/ukpga/2008/27/contents • Town and Country Planning Act 1990 http://www.legislation.gov.uk/ukpga/1990/8/contents • National Planning Policy Framework ("NPPF"), published by the DCLG www.gov.uk/government/publications/national-planning-policy-framework--2 • BS 5837 (2012) *Trees in relation to design, demolition and construction – Recommendations*, BSI http://shop.bsigroup.com/ • BS 8545 (2014) *Trees: from nursery to independence in the landscape – Recommendations*, BSI http://shop.bsigroup.com/ • BS 3998 (2010) *Tree work – Recommendations*, BSI http://shop.bsigroup.com/ • *Trees in the Townscape: A Guide for Decision Makers*, published by the Trees & Design Action Group http://www.tdag.org.uk/ • *Trees in Hard Landscapes: A Guide for Delivery*, published by the Trees & Design Action Group http://www.tdag.org.uk/ • National Joint Utilities Group (2007) Volume 4, Issue 2: *Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees* www.njug.org.uk/publications/

38. Table 7: Data collection

	Data collection
Date of site visit	01 March 2016
People present during site visit	Mark Wadey

Appendix 1: Background administrative information, data collection and any additional relevant information

	Data collection
Weather & visibility	Clear, still and dry, with good visibility
Limitations to observations	• Our inspection of the trees for the purposes of assessing their condition and work requirements is made on the basis that they will be annually inspected in the future to identify any changes in condition and review the original recommendations. For these reasons, the tree assessment advice only remains valid for one year from the date that the trees were last inspected. • All observations were of a preliminary nature and did not involve any climbing or detailed investigation beyond what was visible from accessible points at ground level. • Observations of trees outside the site boundaries are confined to what was visible from within the site. • All dimensions were estimated unless otherwise indicated.
Tree location and numbering	Each tree was inspected and the numbering scheme is indicated on the tree protection plan. If appropriate, obvious hedges and groups were identified and numbered. If important trees were found on site that were not included on the provided plan, their approximate positions and canopy extents are indicated on the plan.
Recording of tree data	For each tree and any group or hedge found on site, the information collected was recorded on the tree schedule in Appendix 2 and the tree protection plan.
Compliance of data collection with BS 5837	The data collection is fully compliant with the advice in subsection 4.4.2 of BS 5837. When collecting this information, specific consideration was given to any low branches that may influence future use, age class, physiological condition, structural condition and remaining contribution. Where appropriate, crown spreads were also noted where they differed from those shown on the provided land survey.
Calculation of RPAs	Following the recommendations in Table D1 of BS 5837, the diameter of each tree was rounded up to the next 2.5cm increment, with the radius of a nominal circle and the resultant RPA taken directly from that table. This information is listed for each tree in the tree schedule in Appendix 2.

Appendix 2: Tree schedule and explanatory notes

NOTE: Colour annotation is A & B trees with green background; C & U trees with blue background; trees to be removed in red text.

Tree No	Species	Height (m)	Diameter (cm) @ 1.5m	Maturity	Low Branches	Category	Notes	Tree Works	RPA radius (m)	RPA area (m2)
All retained trees & hedges								Carry out safety check and lift over site to 3-4m as necessary.		
T1	Acacia	6	25	Young	-	C	-	-	3.0	28
G2	Yew	8	45	Maturing	-	B	Some future potential	-	5.4	92
T3	Norway maple	14	42.5*	Maturing	-	B	-	-	5.1	82
T4	Maple sp	15	80*	Mature	-	B	-	-	9.6	290
T5	Oak	4	10	Young	-	C	-	-	1.2	5
T6	Maple sp	15	62.5*	Mature	-	B	-	-	7.5	177
T7	Norway maple	10	30*	Maturing	-	C	One sided form	-	3.6	41
T8	Maple sp	15	47.5*	Maturing	-	B	-	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	5.7	102
T9	Lime	10	55*	Mature	-	B	Old pollard with decay points but forms part of street scene landscape	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	6.6	137
T10	Cotoneaster	5	20	Maturing	-	C	Shrub form	Fell for development	2.4	18
T11	Maple sp	6	20	Young	-	C	-	Fell for development	2.4	18
T12	Lime	10	55*	Mature	-	B	Old pollard with decay points but forms part of street scene landscape	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	6.6	137

