

Arboricultural Impact Assessment
&
BS5837 Tree Survey
at
82a Jubilee Road, Waterlooville
for
Sarah Chambers



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1 **Instruction**

To inspect the trees on and adjacent to the site in relation to British Standard 5837:2012 Trees in relation to design, demolition and construction - Recommendations. To give recommendations to reduce the impact of such development where feasible.

2 **Limitations**

The survey of the trees was of a preliminary nature carried out from ground level. Detailed investigations were not carried out and no tree climbed. The conclusions are based on my own observations, qualifications and experience in arboriculture. All dimensions recorded are estimated. No soil assessments have been undertaken.

3 **Site details**

The site is within a residential area with Jubilee Road to the south. The site is relatively flat with a series of existing buildings and car parking.

4 **Proposals**

The proposals are to:

- Demolish the existing buildings
- Construct 4 dwellings with associated car parking.

5 **Drawings**

Existing survey 2069/01 by P Stubbington Land Surveys Ltd
Site proposals plan PA13-119:02 by Plum Architects

Drawings and documents have been provided by the client for the purposes of this assessment and associated documents.

6 **Legal restrictions**

No details have been sought from the Local Planning Authority (LPA) on whether the trees on or adjacent to the site are protected by Tree Preservation Order (TPO) or within a Conservation Area. This impact assessment has been carried out to assess which trees are worthy of retention and how the proposed scheme may affect them. Where trees are found to be worthy of retention they are treated as if they are legally protected.

7 **Summary**

The defining arboricultural feature of the site and locality is the mature trees outside the site to the north on local authority open space. These trees are to be retained and industry standard construction methods and tree protection methods (tree protection barriers, ground protection, above ground construction of car parking and access footpath, site monitoring) must be used to reduce the impact of the works upon them.

There are a number of small trees insignificant to the landscape that are to be removed to allow the development to occur. The loss of these trees is not significant to the character of the local area due to their small size. Replacement tree planting can be carried out to mitigate their loss.

Provided the trees to be retained are protected throughout the development in accordance with this Arboricultural Impact Assessment and Appendix 1: Method Statement the impact upon the retained trees and the character of the area is unlikely to be significant.

8 Findings

Please see Appendix 2: BS5837 Tree Survey Sheet for specific details.

8.1 Demolition works

To minimise the impact of the demolition works the demolition should be carried out in a 'top down, pull back manner'. Machinery must be located distant from the trees and pull material away from the retained trees. As there are to be new dwellings the foundations of the existing building will need to be removed prior to the new foundations being constructed. The removal of the existing foundation must be broken up and removed with the machinery working from a point distant to the retained trees and must not travel within the root protection area (RPA) unless suitable ground protection has been installed. The Tree Protection Plan shows the position of the anticipated RPA being outside the existing building footprint.

8.2 Works to remove the hard standing in the rear gardens must be carried out as detailed in Appendix 1: Method Statement (Method statement for the removal of the existing hard surfaces) to avoid unnecessary damage to tree roots below the hard standing material and base course material.

8.3 Proposed dwellings

The proposed dwellings 1, 2 and 3 are outside the root protection area (RPA) of retained trees and therefore there is no significant impact upon the retained trees.

8.4 Dwelling 4 is principally within the footprint of the buildings to be demolished and partially within the car parking area. Additionally the dwelling will encroach within c9m² / 2% of the RPA of tree T2. The roots of T2 are impeded in its use of the 9m² area due to the compaction and surface of the car parking area impeding the free flow of air and water through the structure. Therefore it is likely that there will be fewer roots growing within this 9m² area than within the grassed area to the north in the public open space. Therefore this 2% encroachment within the RPA of T2 is considered insignificant. The creation of the garden area to the east of the dwelling will increase the area available for tree root colonisation and therefore it is reasonable to consider the garden space as mitigation for the encroachment.

8.5 The canopy of T2 to the south is c8m. It is assumed that the dwelling is a two storey structure and therefore adjacent to T2 the height of the building will be c6m. Therefore there is a clear 2m distance between the dwelling and the overhanging branches and no works to the tree will be necessary to implement the proposals. In the long term minor tree pruning may be required to maintain a similar relationship between the proposals and the trees. The impact of these tree works are unlikely to have any significant impact upon the condition of the trees (due to the small wound diameter) or the visual amenity that they provide (due to the wounds being on the south side away from the main visual amenity from within the public open space and the skyline view from the south retained).

8.6 To allow the construction of dwelling 4 the trees T5 and T6 will need to be removed. The loss of these trees is not considered significant due to the small size of the trees. The loss

of these trees is not significant to the character of the local area due to their small size. Replacement tree planting can be carried out to mitigate their loss.

8.7 Proposed turning head and footpaths

The proposed construction of the turning head and footpath to the north of dwelling 4 is within the RPA of T1 and T2. Normal construction techniques would damage the tree roots by excavations severing roots, compacting soil (which would then restrict air flow) and possibly contaminating the soil within the RPA of the trees. As the proposed construction is to be within the RPA of retained trees then a no-dig (following removal of the leaf litter and herbaceous layer) cellular confinement system (CCS) as part of an industry standard special surface construction must be installed. See Appendix 9: Special surface construction for additional details. The entire final wearing course within the RPA must be load bearing and porous to allow the free exchange of air and water, for instance:

- large particle resin bonded surfaces
www.green-tech.co.uk/store/product_info.php?products_id=476
- gravel surfacing
www.ced.ltd.uk/documents/4.pdf
www.geosyn.co.uk/brochures/DuoBlock_02.pdf
www.netlon.co.uk/turfsystems/prod-netpave50.htm
- block paving
www.geosyn.co.uk/brochures/Formpave_01.pdf

8.8 Other suppliers and materials may be used as long as they do not cause contamination, excessive compaction and maintain the free exchange of air and water.

8.9 The thickness of the CCS structures may vary due to their different uses. Therefore, as the vehicle turning area is for vehicles, the thickness of the CCS must be >75mm with the final porous wearing course on top (>100mm) for a full depth of >200mm. The footpath is for pedestrian use, the thickness of the CCS must be >100mm with the final porous wearing course on top (>50mm) for a full depth of >150mm. Guidance from the manufacturer in this matter is essential to ensure that the correct thickness of CCS is used for the specified use.

8.10 As the final wearing course is unlikely to be installed until the end of the construction works, the CCS may suffer damage and not perform to its full design potential until the full 200mm depth of construction is achieved. Therefore there must be an additional load spreading surface installed to support construction traffic until the full depth of construction is achieved. This can be created by either laying an additional 100mm layer of CCS, or use of overlapping 20mm steel plate held in place with road pins, or use of railway sleepers, or other appropriate method. Until the area to be subject to CCS construction is fully built, the area must be protected with ground protection to ensure that the potential for harm does not occur to the tree roots beneath.

8.11 The thickness of the construction will have a bearing upon the relationship to areas of the vehicular and pedestrian access not made from a CCS structure. Excavation will be required at this point, beyond the RPA to taper the above ground construction down to the existing highway carriageway surface. The excavation for this link to the existing hard standing will need to be carried out using an appropriate system to reduce the impact upon the trees as detailed in Appendix 1: Method Statement section 8.

