

**ARBORICULTURAL  
IMPLICATIONS  
REPORT**

**for :**

Entrance Driveway  
to  
Robsack Avenue  
Development  
St Leonards on Sea

**Produced for:**

Hastings Borough Council

**Prepared by:**

Edward Buckton

*BSc (hons) Forestry, M. Arbor. A*

**Date:** 15<sup>th</sup> May 2012

**Reference:**

eb/aiams1/e/robsackavev6

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## Contents

<u>Summary of Conclusions and Recommendations</u>	<u>4</u>
<u>Tree Appraisal and Implications</u>	<u>6</u>
<u>Tree Protection</u>	<u>10</u>
<u>Below Ground Considerations</u>	<u>11</u>
<u>Specialist Supervision</u>	<u>13</u>
<u>General Site Care</u>	<u>14</u>

## Appendices

<u>Appendix 1</u>	<u>Tree Survey Schedule &amp; Tree Constraints Plan</u>
<u>Appendix 2</u>	<u>Tree Protection Plan (TPP) Tree Removal Plan (TRP) and Examples of Tree Protection Fencing</u>
<u>Appendix 3</u>	<u>ACS Guidance for a low-invasive construction method and Examples of Load Dissipating Materials</u>
<u>Appendix 4</u>	<u>Examples of Ground Protection</u>
<u>Appendix 5</u>	<u>Site Supervision/Monitoring Record</u>
<u>Appendix 6</u>	<u>Hand Digging in the vicinity of trees</u>

# Arboricultural Implications and Tree Protection Methods

## Summary of Conclusions and Recommendations

Subject to the implementation of the proposed scheme in accordance with the recommendations set out in this report, the landscape and important trees will not be adversely affected either directly by or resulting from the construction of the proposed scheme.

As a consequence of the above, the scheme will have a low impact upon the visual character and appearance of the area.

## Recommendations

1. **Undertake a pre-commencement site meeting**
2. **Agree the sequence of events**
3. **Adhere to the tree protection measures stipulated in this report**
4. **Monitor tree protection during construction period**

### 1.0 Introduction and Scope

- 1.1 This report has been commissioned by Hasting Borough Council to; i) assess the trees in accordance with BS 5837:2005 'Trees in relation to construction- Recommendations' (The BS); ii) detail the arboricultural consequences of the proposed project and assess its visual impact upon trees and amenity; iii) provide recommendations for effective tree protection, which are commensurate and appropriate for the scale and type of development; iv) develop a tree protection strategy for the duration of the construction including any land preparation or demolition works.
- 1.2 Reference to 'the proposed scheme' below will mean either the approved scheme for which planning consent has been granted or the scheme under consideration by the Local Planning Authority (LPA).
- 1.3 The trees were inspected, in accordance with BS 5837:2005 'Trees in relation to construction- Recommendations' on the 24<sup>th</sup> Sept 2010 and a total of 27 tree records are provided.

- 1.4 This report sets out the protection measures that will be adopted to ensure effective tree preservation. The basic principles are that; the established fenced and ground protected areas are exclusion zones for the duration of the construction (or as duly agreed) and; excavations within the BS root protection areas (RPA) will be subject to professional assessment (see Note 1).
- 1.5 A full hazard assessment of the trees (including for example the assessment of decay or defects and its implications), has not been undertaken as this information is considered beyond the scope of this report. Naturally, any obvious hazards have been identified in the schedule and, I recommend that these are acted upon as soon as practicable.
- 1.6 Any operational practices recommended in this report are to be undertaken by the appropriate specialist company. Operatives are to carry out the relevant risk assessment and record such information, prior to commencement of tasks and work in accordance with current Health and Safety standards, practices and legislation. Unless formally agreed, no contractors are assessed, appointed or monitored by ACS Consulting. Responsibility and liability of all actions, non-actions, products and services associated directly with this report will be limited to the relevant client and contractor.

#### General Site Description

- 1.7 The development site is situated off Robsack Avenue and adjoins existing residential development to the north. The site is enclosed on the remaining three sides by mature ancient semi-natural woodland with access through thin strip of this woodland, covered by an area TPO. The existing access road/track is unsurfaced and the scheme requires that it is enlarged and improved to adequately service the development. Although some low value trees are directly lost as a consequence, as demonstrated within this report, no amenity value will be lost

## 2.0 Tree Appraisal & Implications

- 2.1 The tree details are presented at **Appendix 1**. These details conform to those recommended by BS 5837:2005 'Trees in relation to construction-Recommendations'. The position of the trees is shown on the Tree Constraints Plan (TCP) at **Appendix 1**.
- 2.2 The implications of the proposed scheme, in terms of tree pruning and other works are detailed in the table below. An assessment of the visual impact of the works resulting from the scheme OR as a consequence of sensible arboricultural husbandry is also provided.

Table 1 – Recommended Tree Works

Tree Works (Spec.)	Tree Nos	Visual Landscape Impact of Works*	Available Replacement Planting(Y/N)	Comments
Fell	16, 17, 18, 19, 20 21, 23, 27	Low to Medium	Y (Within development)	Removal of four 'R' grade trees and four 'C' grade trees
Crown Lift to 4m	5, 8, 9 15 , 22	None	NA	To facilitate access and tree protection measurers
Total		Low to Medium		

\*This is a preliminary visual appraisal based upon the opinion of the author having inspected the trees in the context of their current surroundings. – None (no change or beneficial impact) Negligible or indiscernible difference to treed landscape; Low – Noticeable but mitigated by retention of other landscape trees and features; Medium – Obvious but temporary alteration to the treed landscape; High – Obvious and permanent alteration to the landscape.

