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ST MICHAELS CONVENT HAM COMMON HAM

ARBORICULTURAL IMPACT ASSESSMENT & METHOD STATEMENT

for

BEECHCROFT DEVELOPMENTS

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Checked By:	M Welby
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1. Executive Summary

1.1. The site is currently vacant and comprises listed buildings and unsympathetic additions in a landscaped garden. The proposed development is the building of residential housing for over 55s.

1.2. This impact assessment is intended to evaluate the direct and indirect effects of the proposed design on the trees on site, and where necessary recommends mitigation.

1.3. The development proposals are in accordance with BS 5837:2012 'Trees in relation to design, demolition and construction – Recommendations'. Adequate protection can be provided to ensure all retained trees are protected throughout development in the form of barriers and/or ground protection.

1.4. Given the number of trees on the site, the development proposals ensure the retention of the majority of the better, more sustainable specimens that will continue to make a long term contribution to the sylvan character of the site.

1.5. Of the one hundred and ten recorded individuals only thirteen are identified for removal, ten C category trees and three U category trees. None of these trees are of a quality that should represent any constraint to development and there is ample scope on the site for replacement planting as mitigation.

1.6. Where proposed new hard surfaces encroach into the RPA of trees highlighted for retention, sensitive surface construction will be required. Trees nos. T1 and T18 have an encroachment of 13% and tree no. T14 has an encroachment of 7%. This new hard surface does not exceed 20% of the total RPA and therefore complies with section 7.4 of BS 5837:2012.

1.7. There is existing driveway surface within the RPAs of T1, T11, T14, T17 & T18 in the areas indicated on the tree protection plan. This will be retained in situ to allow demolition and construction access, and then resurfaced.

1.8. The relationship between the buildings and retained trees is sustainable and does not result in any situations which may result in unreasonable pressure to prune requests from future occupants.

1.9. The Arboricultural Method Statement (AMS) has been compiled in conjunction with the Tree Protection Plan (TPP) for the purpose of feasibility and planning, as per Figure 1 of BS 5837:2012. These detail any mitigation which will be necessary to ensure the protection of retained trees throughout the development.

2. Introduction

2.1. ACD Environmental has been instructed to prepare the following Arboricultural Impact Assessment and Method Statement by Beechcroft Developments. Reference should be made to the appended Tree Protection Plan (PRI18780-03).

2.2. This Method Statement is to be made available to all operatives on site during the construction process, so that they understand the scope and importance of the measures set out for tree protection. Implementation of the protection methods and other details within this report are integral to ensuring protection for the retained trees.

2.3. For details of trees to be retained, and locations and types of special protection methods, reference should be made to the latest revision of Tree Protection Plan (ref: PRI18780-03), which should be displayed prominently on site for all staff to see.

2.4. To ensure accuracy and avoid future costly adjustments, the Tree Protection Fence must be set out by a surveyor with all node points being marked clearly on site for the fencing contractor to work to. The autocad version of the Tree Protection Plan is available on request.

2.5. This report is based on the recommendations given in BS 5837:2012 'Trees in relation to design, demolition and construction – Recommendations'.

2.6. According to an enquiry made to Richmond Borough Council in August 2016 the site is within a Conservation Area, and T1 is protected by Tree Preservation Order. T66 is also protected by Tree Preservation Order.

2.7. The relevant authority is Richmond Borough Council who can be contacted at: www.richmond.gov.uk.

2.8. Any questions relating to the content of this report should be directed in the first instance to: ACD Arboriculture, Courtyard House, Mill Lane, Godalming, Surrey GU7 1EY, 01483 425 714/07796 832 490, quoting the site address and report reference number.

2.9. The following abbreviations have been used throughout this document:

- Root Protection Area – RPA
- Construction Exclusion Zone- CEZ
- Tree Protection Plan – TPP
- Tree Protection Fencing – TPF

3. Arboricultural Impact Assessment

3.1. The site is currently vacant and comprises listed buildings and unsympathetic additions in a landscaped garden. The proposed development is the building of residential housing for over 55s.

3.2. This impact assessment is intended to evaluate the direct and indirect impacts on the trees on the site in relation to the proposed development. Any potential tree impacts are identified as per BS 5837:2012 section 5.4, and details are given of proposed mitigation.

3.3. Any potentially damaging activities proposed in the vicinity of retained trees are identified, such that mitigation to significantly reduce or avoid this impact can be detailed in the Arboricultural Method Statement and Tree Protection Plan as recommended in BS 5837:2012 section 5.4.2.