- 8.12 BS5837: 2012 discusses hard surfacing within the root protection area (RPA) of trees in section 7.4 page 25. It has a number of design recommendations. The above design specification complies with these design recommendations. In 7.4.2.3 it states 'New permanent hard surfacing should not exceed 20% of any existing unsurfaced ground within the RPA'.
- 8.13 The impact upon T1 of the encroachment by c11m² / 4.5% of an above ground porous construction is unlikely to be significant. It is appreciated that it is normal that development is kept outside the RPA and canopy spread of retained trees. However, this needs to be balanced between the impact of the development and the best design and layout solution that can be created. On this occasion it is reasonable to allow the encroachment within the RPA as the anticipated impact upon the tree is not significant.
- 8.14 The footpath construction and gate access will require the removal of T7. The loss of this tree is not considered significant due to the small size of the tree. The loss of this tree is not significant to the character of the local area due to its small size. Replacement tree planting can be carried out to mitigate its loss. T8 will need to have the lower branches removed (crown lifted) to create a gap from ground level to 3m to allow for pedestrian access. The tree is of poor quality and therefore there is no need to mitigate its retention. Tree root severance may occur as a result of the installation of the footpath predisposing the tree to fail to the south. If this outcome is to be minimised then the use of above ground CCS must be used following removal of the existing hard standing.
- 8.15 Services
Any new services should avoid the RPAs of retained trees. If this is not possible then the route of the services must be designed by an Engineer in consultation with an Arboriculturalist. Further advice is available in Appendix 1: Method Statement and NJUG Volume 4 "Guidance for the planning, installation and maintenance of utility services in proximity of trees".
- 8.16 It is anticipated that there will need to be services to the rear of the properties. The Tree Protection Plan annotates an indicative route avoiding retained trees.
- 8.17 Site monitoring and tree protection measures
BS5837:2012 Trees in relation to design, demolition and construction - Recommendations states in paragraph 6.3:

Wherever trees on or adjacent to a site have been identified within the tree protection plan for protective measures, there should be an auditable system of arboricultural site monitoring. This should extend to arboricultural supervision whenever construction and development activity is to take place within or adjacent to any RPA.
- 8.18 Therefore it is necessary for site monitoring to occur for the proposed works. Details of the occasions and frequency of site monitoring will be given in Appendix 1: Method Statement, Arboricultural Method Statement Summary table: Timing of operations
- 8.19 Tree protection measures are necessary to aid the retention of the trees. The details of these tree protection measures are specified in Appendix 1: Method Statement and shown in Appendix 10: Tree Protection Plan.

8.20 Site compound

The site compound can be located on the car parking area in the middle of the site.

8.21 Soft landscaping

Within the RPA of retained trees there must be no changes of grade (up or down) and the amount of new planting limited to reduce the impact upon the retained trees through severance or damage to tree roots.

8.22 Shade / light, debris issues, post development pressure

Due to the nature of the use of the site and the existing relationship with the trees there is no significant post development pressures anticipated following the development of the site. Maintenance will still be required in the long term to maintain a reasonable relationship between the trees outside the site and the structures. As the trees are outside the site to the north and adjacent to the building there is no sunlight inhibited from the front or rear gardens. The orientation of the windows is not known, but it is assumed that they face east and west removing any direct views from the property towards the retained trees. Therefore, due to the position of dwelling 4 to the retained trees and the anticipated orientation of the dwelling windows there is unlikely to be a significant post development pressure to prune the trees.

8.23 Falling debris is a regular maintenance issue and should be treated as such. A routine of tree survey and inspection will identify foreseeable failures allowing them to be resolved prior to them becoming an issue.

8.24 Falling debris (leaves, seed, needles) is a regular maintenance issue and should be treated as such. If desired, then www.suraflo.co.uk (which prevents debris falling in the gutter through the coanda effect), mesh (www.guttergrid.co.uk or similar) or 'hedgehog' (www.hedgehoggutterbrush.com or similar) inserts can be used to filter out tree debris. Down pipes can also be installed with traps that are easily cleaned or chains used as the down pipe (which requires no cleaning).

8.25 Soils

No soil assessments have been made. In the event of shrinkable soils being found on the site, it will be for an engineer to design the foundations in accordance with the current industry guidance to reduce any potential risk of tree related subsidence to an acceptable level.

8.26 Other trees

This report considers the trees that may significantly be affected by the proposed development. Any trees not mentioned or not surveyed are sufficiently distant that the proposed works of influencing these trees.

9 **Conclusion**

The main arboricultural features of the site are to be retained and tree protective measures must be utilised to minimise the impact of the proposals upon the trees.

The principles and details of the Arboricultural Impact Assessment and Appendix 1: Method Statement must be followed to reduce the impact upon the trees.

10 **Recommendations**

That, following any permission from the LPA, the principles and details of the Arboricultural Impact Assessment and Appendix 1: Method Statement is followed to reduce the potential for harm to the retained trees during development.

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Appendix 1: Method Statement (for protection of trees during development)

01	A pre-commencement meeting prior to the start of any works between the appointed Arboriculturalist and site foreman should take place to clarify any additional protection measures required. An Arboriculturalist should be appointed to inspect and monitor the site at the start of the works and on an as required basis throughout the construction works to ensure that the protection procedures are adhered to and to assist with addressing further arboricultural issues that may arise.
02	Tree works may be required in the interest of good arboricultural practice and to facilitate the use of the site once development is complete. These works are listed in the recommendations of Appendix 2: BS 5837 Tree Survey. All tree works should be carried out according to BS3998: 2010 'Recommendations for tree works' and carried out by an appropriately competent, experienced, qualified and insured arboricultural contractor.
03	The protective barriers, as shown on the drawing "Tree protection plan" and site engineering drawings, should be erected after the tree works and prior to any construction works. Once erected, barriers and ground protection should be considered sacrosanct, and should not be removed or altered without prior recommendation by the appointed arboriculturalist and approval of the LPA. The protective barriers and ground protection should be erected according to drawings "Tree protection plan" and Appendix 2: BS5837 survey sheet which is based upon the guidelines in BS5837: 2012 'Trees in relation to construction'. Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place around the retained trees. On all sites, special attention should be paid to ensure that the barriers remain rigid and complete. Barriers must consist of a 1.8 high scaffold framework in accordance with Figure 2 (see Appendix 5) comprising a vertical and horizontal framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3m. Onto this 1.8m high weldmesh panels should be securely fixed with wire or scaffold clamps. Weldmesh panels on rubber or concrete feet are not resistant to impact and should not be used. If an alternative specification is preferred then it must be agreed in writing with the Local Planning Authority prior to installation. Ground protection for pedestrian movements (and scaffolding activities) within the RPA must be a single thickness of scaffold boards on top of a compressible layer (for instance bark mulch) laid onto a geotextile membrane, or supported by scaffold (see Appendix 6). If an alternative specification is preferred then it must be agreed in writing with the Local Planning Authority prior to installation. Ground protection for wheeled or tracked construction traffic movements within the root protection area (RPA) should be designed by an engineer and Arboriculturalist to accommodate the likely loading and may involve the use of proprietary systems (for instance www.evetrakway.co.uk) or reinforced concrete slabs or a series of railway sleepers pinned together to ensure that the bulk density of the soil remains lower than 1.6g/cm³. If an alternative specification is preferred then it must be agreed in writing with the Local Planning Authority prior to installation.