Appendix 2: Tree schedule and explanatory notes

Tree No	Species	Height (m)	Diameter (cm) @ 1.5m	Maturity	Low Branches	Category	Notes	Tree Works	RPA radius (m)	RPA area (m2)
T13	Lime	10	55*	Mature	-	B	Old pollard with decay points but forms part of street scene landscape	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	6.6	137
T14	Maple sp	10	32.5*	Maturing	-	B	-	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	3.9	48
T15	Norway maple	18	55*	Mature	-	B	-	-	6.6	137
T16	Norway maple	10	47.5	Maturing	-	C	Two stems, grows into BT cable, topped in past	-	5.7	102
T17	Norway maple	12	47.5	Maturing	-	C	Twin stem, tight fork union at base	-	5.7	102
T18	Norway maple	10	40*	Maturing	-	B	-	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	4.8	72
T19	Maple sp	14	40*	Maturing	-	B	-	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	4.8	72
T20	Oak	10	40	Maturing	-	C	Deformed trunk at base due to poor position close to boundary wall	-	4.8	72
T21	Norway maple	12	42.5*	Maturing	-	B	-	-	5.1	82
T22	Alder	15	50*	Mature	-	B	-	-	6.0	113
T23	Whitebeam	6	30	Maturing	-	C	-	-	3.6	41

Appendix 2: Tree schedule and explanatory notes

Tree No	Species	Height (m)	Diameter (cm) @ 1.5m	Maturity	Low Branches	Category	Notes	Tree Works	RPA radius (m)	RPA area (m2)
T24	Lawson cypress	4	20	Young	-	C	Close to building	-	2.4	18
T25	Goat willow	7	30	Maturing	-	C	Close to building	-	3.6	41
T26	Lawson cypress	5	15	Young	-	C	Close to building	-	1.8	10
T27	Lawson cypress	5	15	Young	-	C	Close to building	-	1.8	10
T28	Lawson cypress	6	20	Young	-	C	Close to building	Fell for development	2.4	18
T29	Norway maple	4	10	Young	-	C	-	-	1.2	5
T30	Birch	9	20	Maturing	-	C	Small tree with some tip dieback	-	2.4	18
G31	Lime	8	55	Mature	-	C	Heavily reduced in size and regularly managed at their current size. Provides some boundary screen.	-	6.6	137
G32	Cypress sp, spruce, fruit sp, birch, pine	5	15	Young	-	C	Provides some boundary screen	-	1.8	10
G33	Lime	12	60	Mature	-	B	Dense ivy over trunk and scaffolds. Reduced in past. Some future potential for screening boundary.	-	7.2	163
T34	Lime	8	35	Maturing	-	C	Smaller tree heavily reduced in past	-	4.2	55
T35	Laurel	5	30	Maturing	-	C	-	-	3.6	41
T36	Elder	4	20	Maturing	-	C	Covered in dense ivy	-	2.4	18
T37	Lime	12	65*	Mature	-	B	Pollarded tree that forms part of the street scene landscape	-	7.8	191
T38	Ash sp	14	55*	Mature	-	B	-	-	6.6	137
T39	Ash sp	7	20	Young	-	C	Small tree	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	2.4	18