3.4. The tree survey for the site is at Appendix 2 of the Tree Report for the site ACD reference PRI18780trA.

3.5. This assessment is based upon the supplied layout drawing by PRP Architects which is shown on the Tree Protection Plan.

3.6. Evaluation of impact of proposed tree losses

3.6.1. The majority of the surveyed trees are established at the northern end of the site and as such are not impacted upon by the design proposals. Of the one hundred and ten recorded individuals only twenty-three are within proximity of the design proposals and of these thirteen are identified for removal.

3.6.2. Those trees which are to be removed are shown with a red dashed canopy outline on the Tree Protection Plan ACD reference PRI18780-03.

3.6.3. Ten C category trees are proposed for removal, these are T3, T4, T7, T8, T9, T10, T16, T21 & T22. Three U category trees are proposed for removal, T12 & T12A, T15. None of these trees are of a quality that should represent any constraint to development and there is ample scope on the site for replacement planting as mitigation.

3.6.4. In relation to the conception and design of development proposals, BS 5837:2012 section 5.1.1 states: The constraints imposed by trees, both above and below ground should inform the site layout design, although it is recognised that the competing needs of development mean that trees are only one factor requiring consideration. Certain trees are of such importance and sensitivity as to be major constraints on development or to justify its substantial modification. However, care should be taken to avoid misplaced tree retention; attempts to retain too many or unsuitable trees on a site can result in excessive pressure on the trees during demolition or construction work, or post-completion demands for their removal.

3.6.5. Replacement trees will be proposed through landscape design and will more than mitigate for their removal by providing robust long term tree cover in keeping with the proposal and surrounding properties.

3.7. Trees to be pruned

3.7.1. It is proposed that the canopy of T20 (Apple) is pruned to ensure there is 2m clearance between the canopy and the proposed building. This pruning has been carried out before to trim the tree away from the existing building, and the repeat pruning is unlikely to have any significant adverse impact on the health of the tree.

3.7.2. It is proposed that the canopies of T11, T14 and T17 are crown lifted to a height of 3m over the driveway and carpark areas.

3.7.3. At this time no further tree surgery works are anticipated (excluding tree removals). Should any become necessary it should comply with BS 3998:2010 Tree Work or more recently accepted arboricultural good practice, and be approved by the LPA and project arboriculturist prior to any commencement.

3.8. Protection for retained trees

BS 5837:2012 section 6.2.1. states: 'All trees that are being retained on site should be protected by barriers and/or ground protection (see 5.5) before any materials or machinery are brought onto the site, and before any demolition, development or stripping of soil commences. Where all activity can be excluded from the RPA, vertical barriers should be erected to create a construction exclusion zone. Where, due to site constraints, construction activity cannot be fully or permanently excluded in this manner from all or part of a tree's RPA, appropriate ground protection should be installed (see 6.2.3).' As such, protection for all retained trees is shown on the Tree Protection Plan according to this specification.

3.9. Demolition & Groundworks

To ensure damage does not occur to trees highlighted for retention, tree protection fencing must be erected prior to ANY plant machinery entering site whatsoever. This should be subject to a pre-commencement site meeting between the developer, their project arboriculturist and a representative from the Local Authority. No special demolition procedures need be observed on this site, other than respecting the tree protection fencing.

3.10. **New Hard Surfaces within RPAs**

3.10.1. In order to minimise impact on the trees where the proposed driveway encroaches into the RPA of T1, sensitive surface construction will be required in the form of a no-dig surface. It is anticipated that using no-dig surface means that installation of permanent hard surface in this area is unlikely to cause significant adverse impact on the trees to be retained. It is confirmed that the amount of new hard surface does not exceed 20% of the total RPA and therefore complies with section 7.4 of BS 5837:2012.

3.10.2. The existing and proposed levels have been assessed, and it is confirmed that the proposed no-dig driveway and parking spaces are feasible. The use of no-dig surface necessarily means that surrounding levels will have to be raised to match - it is proposed that the existing driveway is to be raised, which means the proposals are acceptable.