Visual receptors include the public or community at large, residents, visitors or other groups of viewers together with the visual amenity of potentially affected people.

## **Specifications for recommended tree works:**

### General

All work is to conform to BS 3998:2010 'Tree work – Recommendations' and with current arboricultural best practice. Tree works are to be undertaken by a professional and specialist arboricultural contractor, who carries the appropriate experience and insurance cover, equipment and PPE. All works and processes are to comply with all relevant Wildlife, Environmental, Conservation and Health and Safety legislation.

01. Crown reduction will include reducing the height and spread of a tree's canopy (branching structure) whilst retaining the tree's natural tree form (species determined). The amount of reduction will be referred to as a percentage of the whole (canopy) combined with guidance on metre length e.g. 20% (up to 2m) for a 10m high canopy (excludes the ground clearance). Crown reduction work will be undertaken for a specific purpose which may include containing tree growth in a given location or reducing wind purchase and stress.
02. Part reduction include pruning back from structures or boundaries and which is normally applied to no more than two sides of a tree's canopy. The amount of pruning is specified in metres. The result form will be even and provide a framework for re-growth in an even form. The extent of pruning will not impinge upon tree condition and seek to preserve so far as possible, the natural outline of the tree, which is species determined.
03. Crown Cleaning involves the removal of all dead wood small and large diameter, stubs and broken branches. Some small, densely arranged shoots (including epicormic shoots) will be thinned out or removed as recommended.
04. Crown lifting includes the removal of the lowest lateral branches and shoots, (which would not result in irrevocable tree injury), to a specific height above ground level measured in metres.
05. Crown thinning involves the removal of sub-lateral (secondary) branches to appropriate branch/shoot unions, removal of dead and damaged (crossing branches) with a view to reducing the crown density by a specified %, normally no higher than 30%.
06. Felling involves the careful removal of a tree to ground level (or other specified height), either in sections or in one unit (straight felling). The method of felling will be suited to the constraints of the site and judged by the competent operator undertaking the task.

- 2.3 As a consequence of my assessment above, I believe the visual impact of the scheme to be medium in the context of trees and their sustainable contribution to the landscape and local amenity.
- 2.4 Commencement of all or some of the proposed works may be subject to written authorisation from the Local Planning Authority (LPA) should planning consent be obtained. We strongly advise that authorisation for any tree works is obtained from the LPA prior to commencement.
- 2.5 **Specific Comments on Tree Stock in Relation to Scheme** (Impact of scheme on trees)
- 2.5.1 The principal implication of the scheme is the removal of eight (8) trees to allow the widening of the existing access route, to adequately serve the new development. This is illustrated on the Tree Removal Plan (TRP) at Appendix 2. Those trees to be lost are either of a low quality and value or within the 'Remove' category in accordance with BS5837 (Trees in Relation to Construction). Owing to their quality and limited life expectancy, these eight trees should not constitute a constraint on development at the site. Mitigation shall be provided through landscaping proposals associated with the scheme.
- 2.5.2 The loss in canopy cover will not alter the character and appearance of the locality or have a detrimental effect on the wider amenity value of the group. I have not identified any negative effects on the function of the woodland as a whole. As a consequence, I do not consider that works necessary for the scheme entrance will have a detrimental impact on the functioning of the ancient semi natural woodland. This is because the required tree works do not affect the main canopy trees and only low value, understory trees are to be removed. These trees would be subject to natural loss due to shading out, as well as natural decline. The felled timber can be stacked within the woodland to prevent loss in beneficial deadwood habitats.

- 2.5.3 Canopy closure, in the interest of maintaining wildlife corridors, will be sustained via the closed canopies of surrounding trees. As a consequence, the overall loss of canopy cover will be minor. However, to be clear, there will be a break in the canopy as a consequence of the access road. Whilst the appointed ecologist can advise on the need for any mitigation measures they feel are necessary, the canopies of trees around and including T8, will remain in contact with neighbouring trees. Critically, the canopies of Tree 15 and Tree 22, as shown on the Tree Removal Plan at **Appendix 2** (taken from the original topographical survey), remain in contact. I also consider that any break in the canopy, will be quickly filled by extension growth (approx 2 years), as the trees are in good health and condition.
- 2.5.4 The new entrance driveway involves additional surfacing and widening within the RPA's of retained trees. To avoid root damage and/or soil compaction, a low invasive construction methodology will be applied. This will ensure the gaseous and aqueous exchange will be maintained and as a consequence, I do not consider that the proposals will have a detrimental effect on the retained trees.

### 3.0 Tree Protection Measures

#### General

3.1 A tree's BS root protection area (RPA) is based upon a radius measurement taken from the trunk centre. Professional arboricultural judgement may identify modifications to the morphology of an RPA. Any work within a tree's RPA will be subject to professional advice and the guidance set out in this report, particularly where construction is required within this area but beyond the position of fixed tree protection fencing.

3.2 Effective tree protection will be afforded subject to following a logical sequence of events, which **will follow a pre-commencement site meeting** (see para. 6.0). Invitees will include LPA representatives and the site agents and any specialist supervisors:

('S' refers to the stage in order)

S1 Undertake any agreed and or necessary tree works.