	These tree protective measures shall be identified and marked on the 'Tree protection plan' and all the approved engineering drawings to be used on site.
04	All site personnel should be briefed by the site foreman or the Arboriculturalist on the importance of the trees to be retained and the protective measures implemented to aid their retention into the future.
05	Once the construction exclusion zone has been protected by barriers then construction work can commence. All weather notices should be erected on the barriers with words such as "Construction exclusion zone – keep out" (see Appendix 7).
06	Care should be taken when planning site operations 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 damage to the equipment and retained trees, and might make the safe retention of the retained trees impossible. Consequently, any transit or transverse of plant in close proximity to trees should be conducted under the supervision of a banksman to ensure that adequate clearance from trees is maintained at all times. In some circumstances it may be impossible to maintain adequate clearance thus requiring tree works to clear the necessary access. Material which will contaminate the soil, e.g. concrete (dry or mixed), diesel, oil, vehicle washings, etc. should not be discharged within 10m of the stem. It is essential that an allowance should be made for the slope of the ground so that damaging materials such as concrete washings, mortar, diesel or oil cannot run towards the trees. There should be no fires on the site. Notice boards, telephone cables or other services should not be attached to any part of the tree.
07	The advice of the appointed Arboriculturalist should be sought where underground structures present within the RPA are / will become redundant. In general it is preferable to seal these off as this avoids the need for significant excavation.
08	Any excavations in proximity of retained trees will require certain precautions to avoid unnecessary damage to trees to be retained, and should be undertaken as follows: All excavations should avoid damage to the protective bark covering larger roots. Roots, whilst exposed, should be wrapped in dry, clean hessian sacking to prevent desiccation (drying) and to protect from temperature changes. Roots smaller than 25mm diameter may be pruned back, preferably to a side branch, using a proprietary clean cutting tool such as bypass secateurs or handsaw. Roots larger than 25mm diameter should only be severed following consultation with the appointed Arboriculturalist, as the roots may be essential to the tree's health and stability. Prior to backfilling, any hessian wrapping should be removed and retained roots should be surrounded by sharp sand (builder's sand should not be used because of its high salt content which is toxic to tree roots), or other loose granular fill, before soil or other material is replaced. This material, e.g. general purpose grade topsoil to BS3882, should be free of contaminants and other foreign objects potentially injurious to tree roots.

	Further details are available in NJUG Volume 4 “Guidance for the planning, installation and maintenance of utility services in proximity of trees”.
09	There are no services to be installed within the RPA of the retained trees.
10	There should be no changes in grade within the RPA without prior recommendation by the appointed Arboriculturalist and approval of the LPA.
11	Following completion of the construction and hard landscaping works a site meeting between the LPA Arboriculturalist and site foreman should take place to assess whether the protective barriers and ground protection can be removed to allow soft landscaping works.
12	Following the completion of the soft landscaping works a tree survey should be undertaken to identify whether additional tree works are required for the safe use of the site and adjacent land users.

Method Statement Summary / Timing of operations

01	Pre-commencement meeting with Site Foreman and appointed Arboriculturalist prior to construction works to discuss the tree protection measures.	
02	Installation of tree protection measures (barriers / ground protection) to facilitate demolition and construction works.	
03	Tree protection measures to be signed off by the appointed Arboriculturalist.	
04	Construction works with Arboricultural site monitoring: • Pre-commencement site meeting with appointed Arboriculturalist. • Signing off the Tree Protection measures by the appointed Arboriculturalist. • Monitoring visit by the appointed Arboriculturalist after construction works have started to ensure that the tree protection measures are appropriate for the site and to advise if any additional measures are required. • Signing off the removal of the Tree Protection Measures by the appointed Arboriculturalist following the completion of the construction and hard landscaping to allow soft landscaping. This site monitoring and signing off may be carried out by the Site Foreman taking photographs of the relevant issues and issuing them to the project Arboriculturalist.	
05	Inspection by the appointed arboriculturalist to agree the removal of the tree protection measures to allow the soft landscaping works.	
06	Soft landscaping works	
07	Tree survey for remedial works	
08	Remedial tree works	
09	Occupancy	

Method statement for the removal of the existing hard surfaces.

RPA refers to the Root Protection Area as detailed in Appendix 2: Development Site Tree Survey.

1. The existing hard surface should be broken up, lifted and removed from the RPA from outside the RPA where feasible, or from exiting hard surfaces within the RPA.
2. The excavation of the hard surface must not extend into the soil underneath unless specifically determined by an Arboriculturalist. In reality this would mean that the teeth of an excavator bucket should be kept horizontal so that any disturbance to the soil is kept to a minimum. When the hard surface is thin or close to the soil level, the works must be carried out by hand to prevent avoidable unnecessary damage to the tree roots.
3. All material, once lifted, must be transported to outside the RPA to prevent compaction or contamination of the tree roots. No material should be stored within the RPA.
4. Due care and attention must be undertaken to ensure that machinery or other operations do not cause damage to the above ground parts of the tree.
5. Where an existing hard surface is removed and replaced with soil the infill material should be a good quality, weed free aerobic natural topsoil with good crumb structure. Soil samples to be issued to the Arboricultural Consultant for written approval prior to delivery on site where the soil is to be installed within the RPA of retained trees.

Method statement for the installation of the cellular confinement system (CCS).

1. Kill ground vegetation using a systemic contact herbicide and gather the dead organic matter. Care must be taken to ensure that the chemical used will not affect the roots of retained trees either through the type of chemical or through the correct and appropriate delivery of the herbicide. This work must be carried out by an appropriately trained, competent and experienced operative.
2. Remove the major protrusions such as rocks and stumps. Stumps should be ground out to a depth of 100mm below the soil level and the debris removed from site. Fill significant holes with sharp sand, for instance holes left by rocks or ground out stumps.
3. Lay a porous geotextile membrane (for instance Fibrextex by Geosynthetics www.geosyn.co.uk or similar) suitable for the use preventing mixing of materials over the entire area to be covered by the CCS. An engineer should determine the appropriate depths of CCS based upon the use. If appropriate a 2 dimensional grid can be also used to further minimise the mixing of materials and rutting of the structure.
4. Edging to be detailed as per Appendix 9: Special Surface Construction or as determined by an engineer in consultation with an arboriculturalist.
5. Lay the three dimensional Cellular Confinement System (for instance Cellweb by Geosynthetics www.geosyn.co.uk or similar) and fixed in place with the appropriate pins.
6. The CCS should be filled from a point furthest from the tree with inert, washed, no-fines, 20-40mm angular stone working towards the tree. This should ensure that any machinery only moves on the laid sub-base which protects the tree roots.
7. The material should then be compacted with a pedestrian 'wacker plate' (or 8 ton roller on CCS greater than 100mm depth) to ensure binding between the CCS and infill material and to help reduce any potential for rutting of the surface.
8. As the final wearing course is unlikely to be installed until the end of the construction works, the CCS may suffer damage and not perform to its full design potential until the full depth of construction is achieved. Therefore there must be an additional load spreading surface installed to support construction traffic until the full depth of construction is achieved. This can be created by either laying an additional layer of CCS, or use of overlapping 20mm steel plate held in place with road pins, or use of railway sleepers, or other appropriate method.
9. Lay a second porous geotextile membrane loosely directly onto the fill material to allow for the laying of the final wearing course. Any joints in the final wearing course must not be sealed as they allow the free exchange of air and water necessary for the tree roots to survive, respire and take up water and nutrients.