3.10.3. To avoid root damage, a no-dig approach must be taken, limiting the impact on the trees: The use of a three dimensional cellular confinement system, such as 'Cellweb' is an acceptable approach, which aims to fulfil the above design criteria. This system maintains the passage of oxygen and water to root systems; avoids root loss through severance or asphyxiation and minimises the potential for soil compaction. It is achieved by laying a Geotextile membrane directly onto unchanged soil levels, with a three dimensional cellular confinement system ('Cellweb') laid on top filled with no fines granular fill, with a porous finishing surface. See specification on Tree Protection Plan (PRI18780-03).

3.11. **Construction within RPAs**

3.11.1. The proposed estate manager’s office and meeting rooms are within the RPA of T20 (Apple). There is already a building within the RPA of the tree, and the proposed building is on the same footprint. The position of the proposed unit is therefore considered acceptable.

3.11.2. BS 5837:2012 states at section 5.3.1: 'The default position should be that structures (see 3.10) are located outside the RPAs of trees to be retained. However, where there is an overriding justification for construction within the RPA, technical solutions might be available that prevent damage to the tree(s) (see Clause 7). If operations within the RPA are proposed, the project arboriculturist should:
a) demonstrate that the tree(s) can remain viable and that the area lost to encroachment can be compensated for elsewhere, contiguous with its RPA.’ It can be seen on the tree protection plan that the fencing allows additional protection as per this recommendation.

3.12. Shade and future pressure to prune

The site layout has been assessed in terms of shading and future pressure to prune. Given the orientation of the site, and the relationship between the proposed buildings and the retained trees, the juxtaposition is viable for long-term tree retention, and it is considered that shading by trees is unlikely to be a concern to future residents. As a result, it is considered unlikely that there would be any undue pressure to remove trees, or excessively prune from any future occupants.

3.13. Services

It is fundamental to tree protection that infrastructure design is sensitively approached, as trenching close to trees may damage roots and affect tree health and stability. Details of services have not been provided at the time of writing. The Tree Protection Plan, showing the constraints posed by retained trees will be passed to the infrastructure engineers to inform their design, ensuring that all services avoid areas of potential conflict. As per BS 5837:2012 Figure 1, once further details become available as part of the detailed/technical design for the site, the TPP and AMS will be revised to incorporate these details for services for inclusion in the Tender documentation.

3.14. Levels and Landscaping

Full details of any changes in ground levels on site remain to be finalised. Any alterations to levels close to trees may damage roots and affect tree health and stability. Unless no-dig methodology is proposed for installation of surfaces within RPAs the original levels in these areas must be noted, retained, and integrated into the engineering design of the site. Landscaping operations within the RPAs of retained trees must be carried out in a sensitive manner and be subject to a detailed method statement and arboricultural supervision.

3.15. Boundaries

All plot boundaries will need to be designed, positioned and installed to avoid damage to retained trees. When within RPAs, this will include hand excavation of all post holes, and the lining of any post holes with a non-porous membrane to stop leachates from the concrete damaging tree roots.

4. Arboricultural Method Statement

TO BE READ IN CONJUNCTION WITH THE APPENDED TREE PROTECTION PLAN REFERENCE: PRI18780-03

4.1. Phasing of operations for tree protection

4.1.1. Implementation of tree protection measures on the site must be carried out in the following order

1) Tree removals and access facilitation pruning
2) Accurate erection of tree protection measures
3) Site accessible to construction/demolition traffic
4) Demolition/site clearance
5) Construction
6) Removal of tree protection fencing
7) Remedial tree surgery

4.1.2. The above phasing must not be changed without approval from the project arboriculturist and agreement with the Council.

4.2. Tree protection areas

4.2.1. Based on tree survey data, tree protection areas have been determined for every retained tree. These areas are designed to protect at least a functional minimum of tree root mass in order to ensure that the trees survive the construction process.

4.2.2. Some trees on this site are subject to statutory protection by Tree Preservation Order. Damaging them is a criminal offence and is also contrary to planning conditions that, if breached, could lead to all work on site being stopped by the local authority.

4.2.3. It is the responsibility of everyone engaged in the construction process to respect the tree protection measures and observe the necessary precautions within and adjacent to them.

4.3. Restrictions within tree protection areas

4.3.1. Inside the exclusion area of the fencing, the following shall apply:

- No mechanical excavation whatsoever
- No excavation by any other means without arboricultural site supervision
- No hand digging without a written method statement having first been approved by the project arboriculturist.
- No lowering of levels for any purpose (except removal of grass sward using hand tools)
- No storage of plant or materials
- No storage or handling of any chemical including cement washings
- No vehicular access

- No fire lighting

4.3.2. In addition to the above, further precautions are necessary adjacent to trees:
- No substances injurious to tree health, including fuels, oil, bitumen, cement (including cement washings), builders sand, concrete mixing and other chemicals shall be stored or used within or directly adjacent to the protection area of retained trees
- No fire shall be lit such that flames come within 5m of tree foliage.