Appendix 2: Tree schedule and explanatory notes

Tree No	Species	Height (m)	Diameter (cm) @ 1.5m	Maturity	Low Branches	Category	Notes	Tree Works	RPA radius (m)	RPA area (m2)
T40	Unknown sp	5	5	Young	-	C	Small tree	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	0.6	1
T41	Lime	14	70*	Mature	-	B	Pollarded tree that forms part of the street scene landscape	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	8.4	222
T42	Lime	14	82.5*	Mature	-	B	Pollarded tree that forms part of the street scene landscape	Remove subject to consultation with LPA regarding visibility splays. Refer to transport assessment	9.9	308
T43	Ash sp	14	40*	Maturing	-	B	-	-	4.8	72
T44	Lime	15	75*	Mature	-	B	Pollarded tree that forms part of the street scene landscape	-	9.0	254
T45	Unknown sp	4	5	Young	-	C	-	-	0.6	1
T46	Ash sp	14	40*	Maturing	-	B	-	-	4.8	72
T47	Cherry	9	40*	Mature	-	C	Trunk canker at 2m	-	4.8	72
T48	Lime	10	60*	Mature	-	B	Pollarded tree that forms part of the street scene landscape	-	7.2	163
H49	Beech	4	15	Maturing	-	C	Regularly clipped, provides some boundary screen	Fell for development (part)	1.8	10
T50	Ash sp	8	22.5	Young	-	C	Small tree	-	2.7	23
T51	Maple sp	12	70	Mature	-	C	Large dead limbs over road	-	8.4	222
T52	Poplar	14	40	Maturing	-	C	Tight fork union at 6m	-	4.8	72
G53	Elm sp	4	15	Young	-	C	-	-	1.8	10

Appendix 2: Tree schedule and explanatory notes

Tree No	Species	Height (m)	Diameter (cm) @ 1.5m	Maturity	Low Branches	Category	Notes	Tree Works	RPA radius (m)	RPA area (m2)
T54	Sycamore	12	70*	Mature	-	B	-	-	8.4	222
T55	Apple	5	40	Mature	-	C	Small tree	-	4.8	72
G56	Elm sp	4	15	Young	-	C	-	-	1.8	10
T57	Sycamore	8	25	Young	-	C	Small tree	-	3.0	28
T58	Lombardy poplar	14	30	Maturing	-	B	Some future potential	-	3.6	41
T59	Lombardy poplar	18	50	Mature	-	B	-	-	6.0	113
T60	Lombardy poplar	14	30	Maturing	-	B	Some future potential	-	3.6	41
T61	Lombardy poplar	18	50	Mature	-	B	-	-	6.0	113
G62	Elm sp	4	15	Young	-	C	-	-	1.8	10
T63	Laburnum	5	20	Maturing	-	C	Poor form	-	2.4	18
G64	Elm sp	4	15	Young	-	C	-	-	1.8	10
T65	Norway maple	12	70*	Mature	-	B	-	-	8.4	222
T66	Purple plum	6	40	Mature	-	C	Tight fork unions	-	4.8	72
G67	Elder, elm sp	5	15	Young	-	C	-	-	1.8	10
T68	Lime	8	35	Maturing	-	B	Some future potential	-	4.2	55
T69	Fruit sp	2	25	Maturing	-	U	Collapsed tree	Fell for management	3.0	28
T70	Norway maple	10	65*	Mature	-	B	-	-	7.8	191
G71	Elm sp	5	15	Young	-	U	Dead and dying	Fell for management	1.8	10
T72	Cherry	8	55*	Mature	-	C	Significant decay at base of lateral branches	-	6.6	137
T73	Cherry	8	25	Maturing	-	C	Poor form	-	3.0	28
G74	Elm, elder	6	20	Young/maturing	-	U	Dead and dying	Fell for management	2.4	18
T75	Lime	10	45	Maturing	-	B	Dense ivy over trunk	-	5.4	92
T76	Norway maple	11	52.5*	Mature	-	B	-	-	6.3	125
T77	Fruit sp	4	15	Young	-	C	-	-	1.8	10
T78	Norway maple	14	70*	Mature	-	B	-	-	8.4	222
G79	Elm sp, elder	4	10	Young	-	C	-	Fell for development (part)	1.2	5