S2 Erect protective fencing and install ground protection

S3 Carry out ground works

S4 Remove protective fencing and complete porous hard surfacing areas

3.3 The protection fencing will be erected in the position indicated on the Tree Protection Plan (TPP) at **Appendix 2**.

3.4 The type of fencing and its recommended specification is attached at **Appendix 2** also. In this case both, hoarding or fixed Heras fencing will be effective.

- 3.5 The protection fencing will remain in position for the duration of the construction phases, including the removal of the existing structures and land preparation. Clear signs will be attached to the fencing once erected – suggested wording will be ‘**Protected Trees – No Access and Do Not Move this Fence**’.

Fig.1 Example of site signage (Tree protection)



- 3.6 Where, for construction purposes, it is necessary to position tree protection fencing within the RPA of retained trees, suitable ground protection will be installed to prevent undue soil/root compaction from pedestrian and/or vehicular traffic. At **Appendix 4** are recommended examples of effective ground protection suited for this location. Included in the Appendix also is a diagrammatic indication of how ground protection or hard surfacing offers effective root/soil protection. The type of ground protection will be suitable for the type of proposed traffic e.g. scaffold boards over compressible material will be suitable for pedestrian and light machinery such as wheel barrows but polyethylene or steel ground plates will be used for heavier machinery and temporary re-enforced concrete may be suitable by agreement.

#### 4. Below Ground Considerations

- 4.1 Construction for the driveway will be undertaken by adopting the low-invasive methodology as described in the BS at para. 11.8.1. The driveway location and construction methodology has been designed with full consultation and agreement with the design team (Adams Johns Kennard Architects and Kember Loudon Williams LLP) and has been specified by Monson Engineering Limited. The route and exact location driveway have been optimised so as to retain the better trees with the loss of primarily low value or poor quality trees. A cellular confinement system (similar to ACS’s generic specification) is to be utilised to avoid soil compact and inadvertent root damage with engineering drawings provided by Monson Engineering Ltd and included at **Appendix 3**.

- 4.2 Block paving (for the main carriageway) and pavers (for pedestrian footways) have been specified as the wearing course. These can be constructed to be porous in nature and will allow the continued exchange of moisture and oxygen. Installation of low-invasive edging structures to retain load spreaders and hard surfacing is also included in the specification, to avoid continuous trenching, which may encounter and damage roots.
- 4.3 Hand excavations which are required within the RPA of tree No 8 may encounter some roots. Although soil excavation near trees and root pruning is outlined in **Appendix 6**, specifically in this case however the treatment of roots will be undertaken in the following ways:
- i) Clearly mark out the area for hand dig (using biodegradable marker paint) (see TPP)
  - ii) Use hand tools (forks and spades) to remove the spoil and deposit beyond RPA.
  - iii) Identify roots to be retained by brushing or the use of compressed air
  - iv) Unless after professional assessment permits pruning, roots in excess of 25mm Ø are to be retained in-situ by manually clearing around (with compressed air for example), wrapping with woven geotextile (e.g. Terram), covering with a void former e.g. split, rigid polythene piping, and filling with an compressible material (e.g. polyurethane foam).
  - v) Unless after professional assessment permits pruning, retention of roots 50mm Ø or more will be by the use of void-formers.
  - vi) Roots <25mm Ø will be pruned using sharp pruning tools. Roots will be pruned back to a side shoot or suitable position, ensuring the exposed face is kept to a minimum.

## 5.0 Soil Grade Level Changes

- 5.1 There are no significant changes proposed to soil levels (existing grade level), within the RPA of any retained tree. As such, no specific instructions are required to address grade changes and tree preservation.

## 6.0 Site Supervision - Arboricultural Specialist

- 6.1 It is important to recognize that the Local Planning Authority Officers (Enforcement Departments) have stringent powers to serve a **Temporary Stop Notice** through recent changes in the legislation governing planning and development. Circular 02/2005 (see Note 2). It is therefore important that works, which may impact upon trees and amenity, are suitably controlled by competent personnel. Identified below are details of a site monitoring process designed to minimize potential risks to retained trees on or off site.
- 6.2 A **pre-commencement** site meeting, involving invited representatives from the developer, contractors and engineers (as appropriate) and relevant LPA officers, will be undertaken to establish the principal timings and actions.
- 6.3 So as to ensure that the tree protection measures are implemented, an arboricultural specialist will be appointed to record the condition of the trees to be retained and the position and type of tree protection erected and or installed. The specialist will make a record of visits and which will be retained by the contractor/developer and or left on site for inspection (see **Appendix 5**).
- 6.4 Key times for site supervision include:
1. Completion of agreed/necessary tree works
  2. Erection of tree protection fencing
  3. Installation of ground protection
  4. Works within RPA's of retained trees
  5. Landscaping

**NOTE: THE APPOINTED ARBORICULTURAL EXPERT IS TO BE CONSULTED BEFORE ANY WORK, EITHER SCHEDULED OR UNSCHEDULED, IS UNDERTAKEN WITHIN THE ROOT PROTECTION AREAS OF ANY RETAINED TREE. FAILURE TO DO SO MAY LEAD TO ENFORCEMENT ACTION.**

- 6.5 Site monitoring will be at regular intervals. Below is a recommended programme of arboricultural supervision. (This programme may alter dependant upon site circumstances or by agreement.)