4.4. Avoiding damage to stems and branches

4.4.1. Care shall be taken when planning site operations in proximity of retained trees to ensure that wide or tall loads, or plant with booms, jibs and counterweights, can operate without coming into contact with retained trees. Such contact can result in serious injury to them and might make their safe retention impossible.

4.4.2. Consequently, any transit or traverse of plant in proximity of trees shall be conducted under the supervision of a banksman, to ensure that adequate clearance from trees is at all times maintained. In some circumstances, it may be impossible to achieve this without pruning works known as ‘access facilitation pruning’.

4.4.3. Access facilitation pruning shall be kept to the barest minimum necessary to facilitate development and shall be carried out in strict accordance with the guidance below (Tree Surgery). Under no circumstances shall construction personnel undertake any tree pruning operations.

4.5. Tree protection fencing

4.5.1. The Tree Protection Plan (see the latest revision of: PRI18780-03) shows the alignment of Tree Protection Fencing (TPF),which is to be installed prior to any of the following taking place:
- Demolition
- Plant and material delivery
- Soil stripping
- Utility installation
- Construction works
- Landscaping

4.5.2. Stages for installation of TPF:

1) Hand clearance of any vegetation to allow clear working access.
2) Setting out of fencing points
3) Fencing erected
4) Site accessible to demolition/construction traffic

4.5.3. To ensure accuracy and avoid future costly adjustments, the Tree Protection Fence must be set out by a surveyor with all node points being marked clearly on site for the fencing contractor to work to.

4.5.4. Once erected, all TPF will be regarded as sacrosanct, and will not be removed or altered without prior recommendation by the project arboriculturist and approval of the local planning authority.

4.5.5. The typical TPF construction is suitable for areas of high intensity development, and shall comprise of interlocking weld-mesh panels, well braced to resist impacts by attachment to a scaffold framework that is set firmly into the ground. A detailed specification can be found on the TPP.

4.5.6. Should any alternative method of barrier construction be proposed, consultation with the project arboriculturist will be obtained to clarify the efficacy of the revised design prior to informing the local planning authority and obtaining their consent.