Appendix 2: Tree schedule and explanatory notes

Tree No	Species	Height (m)	Diameter (cm) @ 1.5m	Maturity	Low Branches	Category	Notes	Tree Works	RPA radius (m)	RPA area (m2)
T80	Lime	12	60	Mature	-	B	Dense ivy over trunk	Minor pruning of secondary and tertiary low branches to provide adequate clearance over the new access of up to 4m for construction vehicles	7.2	163
T81	Lime	10	60	Mature	-	B	Dense ivy over trunk	Minor pruning of secondary and tertiary low branches to provide adequate clearance over the new access of up to 4m for construction vehicles	7.2	163
G82	Holly, maple sp, elm, fruit sp	9	30	Maturing	-	C	Provides some boundary screen	-	3.6	41
T83	Lombardy poplar	10	35	Maturing	-	C	Topped in past	-	4.2	55
T84	Lime	10	45	Mature	-	B	Dense ivy over stems and scaffolds. Some future potential if ivy removed.	-	5.4	92
T85	Oak	4	20	Young	-	C	Small multi stemmed tree	-	2.4	18
T86	Laurel	5	25	Maturing	-	C	Grows from neighbours	-	3.0	28
T87	Pine sp	10	30	Maturing	-	B	Some future potential	-	3.6	41

Appendix 2: Tree schedule and explanatory notes

Explanatory Notes

- **Abbreviations:**

G : Group
H : Hedge
RPA : Root protection area

- **Botanical tree names:**

Acacia	: *Robinia pseudoacacia*
Alder	: *Alnus cordata*
Apple	: *Malus* sp
Ash	: *Fraxinus excelsior*
Beech	: *Fagus sylvatica*
Birch	: *Betula pendula*
Cherry	: *Prunus* sp
Cotoneaster	: *Cotoneaster* sp
Cypress	: *Cupressus* sp
Elder	: *Sambucus nigra*
Elm	: *Ulmus* sp
Fruit	: *Malus* sp, *Prunus* sp or *Pyrus* sp
Goat willow	: *Salix caprea*
Holly	: *Ilex aquifolium*
Laburnum	: *Laburnum* sp
Laurel	: *Prunus laurocerasus*
Lawson cypress	: *Chamaecyparis lawsoniana*
Lime	: *Tilia* sp
Lombardy poplar	: *Populus nigra* 'Italica'
Maple	: *Acer* sp
Norway maple	: *Acer platanoides*
Oak	: *Quercus robur*
Pine	: *Pinus* sp
Poplar	: *Populus* sp
Purple plum	: *Prunus cerasifera* 'Nigra'/'Pissardii'
Spruce	: *Picea* sp
Sycamore	: *Acer pseudoplatanus*
Whitebeam	: *Sorbus aria*
Yew	: *Taxus baccata*

- **BS 5837 (2012) compliance:** All data has been collected based on the recommendations set out in subsection 4.4 of BS 5837.
- **Tree inspections and site limitations:** Each tree was subjected to a quick visual check level of inspection. Where there is restricted access to the base of a tree, its attributes are assessed from the nearest point of access. Climbing inspections are not carried out during this level of inspection and, if heavy ivy is present, tree condition is assessed from what can be seen from the ground. A separate note is recorded if further investigation may be required to clarify its status.
- **Crown spreads:** Crown spread dimensions are not listed in the tree schedule because they are illustrated on the land survey base to all the plans in this document. Where crown spreads of significant trees on site are found to deviate from those shown on the provided land survey, we have noted it in the text of the report and annotated it on our plans.
- **Dimensions:** All dimensions are estimated unless annotated with a '*'.
- **Species:** Species identification is based on visual observations. Where there is some doubt over tree identity, sp is noted after the genus name to indicate that the species cannot be reliably identified at

Appendix 2: Tree schedule and explanatory notes

the time of the survey. Where there is more than one species in a group, only the most frequent are noted and not all the species present may be listed.