<b>Stage</b>	<b>Action</b>	<b>Arboricultural Supervisor (AS) (Required – Y/N)</b>	<b>Notes</b>
1	<i>Pre-commencement meeting</i>	Y	<i>LPA, Site Agent(SA) and demolition contractor to attend</i>
2	<i>Tree works</i>	Y	<i>Following completion of tree works</i>
3	<i>Installation of Tree protective fencing and ground protection</i>	Y	<i>PRIOR to demolition works</i>
4	<i>Excavations within the RPA of Tree 8</i>	Y	<i>To advise on root treatment</i>

## 7.0 General Site Care

- 7.1 No fires will be lit on site.
- 7.2 No access will be permitted to within the fenced or otherwise protected areas (unless for site accommodation or Authorised agreement) at any stage during construction.
- 7.3 No materials, equipment or debris will be stored within the fenced areas unless agreed with the arboricultural supervisor.
- 7.4 Areas for mixing are to be located beyond RPAs of trees and contained to prevent leaching into the soil.
- 7.4 A copy of this report and the Tree Protection Plan is to remain on site at all times.

Note 1. RPA to be assessed by an arboriculturalist. BS 5837:2005 'Trees in Relation to Construction - Recommendations' paras. 5.2.4 and 11.1.1.

Re-building of existing structures located within the protection distances, such as retaining walls, may require soil excavation and root treatment.

Note 2. The Circular 02/2005 gives guidance on the temporary stop notice provisions in Part 4 of the Planning and Compulsory Purchase Act 2004 which inserted sections 171E to 171H to the Town and Country Planning Act 1990.

**Liability Limitation**

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# APPENDIX 1

Site: Robsack Avenue, St Leonard's -on- Sea  
Date: 24th Sept 2010

Surveyor: E. Buckton  
Ref:robsackTS

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Sub Cat	Useful Life	Observations
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T1	Willow, Goat	11	1 3 2 5	1	Mature	420 MS	10	4.2	Normal	Fair	Medium	C 2	20-40	Multi stem weakness Ivy covered trunk and branches
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T2	Willow, Goat	11	2 1 3	1	Mature	370 MS	10	3.7	Normal	Fair	Medium	C 2	20-40	Ivy covered trunk and branches Leaning (significantly)
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T3	Sycamore	14	3 3 4 6	1	Mature	550	10	5.5	Normal	Fair	Medium	C 2	20-40	Twin stem Included bark in main stem unions self sown
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**Notes:**

- Height describes the approximate height of the tree measured in meters from ground level.
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- Ground Clearance is the height in meters of crown clearance above adjacent ground level.
- Stem Diameter is the diameter of the stem measured in millimeters at 1.5m from ground level for Single Stemmed (SS) trees or at ground level for Multi Stemmed (MS) trees. Stem Diameter may be estimated (est) where access is restricted or an average (ave) taken for groups of trees.
- Protection Multiplier is 12 for single stemmed and 10 for multi-stemmed trees and is the number used to calculate the tree's protection radius and area.
- Protection Radius is a radial distance measured from the trunk centre.
- Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
- Structural Condition - Good (no or only minor defects), Fair (remediable defects), Poor - Major defects present.
- Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
- B.S. Cat refers to (British Standard 5837:2005 Table 1) and refers to tree/group quality and value: 'A' - High, 'B' - Moderate, 'C' - Low, 'R' - Remove.
- Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
- Useful Life is the tree's estimated remaining contribution in years.

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T4	Oak, Turkey	12	9 3 5 4	.5	Mature	650	10	6.5	Normal	Poor	Low	C	2	10-20	Windblown Ivy smothered
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T5	Sycamore	18	7 7 6 5	4	Mature	860	12	10.3	Moderate	Fair	Medium	B	2	20-40	Multi stem Included bark in main stem unions ivy covered
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G6	Hazel	8	2 2 2	2	Mature	120a	12	1.4	Moderate	Fair	Low	C	2	10-20	Ivy covered trunk and branches Understorey vegetation coppice regrowth
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T7	Oak, Common	16	10 8 5 7	3	Mature	570	12	6.8	Normal	Good	High	A	2	>40	Root pattern affected by structures Ivy smothered
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T8	Oak, Common	14	3 2 1 2	6	Mature	460	12	5.5	Moderate	Fair	Low	C	2	10-20	Subordinate tree Suppressed by nearby tree
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T9	Beech, Common	18	6 5 2 3	2	Mature	580	10	5.8	Normal	Fair	Medium	C	2	20-40	One-sided form/suppressed Leaning (significantly) growing out of bank, decay in trunk base
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T10	Beech, Common	18	2 3 2	.5	Mature	460	10	4.6	Normal	Fair	Medium	C 2	20-40	Multi stem weakness growing out of bank, decay in trunk base
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T11	Oak, Common	10	7 1 2 1	1.5	Middle Aged	350	12	4.2	Moderate	Fair	Low	C 2	10-20	Suppressed by nearby tree Subordinate tree
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T12	Oak, Common	7	7 1 1 1	5	Middle Aged	320	12	3.8	Moderate	Fair	Low	C 2	10-20	Suppressed by nearby tree Subordinate tree
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Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Sub Cat	Useful Life	Observations
----------	--------------	--------	--------------	------------------	-----------	---------------	-----------------------	-------------------	-----------------	----------------------	------------------------	--------------	-------------	--------------