Appendix 2: BS5837 tree survey

Tree no.	Species	Height (m)	Trunk diameter (mm) at 1.5m	Canopy spread				Crown Height (m)	Age class	Condition	Recommendations	BS5837 category	Useful remaining life expectancy	Root protection area (radius in m)
				N	E	S	W							
T1	English Oak <i>Quercus robur</i>	17	735	7	9	5	6	2.5	Mature	Off site. Prominent tree within park close to northern boundary of site. Surface roots lifting tarmac footway, crown suppressed on south side. Reasonable form and vitality. Dead wood over 25mm diameter. Evidence of historic limb failure.	1. Crown lift (remove lower branches) over footway to create clearance of 3m from ground level to the first branches retaining branches over 100mm diameter (except over the footway). 2. Remove deadwood >25mm diameter. 3. Remove climbing plants through cutting them at the base of the tree with a handsaw only to remove a section of vegetative material 150mm in length to kill the aerial parts of the climbing plant. Works required for development: No works required.	B2	>20	8.8
T2	English Oak <i>Quercus robur</i>	16	940	8	7	5	5	2.5 north 8.0 south	Over mature	Off site. Prominent tree within park close to northern boundary of site. Surface roots lifting tarmac footway, increment strip - evidence of spit in west side of trunk from ground to 6m. Multiple large pruning wounds, extensive dead wood over 25mm diameter, sparse crown. Medium potential to support bats.	1. Detail investigation of structural condition of trunk - consider branch reduction to reduce the end weight of overlong branches thereby reducing their potential for failure in the short and medium term. 2. Remove deadwood >25mm diameter. 3. Remove climbing plants through cutting them at the base of the tree with a handsaw only to remove a section of vegetative material 150mm in length to kill the aerial parts of the climbing plant. Works required for development: No works required.	C3	<10	11.3

G3	Group of Elderberry and Blackthorn <i>Sambucus nigra</i> and <i>Prunus spinosa</i>	3.5	100	1.5	1.5	1.5	1.5	N/A	Young	3 x self set shrubs on the northern boundary of the site abraded fence and rear elevation of site buildings.	Remove and treat stumps with herbicide to prevent regrowth. Herbicide treatment to be in accordance with current regulations (see HSE website for specific details). Works required for development: Cut back and maintain as hedge.	U	-	1.2
T4	Ash <i>Fraxinus excelsior</i>	14	350	3	5	6	4	2.5	Middle aged	Located within park. Tree of reasonable form and vitality - crown somewhat suppressed on north side due to group pressures.	No works required. Works required for development: No works required.	B2	>20	4.2
T5	Cypress <i>Cupressus</i>	14	c250	2	4.5	3	2	1 east	Middle aged	Located within the site. No access to tree due to vegetation. Reasonable vitality, crown suppressed on west side.	No works required. Works required for development: Remove.	C2	10 to 20	3.0
T6	Cherry Laurel <i>Prunus laurocerasus</i>	4.5	2 x 150	2.5	2.5	2.5	2.5	ground level	Mature	Located within the site. Multi stem form, reasonable vitality, numerous recent pruning events, crown abrades adjacent building.	Remove and treat stumps with herbicide to prevent regrowth. Herbicide treatment to be in accordance with current regulations (see HSE website for specific details). Works required for development: Remove.	U	>20	2.1
T7	Ash <i>Fraxinus excelsior</i>	10	200	2.5	3	2	1	2 east 5 west	Young	Located on eastern boundary of site - stem impacts boundary fence. Bifurcated at 2.5m above ground level - weak fork structure. Good vitality but crown suppressed on west side.	Remove and treat stumps with herbicide to prevent regrowth. Herbicide treatment to be in accordance with current regulations (see HSE website for specific details). Works required for development: Remove.	U	>20	2.4
T8	Cypress <i>Cupressus</i>	5	c160	1	2.5	2	2.5	1.8	Young	Off site tree located 0.5m within rear garden of adjacent dwelling. Reasonable vitality and form but not considered significant.	No works required. Works required for development: Crown lift to 3m over footpath.	C	10 to 20	1.9

General notes

I have not checked whether the site is within a Conservation Area or whether the trees are under Tree Preservation Order (TPO). Prior to any tree works confirmation of whether these legal restrictions apply to the site or trees ought to be sought from the Local Planning Authority (LPA). If the trees stand within a Conservation Area designated under the Town and Country Planning Act the LPA will normally require 6 weeks notice of intention to carry out any tree works as detailed in the survey. If the trees are under TPO then the LPA will normally require an application for any tree works. Some tree works are exempt, for instance if the trees are dead or dangerous, and certain works can be carried out without application. It is necessary to give the LPA at least five days notice prior to carrying out any of these tree works under these exemptions. This survey, with recommendations, can be used to support any such application or notice.

Wildlife issues are of significant concern to the general public. A balance has to be found between the protection of wildlife and the need for safety when managing trees. The Wildlife and Countryside Act (1980) and Countryside Rights of Way Act (2000) give statutory protection to wild birds, bats, mammals, some invertebrates and plants. It is important to ensure that this legislation is properly considered when carrying out any works to trees.

Bird nests were not identified whilst on site. However, any Arborist carrying out the tree works should ensure that there is no disturbance to nesting birds prior to the works being carried out. Further guidance upon the appropriate timing of the works can be sought from DEFRA, if necessary. Where nesting birds are found further information should be sought from DEFRA 08459 33 55 77 or helpline@defra.gsi.gov.uk.

In this instance, considering the size of the trees, their location and features I believe that there is a medium potential of bats using the mature trees as a roost site. A bat survey prior to tree works is not recommended as it would be difficult to determine the location of any exit point from the roost within the tree by a bat survey and also confusion may also arise from bats travelling from other roosts. Any such exit could more easily identified by a competent tree worker. During the tree works the contractor should carry out the tree works with bats as an active consideration and follow the current industry best practice, e.g. Arboricultural Association Guidance Note 1 Bats in the context of tree work operations 2011, which a competent tree contractor should be familiar with.

Typical significant defects that are to be identified can be referred to in "Hazards from Trees, a general guide", "Principles of tree hazard assessment and management" both by David Lonsdale and "The body language of trees" by Claus Mattheck published by the Forestry Commission and the Department of the Environment respectively.

Trees are dynamic structures and as such their condition and health may change in a short period of time, particularly in relation to changes in their immediate environment and circumstances, as such the survey relates to the visible condition found on the day of the survey.