4.5.7. Once the exclusion zone has been protected by barriers and/or ground protection, construction work can commence.

4.5.8. All weather notices should be erected on the barriers (for example see figure below).

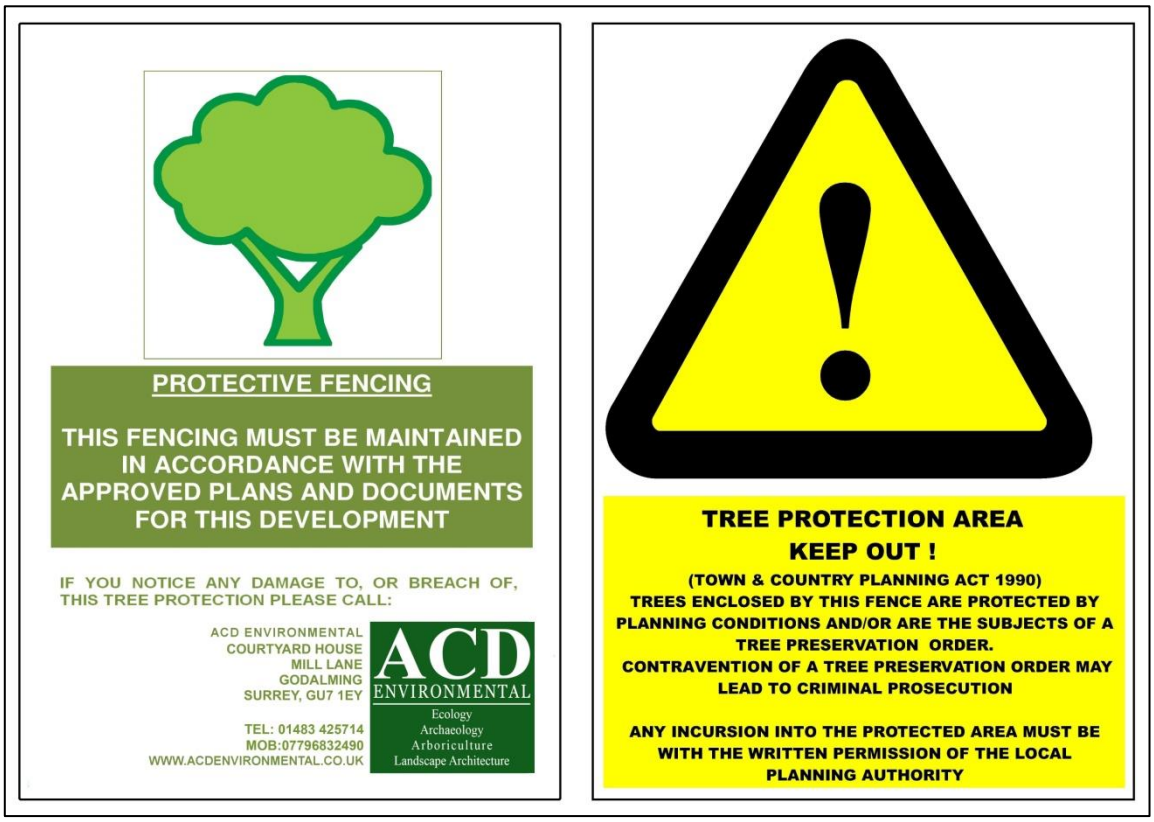

Figure 1: Tree Protection Sign (digital copies available for download at: www.acdarb.co.uk)

4.6. Site storage, parking, welfare facilities

4.6.1. The site will require provision for; site storage, contractor parking, welfare facilities, temporary services/drainage, material drop of points, etc.

4.6.2. No details of these provisions are available at the time of writing of this report.

4.6.3. None of the above provisions will be sited within RPAs of retained trees without the input or the project arboriculturist and the consent of the Local Authority.

4.7. Tree surgery and removal

4.7.1. Those trees which are to be removed are shown with a red dashed canopy outline on the Tree Protection Plan ACD reference PRI18780-03.

4.7.2. The following surgery works are to be carried out:

Tree number	Species	Operation
T20	Apple	Trim canopy to ensure there is 2m clearance from the proposed estate manager's office and meeting rooms.
T11	Yew	Crown lift canopy to ensure there is 3m clearance over the driveway and parking areas.
T14	Yew	Crown lift canopy to ensure there is 3m clearance over the driveway and parking areas.
T17	Yew	Crown lift canopy to ensure there is 3m clearance over the driveway and parking areas.
T18	Yew	Crown lift canopy to ensure there is 3m clearance over the driveway and parking areas.

4.7.3. If any further surgery works are proposed, it will be submitted to, and approved by the council before being carried out.

4.7.4. All work will be carried out in accordance with BS 3998:2010 Recommendations for Tree Work, industry best practice and in line with any works already agreed with the Council.

4.7.5. The tree surgery contractor is responsible for carrying out any relevant health and safety risk assessment, and insurance, prior to any work being carried out.

4.7.6. The stumps of any trees removed from within the Construction Exclusion Zone or the RPAs of retained trees will be either; cut flush to ground level and left in situ or ground out using a stump grinder. They will not be winched out.

4.7.7. All operations shall be carefully carried out to avoid damage to the trees being treated or neighbouring trees. No trees to be retained shall be used for anchorage or winching purposes.

4.8. **Soft landscaping within RPA**

4.8.1. All landscaping and associated ground preparation within exclusion zones will be carried out sensitively to ensure root damage is mitigated as much as is practicable. At no time is any heavy plant to be used within any protected area. Removal of existing vegetation will be carried out by hand, turf may be removed using a mechanical turf stripper or by hand.

Turfing

4.8.2. Stages for turfing gardens and open spaces:

No plant machinery[1] to be used in the area for whatever reason

1) Remove TPF to allow access to area.
2) Do not reduce any high spots or excavate in any way.
3) Existing poor quality turf may be removed with a turf stripper.
4) Use good quality top-soil to level any low-lying areas and hollows, and provide a fine tilth to lay turf on. This imported soil must not result in a level increase of more than 100mm in any area.
5) Import turves by hand in wheelbarrow
6) Lay turves

Planting

4.8.3. Should the soil be compacted or have a poor structure which may hinder the development of any new planting, soil decompaction techniques may be used upon consultation with the project arboriculturist.