T13	Oak, Common	18	4 7 1 2	6	Mature	420	12	5.0	Normal	Good	Medium	B 2	20-40	One-sided form/suppressed
-----	-------------	----	------------------	---	--------	-----	----	-----	--------	------	--------	-----	-------	---------------------------

G14	Oak, Common	18	7 4 4 4	4	Mature	600	12	7.2	Normal	Good	Medium	A 2	20-40	Ivy covered trunk and branches A group with insignificant defects root patten effected by drainage ditch running to north
-----	-------------	----	------------------	---	--------	-----	----	-----	--------	------	--------	-----	-------	---

T15	Maple, Field	15	8 2 8 3	1	Mature	360	12	4.3	Normal	Good	Medium	B 2	20-40	Low branches Deadwood throughout crown
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**Notes:**

- Height describes the approximate height of the tree measured in meters from ground level.
- The Crown Spread refers to the crown radius in meters from the stem center and is shown above on each of the four compass points (i.e. N, S, E, W).
- Ground Clearance is the height in meters of crown clearance above adjacent ground level.
- Stem Diameter (SS) trees or at ground level for Multi Stemmed (MS) trees. Stem Diameter may be estimated (est) where access is restricted or an average (ave) taken for groups of trees.
- Protection Multiplier is 12 for single stemmed and 10 for multi-stemmed trees and is the number used to calculate the tree's protection radius and area.
- Protection Radius is a radial distance measured from the trunk centre.
- Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak), Dead (dead or dying tree).
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- Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
- B.S. Cat refers to (British Standard 5837:2005 Table 1) and refers to tree/group quality and value: 'A' - High, 'B' - Moderate, 'C' - Low, 'R' - Remove.
- Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
- Useful Life is the tree's estimated remaining contribution in years.

Site: Robsack Avenue, St Leonard's -on- Sea  
Date: 24th Sept 2010

Surveyor: E. Buckton  
Ref:robsackTS

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Sub Cat	Useful Life	Observations
----------	--------------	--------	--------------	------------------	-----------	---------------	-----------------------	-------------------	-----------------	----------------------	------------------------	--------------	-------------	--------------

T 16	Hawthorn	12	3 1 1	2	Mature	240	12	2.9	Moderate	Fair	Low	R 2	<10	Suppressed by nearby tree barbed wire growing within stem
------	----------	----	-------------	---	--------	-----	----	-----	----------	------	-----	-----	-----	--

T 17	Hawthorn	9	1 1 1	2	Mature	240	12	2.9	Moderate	Fair	Low	R 1	<10	Suppressed by nearby tree Ivy covered trunk and branches barbed wire growing within stem
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T 18	Maple, Field	14	3 7 4	1	Mature	430	12	5.2	Normal	Poor	Medium	C 2	10-20	Decay at trunk base Weak unions
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**Notes:**

- Height describes the approximate height of the tree measured in meters from ground level.
- The Crown Spread refers to the crown radius in meters from the stem center and is shown above on each of the four compass points (i.e. N, S, E, W).
- Ground Clearance is the height in meters of crown clearance above adjacent ground level.
- Stem Diameter is the diameter of the stem measured in millimeters at 1.5m from ground level for Single Stemmed (SS) trees or at ground level for Multi Stemmed (MS) trees. Stem Diameter may be estimated (est) where access is restricted or an average (ave) taken for groups of trees.
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Site: Robsack Avenue, St Leonard's -on- Sea

Date: 24th Sept 2010

Surveyor: E. Buckton  
Ref:robsackTS

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Sub Cat	Useful Life	Observations
----------	--------------	--------	--------------	------------------	-----------	---------------	-----------------------	-------------------	-----------------	----------------------	------------------------	--------------	-------------	--------------

T 19	Maple, Field	17	5 5 2	6	Mature	290	12	3.5	Normal	Fair	Medium	C	2	10-20	Ivy smothered Suppressed by nearby tree
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T 20	Oak, Common	14	1 7 1	9	Mature	400	12	4.8	Moderate	Fair	Medium	C	2	10-20	Suppressed by nearby tree Ivy covered trunk and branches
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T 21	Oak, Common	7	1 6 1	5	Middle Aged	330	10	3.3	Moderate	Fair	Low	C	2	10-20	Suppressed by nearby tree Twin stem
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**Notes:**

- Height describes the approximate height of the tree measured in meters from ground level.
- The Crown Spread refers to the crown radius in meters from the stem center and is shown above on each of the four compass points (i.e. N, S, E, W).
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Site: Robsack Avenue, St Leonard's -on- Sea

Date: 24th Sept 2010

Surveyor: E. Buckton  
Ref: robsackTS

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Sub Cat	Useful Life	Observations
----------	--------------	--------	--------------	------------------	-----------	---------------	-----------------------	-------------------	-----------------	----------------------	------------------------	--------------	-------------	--------------

T22	Oak, Turkey	17	4 8 3 5	5	Mature	530	12	6.4	Moderate	Good	Medium	B 2	20-40	A sparser than normal canopy Inspection limited by ivy/access
-----	-------------	----	------------------	---	--------	-----	----	-----	----------	------	--------	-----	-------	--