Appendix 3: Key to BS5837 tree survey

No	Tree number.	
Species	Species of tree.	
Height	Height measured in metres and rounded to the nearest metre.	
Stem Ø	Stem diameter at 1.5metres following normal Forestry conventions or immediately above the root flare for multiple stemmed trees, in millimetres.	
abf	Above basal or root flare.	
Branch Spread	Branch spread in metres taken at the four cardinal points to derive an accurate representation of the crown.	
Height of crown	Height in metres of crown clearance above adjacent ground level.	
Life stage (Age)	Young	A tree considered to be less than approximately 20 years old.
	Middle aged	A tree in approximately the first 1/5th of its normal life span with apical dominance (rapidly growing with a clear main leader) and not yet fully at its environmental potential full height.
	Mature	A tree in its 2/5ths to 5/5ths of its normal life span with apical dominance lost and at its environmental potential full height.
	Over mature	
	Veteran	A tree beyond the normal life span for the location with apical dominance lost and with symptoms of canopy decline.
		A tree of interest biologically, aesthetically or culturally because of its age and is old relative to others of the same species.
Condition (Physiological and Structural)	Good	Full healthy canopy; but possibly including some suppressed branches or minor physical damage. A tree that requires little or no tree works and it is anticipated to be retained for over 20 years.
	Fair	Slightly reduced leaf cover, minor dead wood, or isolated major deadwood. A tree that requires tree works to remove defects and/or improve the form so that it may be anticipated to be retained for over 10 years.
	Poor	Overall sparse leafing or extensive dead wood. A tree that has a significant proportion of defects and/or requires considerable tree works to aid its retention and/or where the retention of the tree is not anticipated beyond 5 years.
	Very poor	Large areas of crown dead. A tree that has a significant proportion of defects and/or requires considerable tree works to aid its retention. Unlikely to be retained.
Preliminary management recommendations	As per BS3998: 2010 Recommendations for Tree Works.	
Category grading	See below Table 1.	
Estimated remaining contribution (years)	Estimated remaining contribution in years (e.g. < 10, >10, >20, >40).	
Root protection area	See below Table 2.	
OI	Over ivy	
INAC	Inaccessible	
LS	Land survey, i.e. data provided by the land survey.	
c	circa / about	
All measurements in metres are approximate and rounded to the nearest metre.		

Table 1 - Cascade chart for tree quality assessment, BS5837: 2012 Trees in relation to construction - Recommendations

TREES UNSUITABLE FOR RETENTION				
CATEGORY AND DEFINITIONS	CRITERIA			IDENTIFICATION ON PLAN
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning). • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline. • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality. <i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5 of BS5837:2012</i>			RED  RGB 127.000.000
TREES TO BE CONSIDERED FOR RETENTION				
CATEGORY AND DEFINITIONS	CRITERIA - SUBCATEGORIES			IDENTIFICATION ON PLAN
	1 Mainly arboricultural values	2 Mainly landscape values	3 Mainly cultural values, including conservation	
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue).	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features.	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	LIGHT GREEN  RGB 000.255.000
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation.	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality.	Trees with material conservation or other cultural value	MID BLUE  RGB 000.000.255
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits.	Trees with no material conservation or other cultural value.	GREY  RGB 091.091.091

Root protection area (RPA)

4.6.1 For single stem trees, the RPA (see 3.7) should be calculated as an area equivalent to a circle with a radius 12 times the stem diameter. For trees with more than one stem, one of the two calculation methods below should be used. In all cases, the stem diameter(s) should be measured in accordance with Annex C, and the RPA should be determined from Annex D. The calculated RPA for each tree should be capped to 707 m².

a) For trees with two to five stems, the combined stem diameter should be calculated as follows:

$$\sqrt{(\text{stem diameter } 1)^2 + (\text{stem diameter } 2)^2 \dots + (\text{stem diameter } 5)^2}$$

b) For trees with more than five stems (not illustrated in Annex C), the combined stem diameter should be calculated as follows:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

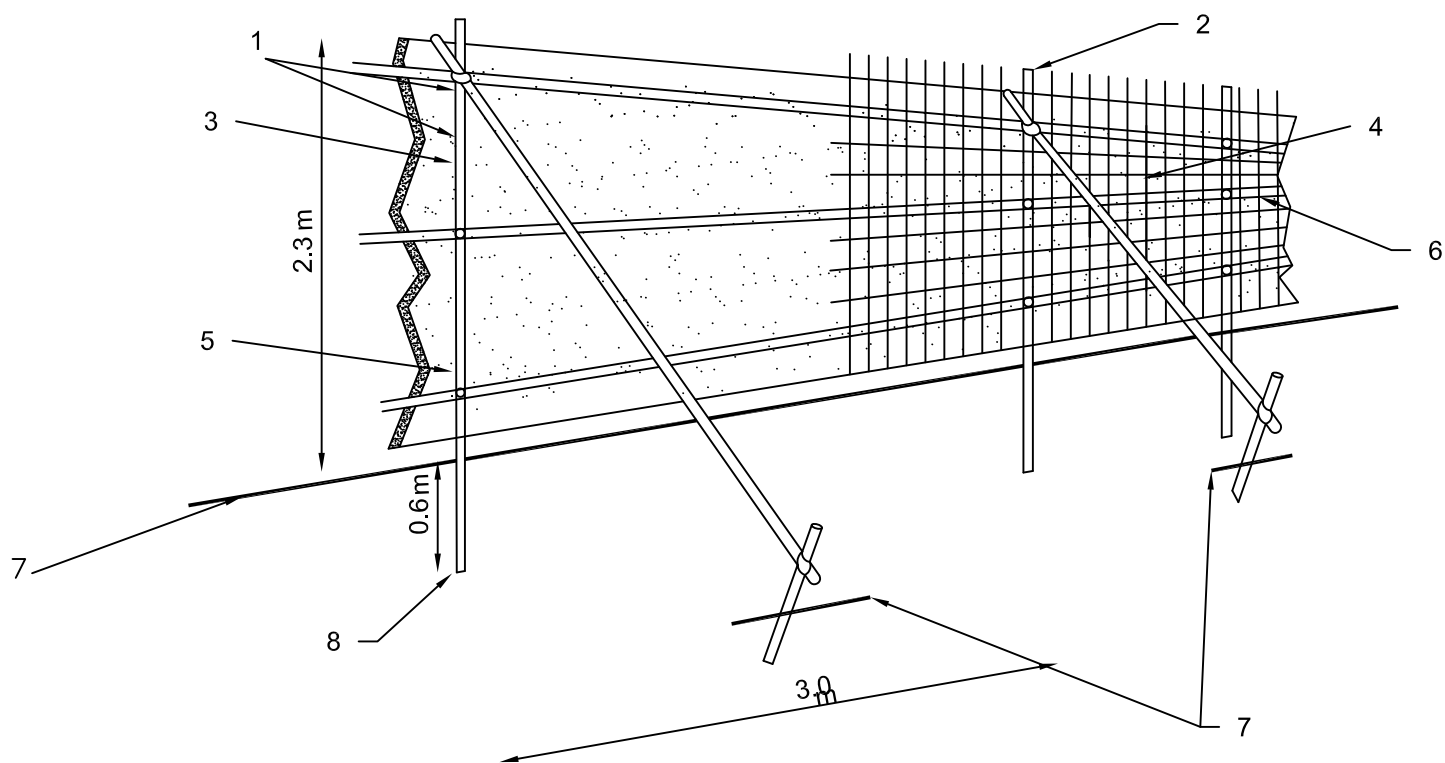
4.6.2 The RPA for each tree should initially be plotted as a circle centred on the base of the stem. Where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced. Modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution.

4.6.3 Any deviation in the RPA from the original circular plot should take account of the following factors whilst still providing adequate protection for the root system:

- a) the morphology and disposition of the roots, when influenced by past or existing site conditions (e.g. the presence of roads, structures and underground apparatus);
- b) topography and drainage;
- c) the soil type and structure;
- d) the likely tolerance of the tree to root disturbance or damage.