4.8.4. Stages for planting within tree protection areas:

No plant machinery to be used in the area for whatever reason

1) Remove TPF to allow access to area.
2) Remove existing vegetation by hand, turf may be removed using a mechanical turf stripper.
3) Do not reduce any high spots or excavate in any way.
4) Import good quality top-soil by hand (with wheelbarrow) into area.
5) Level to a depth of no more than 100mm with hand tools
6) Dig individual planting pits for each plant by hand (including hedging which must not be trench planted)
7) Any mulch should also be imported and spread by hand.

4.8.5. No works will be carried out within any protected areas if the soil moisture is of a level likely to allow compaction to occur.

[1] Including rotovators

4.9. **Installation of no-dig surface**

4.9.1. To ensure that tree roots, within the ground under this proposed surface, continue to survive during and after construction a cellular system such a CellWeb (Geosynthetics Ltd, 01455 617139, www.geosyn.co.uk) of 100mm depth is to be used[2].

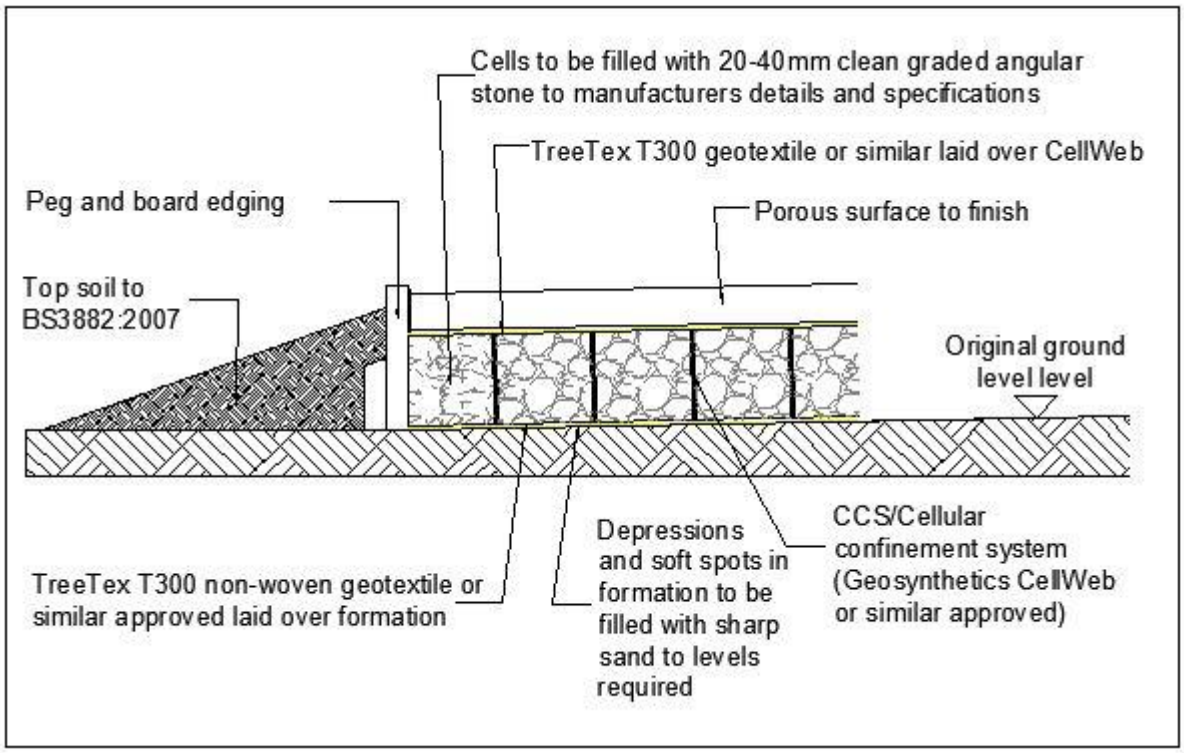

Figure 2: Cellular system profile

4.9.2. Stages for Installation of the cellular confinement surface:

1) Dismantle TPF to allow access to working area
2) Remove existing vegetation by using a specific herbicide (as advised by a specialist) or manual removal with hand tools only. Agreed removal of shrubs, saplings or trees, within the protected areas of retained trees are to be cut, or ground out to just below ground level rather than grubbed or winched out, which can damage roots of retained trees.
3) Retain all original ground levels after vegetation removal. No excavation whatsoever.
4) Remove any existing hard surfaces (paving, tarmac etc.) Hand tools should be used if possible. If machinery is required for this operation, it must be used only on existing surfaces or outside the protection areas and tree canopies (approval from project arboriculturist must be sought before using machinery). The sub base of existing surfaces or foundations should be left in situ where possible to avoid unnecessary root disturbance and provide a base for the new surface.