- **Height:** Height is estimated to provide a broad indication of the size of the tree.
- **Trunk diameter:** Trunk diameter is estimated or measured and recorded in 2.5cm increments as advised in BS 5837 Table D1. It is measured with a diameter tape unless access is restricted, direct measurement is not possible because of ivy on the trunk or the tree is assessed as poor quality. The point of measurement and the adjustments for stem variations are as advised in Figure C1 of BS 5837.
- **Maturity:** In planning context, maturity provides a simplistic indication of a tree's ability to cope with change and its potential for further growth. For the purposes of this report, young indicates a potential to significantly increase in size and a high ability to cope with change, maturing indicates some potential to increase in size and a medium ability to cope with change, and mature indicates little potential to increase in size and limited ability to cope with change.
- **Low branches:** Any low branches that would not be feasible for removal during normal management and should be considered as a design constraint are noted here and explained in the notes.
- **Category:** Our assessment automatically considered tree physiological/structural condition (BS 5837, 4.4.2.5h), and so these are not listed separately in the schedule. Additionally, the category accounts for the remaining contribution (BS 5837, 4.4.2.5i) as greater than 40 years for A trees, greater than 20 years for B trees, at least 10 years for C trees and less than 10 years for U trees, so this is also not listed separately in the schedule. Category A, B and C trees are automatically listed as sub-category 1 unless otherwise stated.
- **Notes:** Only relevant features relating to physiological or structural condition and low branches that may help clarify the categorisation are recorded. If there are no notes, then the presumption should be that no relevant features were observed.
- **Tree works:** The recommended tree works are based on the quick visual check level of inspection and only intended to address significant hazards identified during that inspection.
- **Future tree safety inspections:** Due to the time that may elapse between the original survey and the start of development, all trees should be re-inspected as part of the standard risk management process before any works start on site. Our assessment of the trees was carried out on the basis that a re-inspection would be carried out within a year of the assessment visit and our advice on tree condition must be reviewed annually from the date of that visit.

Appendix 3: Construction Method statement

QUANTUM GROUP

CONSTRUCTION MANAGEMENT STATEMENT

Former Imperial College Private Ground
Udney Park Road
Teddington

Appendix 3: Construction Method statement

Considerate Construction...

Care about appearance...

Respect the community...

Protect the environment...

Secure everyone's safety...

Value our workforce...

CONTENTS

Appendix 3: Construction Method statement

INTRODUCTION & OBJECTIVES

Appendix 3: Construction Method statement

INTRODUCTION & OBJECTIVES

[illegible]

[illegible]

- Construction Traffic
- On Site Parking Provisions (Construction Staff/Management Staff/Visitors)
- Site Signage
- Deliveries and Vehicle Movement
- Haulage & Debris Removal
- [illegible]
- Site and Boundary Security
- Dust and Dirt Management
- Waste Management
- Noise Management
- Vibration Control
- Operational Working Hours
- Construction Programming
- Welfare Provisions

[illegible]

Appendix 3: Construction Method statement

EXISTING ENVIRONMENT & OUTLINE PROPOSALS

Appendix 3: Construction Method statement

EXISTING ENVIRONMENT

SITE CONTEXT

The Site is located within Teddington in the London Borough of Richmond upon Thames, with the exception of its south-west edge, covers 12.0 acres and is bordered by residential development on:

- Hallowell Court to the north;
- Kingston Lane to the west;
- Cornwall Road to the south; and
- Udney Park Road to the west.

Teddington High Street is 150m to the north of the Site, beyond which there is a continuous settlement pattern extending to Hampton. The Site is part of a townscape which consists of a mixture of Victorian, Edwardian, post 2nd World War and contemporary buildings.

To the south of the Site, Teddington's residential settlement pattern extends to up to the walled grounds of Udney Park, 0.3km to the south of the Site. Hampton Court is to the south of Udney Park and adjacent to the River Thames, 2.2km to the south of the Site.

To the west of the Site Teddington's settlement pattern continues towards Hampton Hill with Hallowell Park and Golf Course forming a notable area in the settlement pattern, 0.5km to the north-west of the Site.

TOPOGRAPHY AND HYDROLOGY

The River Thames meanders to the south, east and north of the Site and at its closest point is 200m to the north-east of the Site. The Site is therefore within the plains of the River Thames situated across flat landform between 5 - 10m Above Ordnance Datum (AOD).

The landform across the Site is relatively flat adjacent to both sides of the River Thames, before rising across Hampton Hill (12-20m AOD), to the west of the Site and Sewer's Hill to the north-east of the Site (20-30m AOD).

Other water bodies within the area include Longford River to the west of the Site which flows through Udney Park (with a number of large pools) to the River Thames and the Long Water, a 0.7km long rectangular water body within Hampton Court.