Appendix 5: Protective barrier

Appendix 5: Tree protective barriers



1. Standard scaffold poles

5. Standard clamps

2. Uprights to be driven into the ground

6. Wire twisted and secured on inside face of fencing to avoid easy dismantling

3. Panels secured to uprights with wire ties and where necessary standard scaffold poles

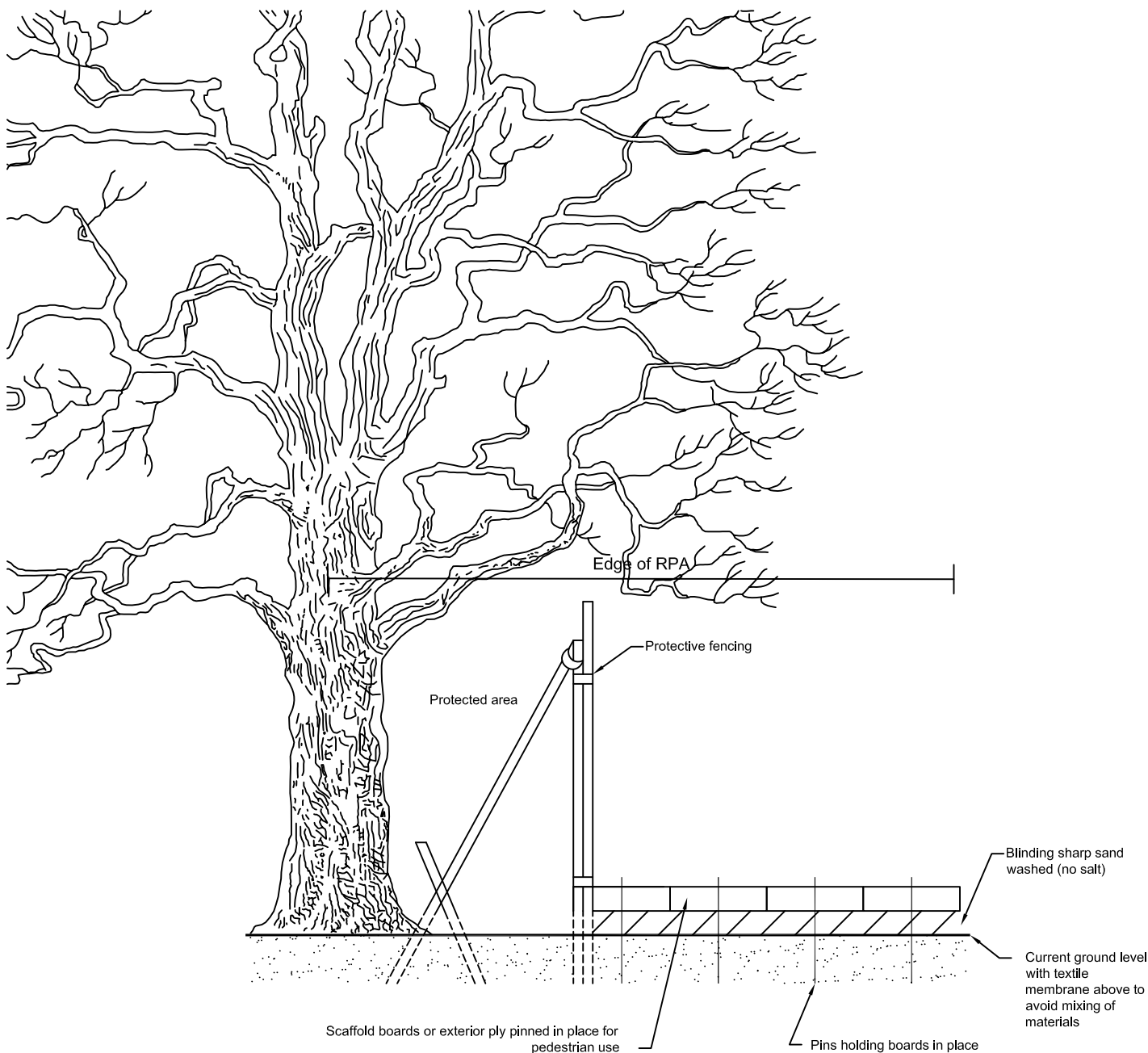
7. Ground level

4. Weldmesh wired to the uprights and horizontals

8. Approx. 0.6m driven into the ground

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Appendix 6: Ground protection



Appendix 6: Pedestrian ground protection

Drawing title:

Appendix 6: Ground protection within Root Protection Area (RPA)

Drawing reference:

Revision: -

Date: May 2012

Scale:

Sheet: 1 of 1

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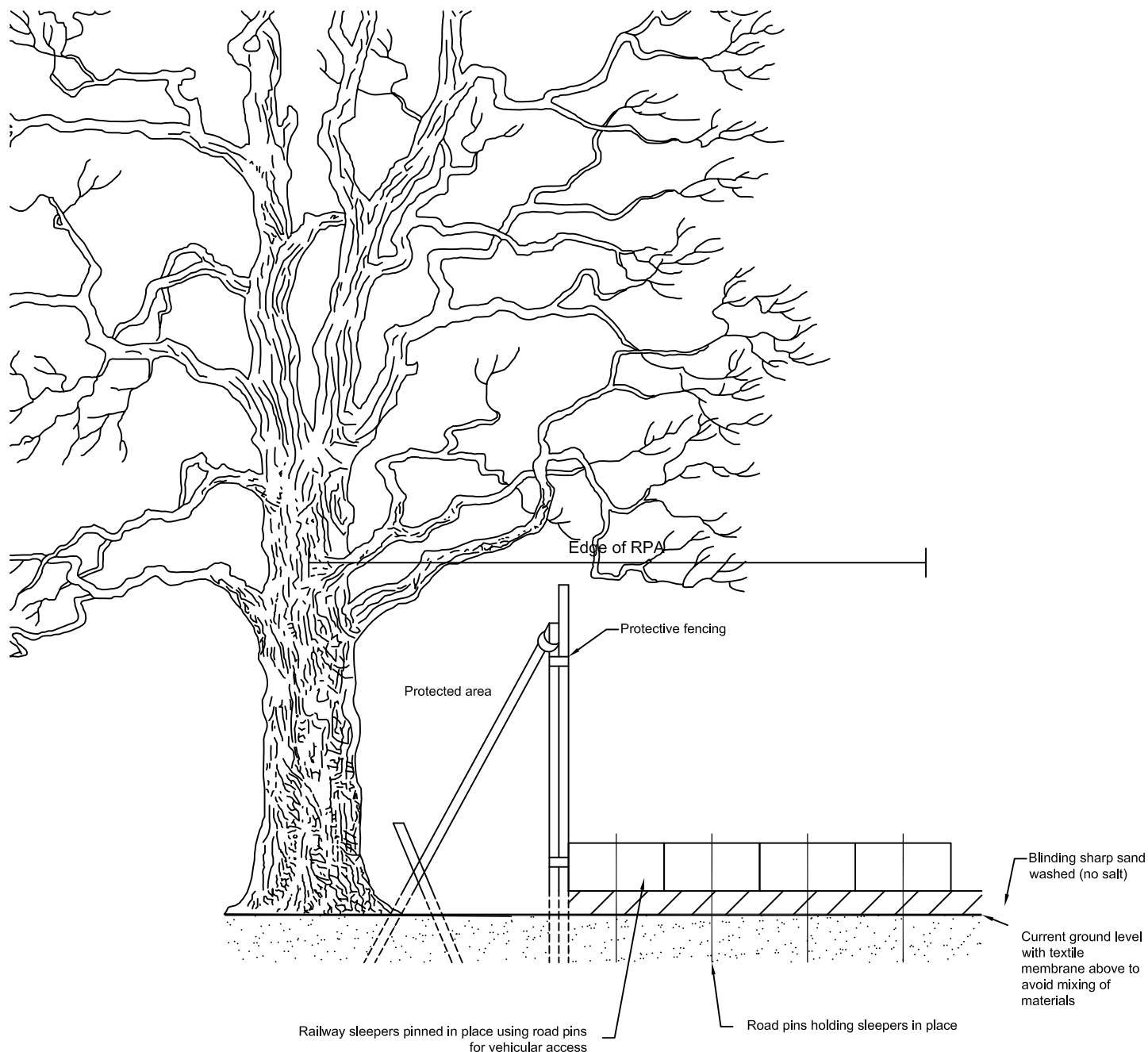
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Appendix 6: Vehicular Ground Protection