T23	Maple, Field	14	2 2 5 2	3	Mature	360	12	4.3	Normal	Poor	Low	R 1	<10	Windblown
-----	--------------	----	------------------	---	--------	-----	----	-----	--------	------	-----	-----	-----	-----------

G24	Hazel / Hawthorne	6	2 2 2	2	Mature	140a	12	1.7	Moderate	Fair	Low	C 2	10-20	Ivy covered trunk and branches Understorey vegetation coppice regrowth
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**Notes:**

- Height describes the approximate height of the tree measured in meters from ground level.
- The Crown Spread refers to the crown radius in meters from the stem center and is shown above on each of the four compass points (i.e. N, S, E, W).
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Site: Robsack Avenue, St Leonard's -on- Sea  
Date: 24th Sept 2010

Surveyor: E. Buckton  
Ref:robsackTS

Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Sub Cat	Useful Life	Observations
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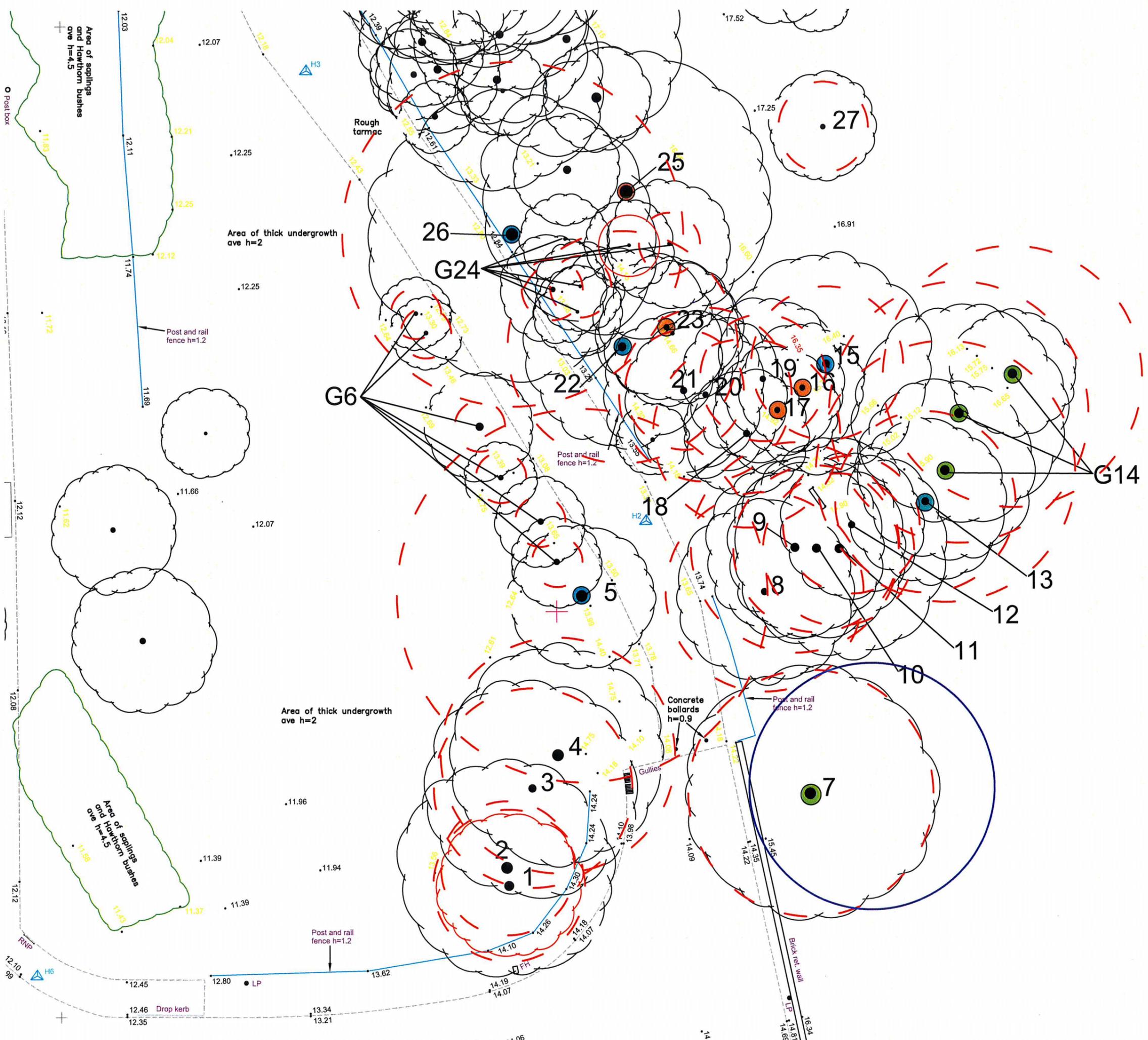
T25	Maple, Field	11	7 4 11 4	1	Mature	800e	10	8.0	Normal	Poor	Low	R 1	<10	Windblown
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T26	Oak, Turkey	19	7 12 5 5	3	Mature	780	12	9.4	Moderate	Good	High	B 2	20-40	One-sided form/suppressed Inspection limited by ivy/access
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T27	Maple, Field	5	1 2 2 5	.5	Middle Aged	250	10	2.5	Normal	Fair	Medium	C 2	10-20	regrown from windblown stem
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**Notes:**

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- The Crown Spread refers to the crown radius in meters from the stem center and is shown above on each of the four compass points (i.e. N, S, E, W).
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BS Root Protection Area, (RPA) shown uniform here but site features such as roadways, kerb and foundations, may modify root patterns and therefore the RPA shape

The BS rooting areas are to remain free from construction works which has the potential to damage or remove roots to an extent which may affect the condition of the tree.