[2]This approach describes installation of a typical no-dig surface. The author of this report is not an engineer and therefore detailed engineering design and analysis must be carried out before installation.

5) Install a non-woven Geotextile (such as Fibretex F4M) directly over soil grade level (levelled where necessary, by non-compacted washed sand) and fix in place.
6) Lay the cellular system over the Geotextile, which is secured open under tension during the infill process with steel staples or wooden pegs.
7) Install kerbs and edgings directly on top of existing soil grade level. For light structures, a treated peg and board may be acceptable. For more substantial structures, railway sleepers, haunched concrete with road pins, drilled kerbstones, gabions or cast in situ kerbs will be appropriate.
8) Fill the cellular system ensuring any machinery works only on already filled areas. Typical infill consists of no fines angular granular material 20-40mm, which will remain un-compacted.
9) Install porous wearing surface.

4.9.3. Any variation to the above specification must meet the following design criteria for low-invasive surfaces to provide the conditions for continued tree survival and growth:

- Maintain oxygen diffusion through new surface to rooting area (5-12% by volume[3])
- Maintain sufficient passage of water to the rooting area (12-40% by volume[4])
- Maintain existing ground levels to avoid root damage (severance and/or asphyxiation)
- Avoid compaction by maintaining a soil structure sufficient to sustain root growth (soil bulk density below 1.4g/cc[5])

4.9.4. If ground levels are to be raised more than 150mm this should be achieved by the use of a granular material, which does not inhibit vertical gaseous diffusion. For example: no-fines gravel, washed aggregate, structural soil (min. 20% sand content) or cobbles.

4.9.5. Ideally, the surface should be installed between May and October when the ground is driest and least prone to compaction. The approved wearing course is to be laid over the Cellular System. Where it covers in excess of 20% of the RPA or is wider than 3m within the RPA, the new surface should be constructed in a manner to permit infiltration of moisture and gaseous diffusion (pervious). Where the wearing course is in excess of 20% of the RPA or wider than 3m, a specially engineered surface will need to be designed to meet the above criteria.

[3] Tree Roots in the Built Environment 2006, Roberts Jackson Smith HSO
[4]Tree Root Growth Requirements, Dr Kim. D. Coder, University of Georgia. July 2000
[5] Arboriculture, Tree Management of Shade Trees and Vines 2004, Harris, Clarke, Matheny

4.10. **Resurfacing of existing driveway**

4.10.1. Tree protection measures will remain in place until work commences and when removed all personnel to be working within the area are to be made aware of the extent and nature of the area.

4.10.2. Stages for resurfacing of existing hard surface within tree protection areas:

No plant machinery to be sited on any exposed rooting area

1) Remove TPF to allow access to area.
2) Plant machinery to run only on existing surface.
3) Plant may be used to carefully peal up existing surface.
4) Existing sub-base to be retained.
5) Sub-base to be increased in height if required, but no excavation of the sub base will take place.
6) New gravel surface to be installed.

4.10.3. Should any roots over 25mm diameter be encountered during deconstruction of the old profile, their removal will only be carried out under arboricultural supervision and with the approval of the LPA.

4.10.4. Any new kerbing must be installed within the current hard construction profile.

4.10.5. No new excavation closer to retained trees is permitted.

4.11. **Installation of boundary fencing within protected areas**

4.11.1. Stages for installing wooden fence posts:

No plant machinery to be used in the area for whatever reason

1) Remove TPF to allow access to area.
2) Dig post holes using hand tools, avoiding damage to the protective bark covering larger roots. Roots smaller than 25mm diameter may be pruned back using either secateurs or a hand saw, leaving a clean cut.
3) Damage or severance of roots above 25mm diameter must be avoided. If roots of this size are discovered, the hole should be relocated. If there are a large number of such roots it may be necessary to relocate the hole by half a fence panels length and adjust the fence panels accordingly.
4) Line hole with non porous lining, for example durable polythene bag.
5) Insert post and fill post hole with concrete to ground level.
6) Trim polythene to ground level

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