Drawing title:

Appendix 6: Ground protection within Root Protection Area (RPA)

Drawing reference:

Revision: -

Date: May 2012

Scale:

Sheet: 1 of 1

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Appendix 7: Construction exclusion zone sign

CONSTRUCTION EXCLUSION ZONE

KEEP OUT!

THE FOLLOWING MUST BE OBSERVED BY ALL PERSONS:

- THE PROTECTIVE FENCING MUST NOT BE MOVED
- NO PERSON SHALL ENTER THE PROTECTED AREA
- NO MACHINE OR PLANT SHALL ENTER THE PROTECTED AREA
- NO MATERIALS SHALL BE STORED IN THE PROTECTED AREA
- NO SPOIL SHALL BE DEPOSITED IN THE PROTECTED AREA
- NO EXCAVATION SHALL OCCUR IN THE PROTECTED AREA

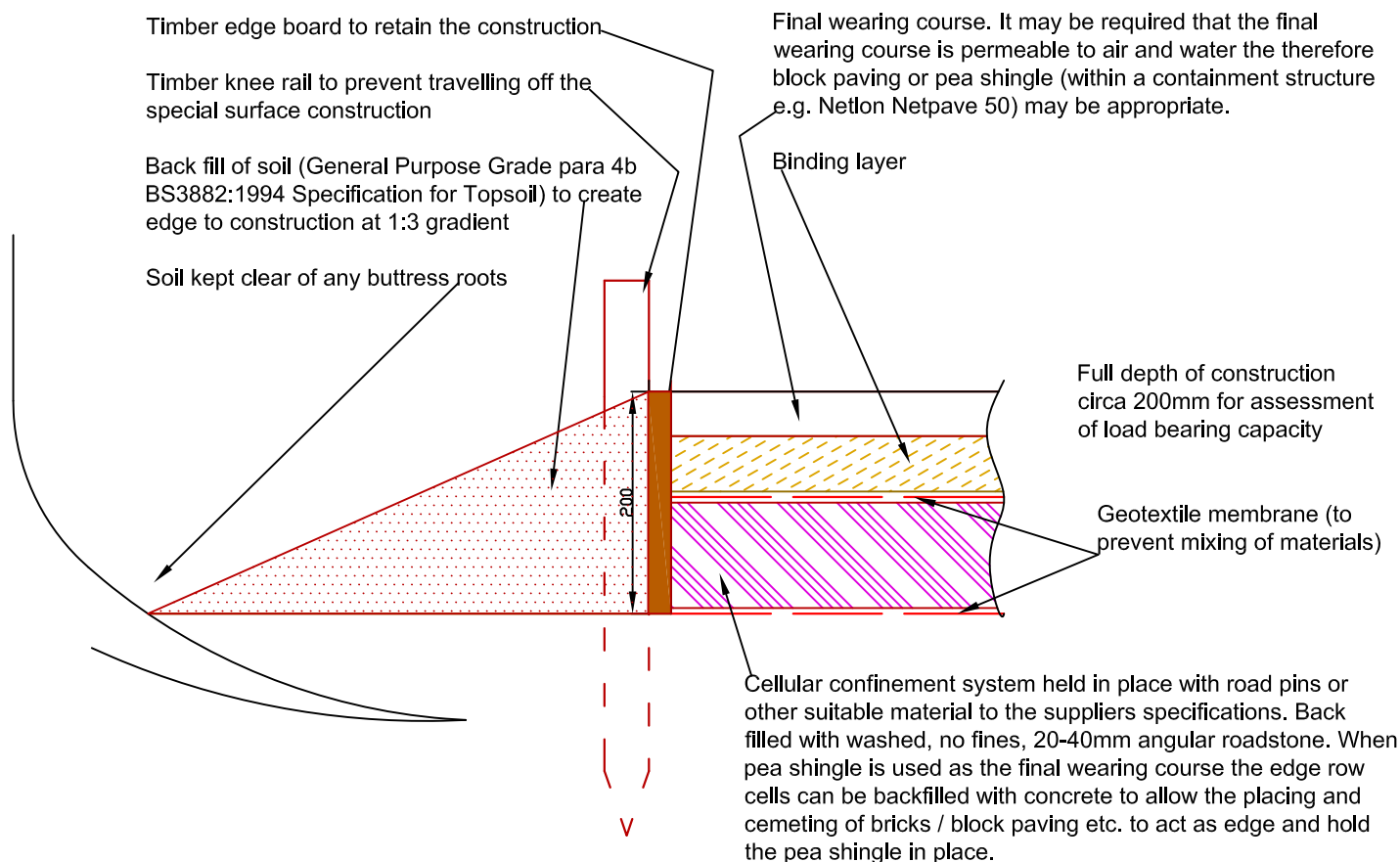
ANY ACCESS INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY

A3 sign on laminated all weather material at 1.8m on the protective fencing every 10m.