	A grade trees		C grade trees (clear)
	B grade trees		R grade trees

The BS rooting areas offset to account for modifications due to site features

Project:  
Robsack Avenue

Drwg Title:  
Tree Constraints Plan

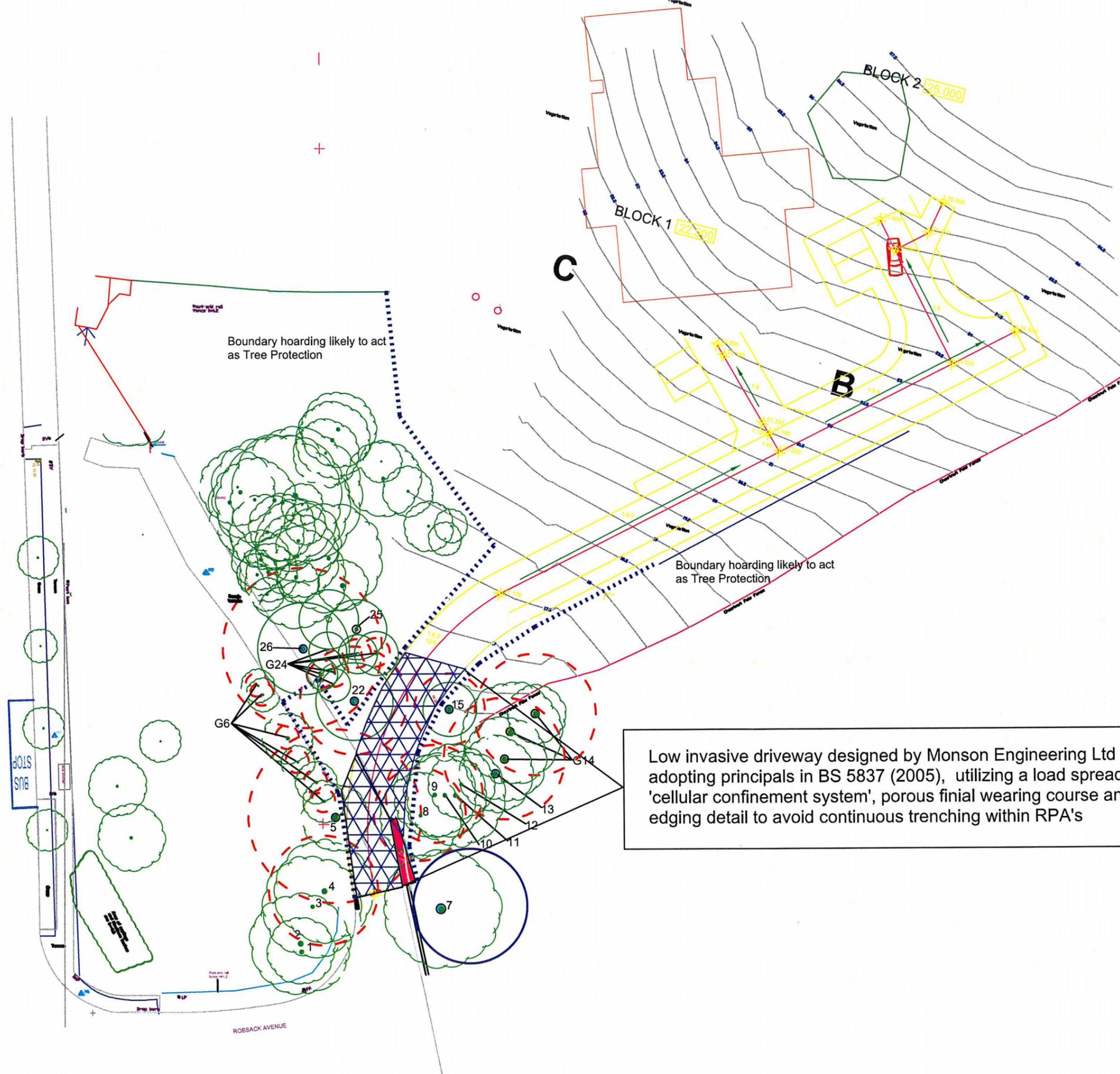
SCALE: 1:200@A.3      DATE:26th Sept 2010

DRAWN BY: EB

DRAWING NO:      REV:

TCPEBACS102010

## APPENDIX 2



Low invasive driveway designed by Monson Engineering Ltd adopting principals in BS 5837 (2005), utilizing a load spreading 'cellular confinement system', porous final wearing course and edging detail to avoid continuous trenching within RPA's

- BS Root Protection Area, (RPA) shown uniform here but site features such as roadways, kerb and foundations, may modify root patterns and therefore the RPA shape
- A grade trees
- C grade trees (clear)
- B grade trees
- R grade trees
- The BS rooting areas offset to account for modifications due to site features
- Recommended position of fixed 'Heras' style tree protection fencing.
- Hand digging with RPA of Retained Trees
- Recommended area for low-invasive & permeable hard standing construction methods.