OUTLINE PROPOSALS

The proposed scheme will see the former Imperial College London Private Ground on Udney Park Road, Teddington, London, TW11 9BE, operated by a mixed-use development that will deliver high-quality sports and community facilities, alongside new public open space, affordable-rented accommodation for Older People and a new GP surgery. The Site access secures a sustainable, inclusive future for the site, the benefits of which underpin national and local planning policy.

Within the realm of the Teddington Community Sports Ground Community Interest Company, it is envisaged will be established:

- Assisted living and care, residential development and new GP surgery;
- Open space with community orchard and outdoor gym;
- Community sports facilities.

The proposed community sports facilities will consist of the following:

- 4 full-size 3rd Generation artificial grass pitch (3G AGP);
- Natural grass playing pitch provision;
- Tennis Courts / MUGA;
- Community pavilion containing changing rooms, showers, cafe and server. Flexible use community rooms and offices.

Appendix 3: Construction Method statement

CONSTRUCTION MANAGEMENT

Appendix 3: Construction Method statement

CONSTRUCTION MANAGEMENT

ON SITE PARKING PROVISIONS (CONSTRUCTION STAFF/ MANAGEMENT STAFF/VISITORS)

SITE STORAGE

DELIVERIES AND VEHICLE MOVEMENT

HAULAGE & DEBRIS REMOVAL

TEMPORARY SUSPENSION OF HIGHWAYS RELATED ASPECTS

SITE AND BOUNDARY SECURITY

SITE DEBRIS CONTROL

- Use of a power hydraulic road sweeper

- Vehicle wash down facilities to ensure that no site soiled vehicles leave the site

DUST MANAGEMENT

- Local Exhaust Ventilation (LEV) units to all power tools where possible
- Wet cutting, sawing, drilling & grinding
- Damping down site roadways as necessary
- Vacuum cleaning and damp sweeping
- Good site housekeeping

Appendix 3: Construction Method statement

CONSTRUCTION MANAGEMENT

WASTE MANAGEMENT

- Segregation of waste into skips for recycling groups
- Incentives for sub-contractors to follow the Waste Management Plan
- Monitoring of waste performance against the Waste Management Plan

NOISE MANAGEMENT

VIBRATION CONTROL

OPERATIONAL WORKING HOURS

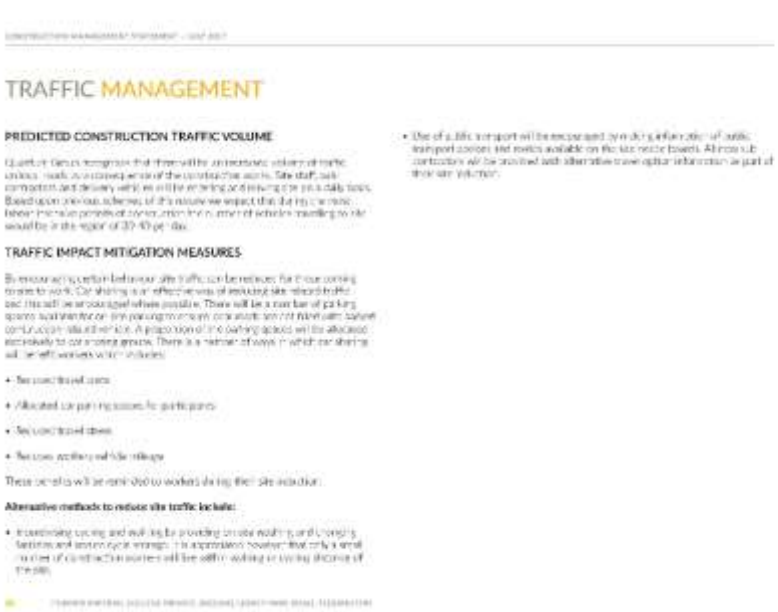
CONSTRUCTION PROGRAMMING

- Welfare Provisions
- Site Office
- Site Induction
- Site Meeting Room
- Site Canteen