Appendix 8: Monitoring Sheet

Client:			
Site:			
Inspector:			
Date:			
Weather:			
	Yes	No	Comments
Has the protective fencing been installed?			
Are the TPZ signs in place?			
Has the protective fencing been moved?			
Has there been any works carried out or storage of materials within the TPZ?			
Is there any new visible damage to the trees?			
Has the condition of the trees significantly altered since the previous inspection?			
Are there any scheduled works within the TPZ?			
Have these works within the TPZ been agreed in writing with the LPA?			
Is the ground protection sufficient?			
Are there any additional measures required to aid the retention of the trees?			
Notes			

Appendix 9: Special surface construction



No rolling of the ground under the construction to occur as it not required and would restrict soil permeability for air and water

Where it is desirable to create a hard surface within the Tree Protection Zone the design of the construction / hard surface should follow specific aesthetic, engineering and biological parameters. The dual use of such an area within the Tree Protection Zone is usually in conflict, i.e. a rooting zone for the trees & a stable structure/ hard surface. Whilst it is accepted that there cannot always be a solution to this problem these issues may be successfully resolved if the following design factors are considered:

Engineering:

There should be adequate resistance to applied loads
Construction should be resistant or tolerant of deformation by tree root growth
Volumetric stability under range of moisture content and frost penetration
Adequate uniformity to avoid differential settlement
No change in soil pH (for instance from imported materials)
Waterlogging not to exceed 1-2 days duration during the growing season
Maintenance of hydraulic conductivity
Air channels not to be blocked by excessive compaction, smearing or extensive impermeable surfacing

Aesthetic:

The hard surface should meet the requirements of the users of the space
There should be no obstructions to pedestrians or trip hazards
There should be rapid disposal of surface water / infiltration of water
The cost of maintenance should be minimal
Litter should be easily removed
No settlement or deformation of the surface should occur

Biological:

The soil/rootzone should provide sufficient for the tree in maturity
Oxygen for the roots, according to seasonal demand
Water to meet seasonal demand
Anchorage
Availability of nutrients

An engineer should design the type of hard surface with specific specialist input from the developer/planner (aesthetic) and an arboriculturalist (biological).

Drawing title:

Special surface construction

Drawing reference: -

Revision: -

Scale: Not drawn to scale

Sheet: 1 of 1

General / Key:

Appendix 10: Tree protection plan



CONDITIONS OF ENGAGEMENT

1. Interpretation

'Client' means the person named on the Quotation for whom the Contractor has agreed to provide Specified Services in accordance with these terms.

'Contract' means the Contract for the provision of the Specified Services.

'Contractor' means Sapling Arboriculture Ltd.

'Quotation' means the Quotation to which these Terms and Conditions apply.

'Specified Services' means the service to be provided by the Contractor to the Client, as referred to in the Quotation.

2. The responsibilities of the Contractor

- 2.1 The Contractor shall provide the Specified Services to the Client as set out in the Quotation.
- 2.2 Timescales for the Specified Services will be agreed with the Client and adhered to as far as is reasonable. Where information received is out of date, inaccurate or if scheme design changes, it may not be possible to adhere to agreed timescale.
- 2.3 The Contractor shall provide his opinion on those matters in respect of which he has given the Client express written confirmation and subject to the limitations and conditions stated. The Contractor will not purport to express an opinion about or advise upon the condition of un-inspected parts of the land or trees and should not be taken as making any implied representation or statements about such parts.
- 2.4 The Contractor will only provide advice on matters within his arboricultural experience and qualifications.

3. The responsibilities of the Client

- 3.1 The Client shall provide the Contractor with accurate and up to date information as requested by the Contractor in a timely manner and in the format requested.
- 3.2 The Client shall notify the Contractor in writing of any changes to the Specified Services brief in the Quotation, scheme design or works instructions.
- 3.3 If a report suggests further investigation works be carried out by a specialist firm or person (e.g. Structural Engineer, Surveyor) the Client is responsible for sourcing such services and information. On no account will liability be accepted by the Contractor in respect of such matters nor if the client proceeds or acts without obtaining and acting upon the relevant further advice.

4. Assumptions

- 4.1 That the land, which is the subject of the inspection or survey, is not subject to any unusual or especially onerous restrictions, encumbrances or outgoing and that good title can be shown;
- 4.2 That the land and its value are unaffected by any matters which might be revealed by a local land search or replies to conveyancing enquiries or by any statutory notice and that neither the land nor its condition nor its uses nor its intended uses is, or will be unlawful or contrary to planning or building regulations;
- 4.3 That inspection of those parts of the land or soil strata or any tree which have not been inspected would neither reveal material defects nor cause the Contractor to alter his opinion materially;
- 4.4 That there are no underground pipes, wires, cables or other services or installations which might be damaged as a result of work recommended or necessary; and
- 4.5 That no tree is subject to legislation relating to Conservation Areas, Tree Preservation Order or terms of a planning consent, in relation to which the Client must make his own enquiries of the Local Planning Authority.

5. Charges

- 5.1 The Client shall pay the Contractor its fee regardless of any outcome as well as reimbursing the cost of all reasonable out of pocket expenses incurred.
- 5.2 Payment in full (including VAT) must be paid within 14 days of the date of the invoice.
- 5.3 No discount nor retention or set off against the amount due is allowed unless previously agreed by the Contractor in writing.
- 5.4 The Contractor reserves the right to charge interest on any monies which are not received within 14 days. In accordance with the Late Payment of Commercial Debts (Interest) Act 1998 the Contractor will be entitled to charge interest (both before and after any judgement of the amount unpaid) at the rate of 10% per month over the Bank of England base rate until payment in full is made (part of the month shall be treated as a full month for the purpose of charging interest).

- 5.5 All unpaid accounts will be referred to the County Courts. Sapling Arboriculture Ltd reserves the right to claim compensation in respect of debt recovery costs.
- 5.6 Sapling Arboriculture Ltd reserves the right to withhold the release of reports and other Specified Services until payment is received in full.

6. Contractor liability

- 6.1 Any report is provided for the sole use of the named client and is confidential to the client and his professional advisors. The Contractor accepts responsibility to the Client alone for the stated purposes of the report, which will be prepared with the skill, care and diligence reasonably expected of a competent Arboricultural Consultant, but no responsibility whatsoever is accepted to any person other than the client himself. Any other such person relying on the report does so at his own risk. Neither the whole nor any part of the report or any reference thereto may be included in any published document, circular or statement nor may it be published in any way without the Contractor's prior written approval of the form and context in which it may appear. Liability is limited to the amount that the Contractor is insured to. Intellectual Property Rights shall remain in the ownership of the Contractor.
- 6.2 The Contractor shall not be held liable to the Client or deemed to be in breach of the Contract by reason of any delay in performing, or failing to perform any of the Contractor's obligations in respect of the Specified Services, if the delay or failure was beyond the Contractor's control.
- 6.3
- (i) Subject as expressly provided in these conditions, and except where the client is sold to a person dealing as a consumer (within the meaning of the Unfair Contract Terms Act 1977) all warranties, conditions or other terms implied by the statute or common law are excluded to the fullest extent permitted by law.
 - (ii) Any claim by which the client is based on any defect in the nature or quality of the Company's services shall be notified to the Company within 7 days from the date of supply.
 - (iii) Except in respect of death or personal injury caused by the Company's negligence, the Company shall not be liable to the client by reason of any representation, or implied warranty, condition or other term, or any duty at common law, or under the express terms of any contract, for any consequential loss or damage (and whether caused by the negligence of the Company, his employees or agents or otherwise) which arise out of or in connection with the Contractor's services, except as expressly provided in these conditions.

7. Miscellaneous

- 7.1 Quotations are valid for 28 days from the date of the quotation.
- 7.2 Any dispute arising out of or in connection with the contract between the client and the Company shall be referred to the arbitration or a single arbitrator appointed by agreement between the parties or, in default of agreement, nominated on the application of either party to the Arboricultural Association.
- 7.3 The Contractor reserves the right to refuse work(s) if a conflict of interest is identified or arises.
- 7.4 The report is valid for a period of one year from the date on the report.
- 7.5 Each provision of these conditions limiting or excluding liability operates separately in itself and survives independently of the others.
- 7.6 The Contract between the Client and the Contractor shall be governed by the laws of England.