Appendix 3: Construction Method statement

TRAFFIC MANAGEMENT

Appendix 3: Construction Method statement



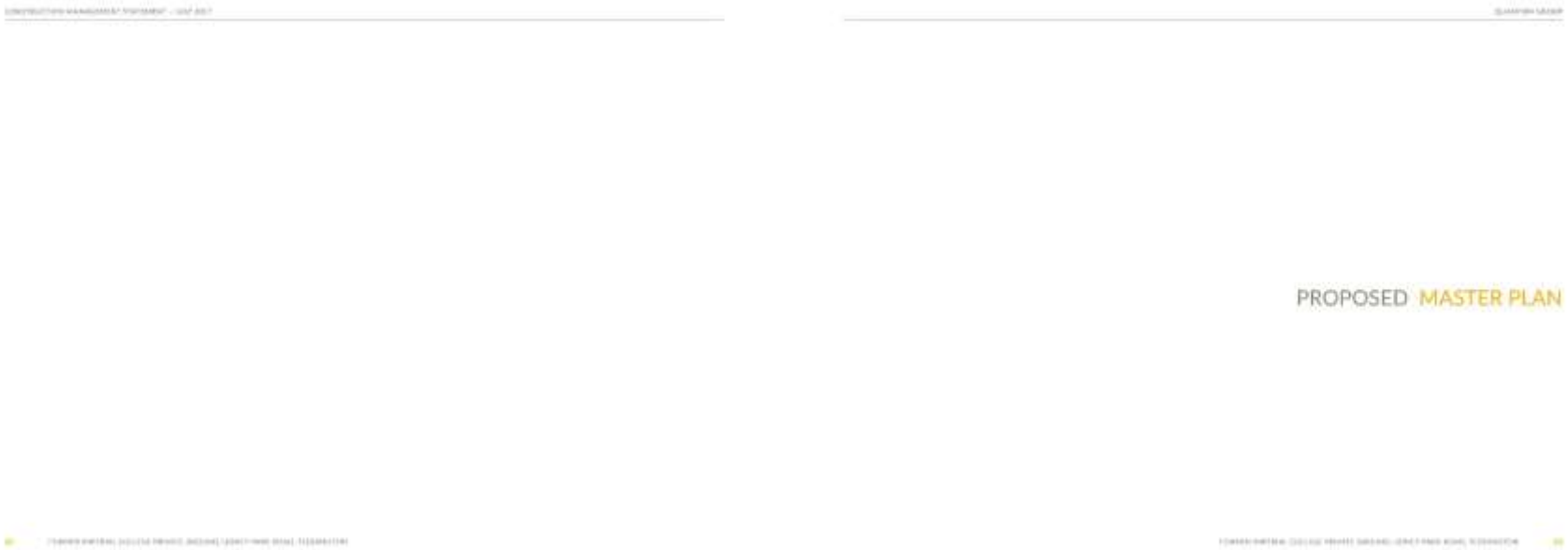
TRAFFIC MANAGEMENT

PREDICTED CONSTRUCTION TRAFFIC VOLUME

TRAFFIC IMPACT MITIGATION MEASURES

Alternative methods to reduce site traffic include:

Appendix 3: Construction Method statement



Appendix 3: Construction Method statement

PROPOSED MASTER PLAN

1. Courtyard Garden
2. Extra Care Apartments
3. GP Surgery & Car Park (51 spaces)
4. Public Park
5. Converted Club House
6. Extra Care Apartments
7. 3G Pitch
8. 4G Pitch
9. Multi-use Games Area
10. Car Park (60 spaces)
11. Teddington Community Sports
12. Playground
13. Tree-lined entrance road
14. Community Ground

Appendix 3: Construction Method statement

Appendix 3: Construction Method statement

Appendix 3: Construction Method statement

ARBORICULTURAL PROTECTION MEASURES

Appendix 3: Construction Method statement

ARBORICULTURAL PROTECTION MEASURES

UPDATE FROM ARBORICULTURAL REPORT

Appendix 3: Construction Method statement

APPENDICES

APPENDIX A - BASEMENT CONSTRUCTION STRATEGY
APPENDIX B - BASEMENT VENTILATION STRATEGY

Appendix 3: Construction Method statement

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