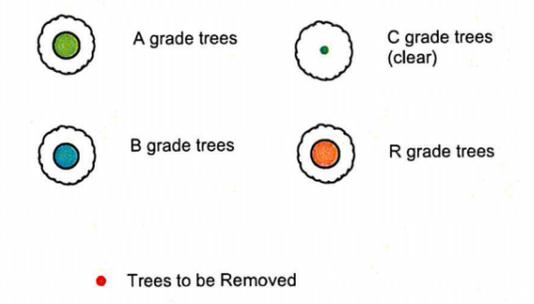
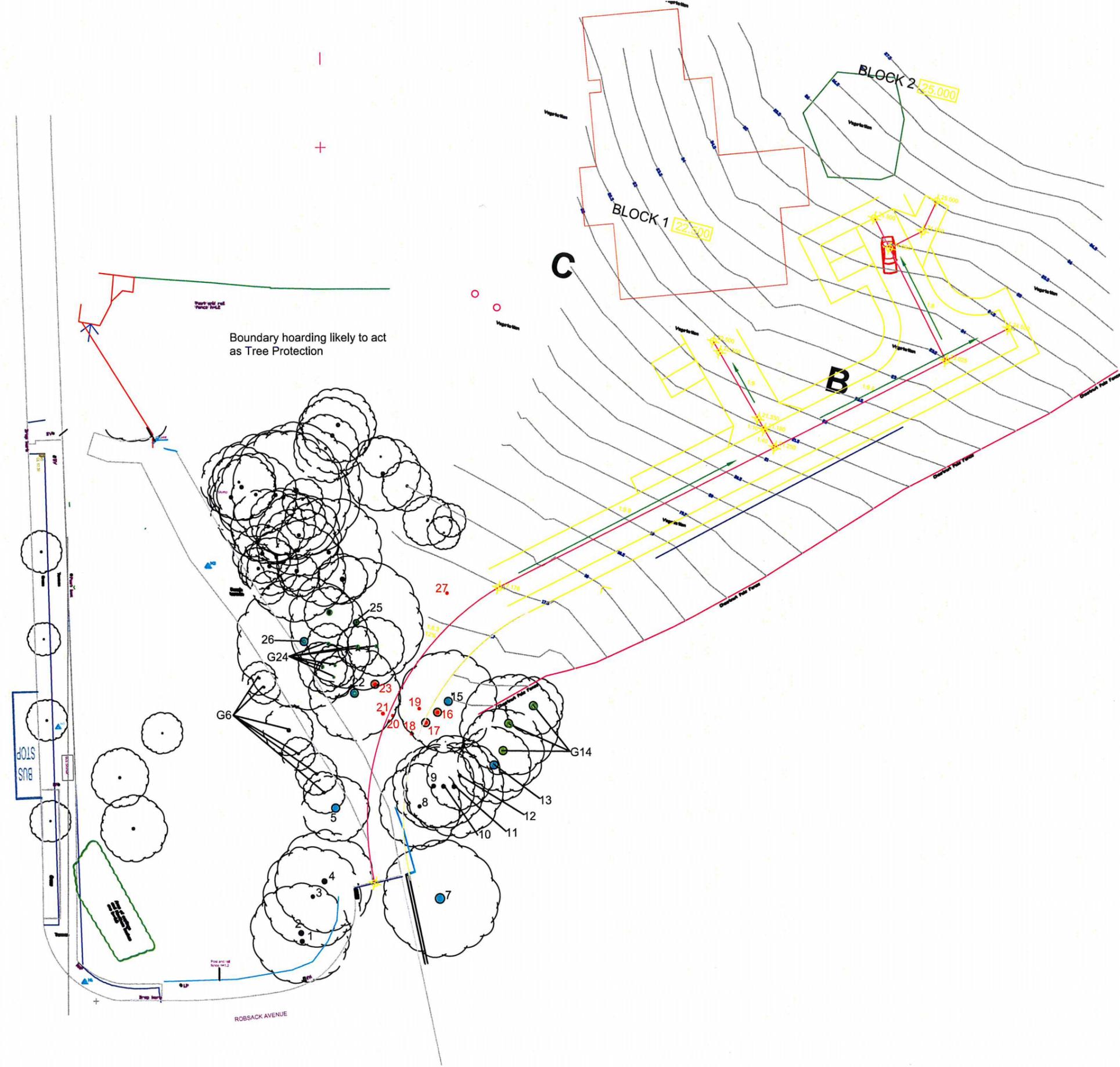
Project:  
Robsack Avenue - Entrance Driveway

Drwg Title:  
Tree Protection Plan

SCALE: 1:200@A.3  
DATE: Mar 2012  
DRAWN BY: EB

DRAWING NO: TPPEBACS-RA-MAR2012  
REV: 2

Access route designed and agreed with design team and Hastings Borough Council to have least impact on the integrity and canopy cover of Ancient Semi-Natural Woodland



Project:  
Robsack Avenue - Entrance Driveway

Drwg Title:  
Tree Removal Plan

SCALE: 1:200@A.3	DATE: May 2012
	DRAWN BY: EB
DRAWING NO: TRPEBACS-RAMAY2012	REV:

# Tree Protection Fencing

**Specifications** (specifically identified by outline box)

## 2.4m Hoarding

3.0m 100 X 100mm square wooden posts

3 X 38 X 87mm wooden rails affixed to posts

2.4m X 1200 outside grade ply panels (12mm) affixed to rails.

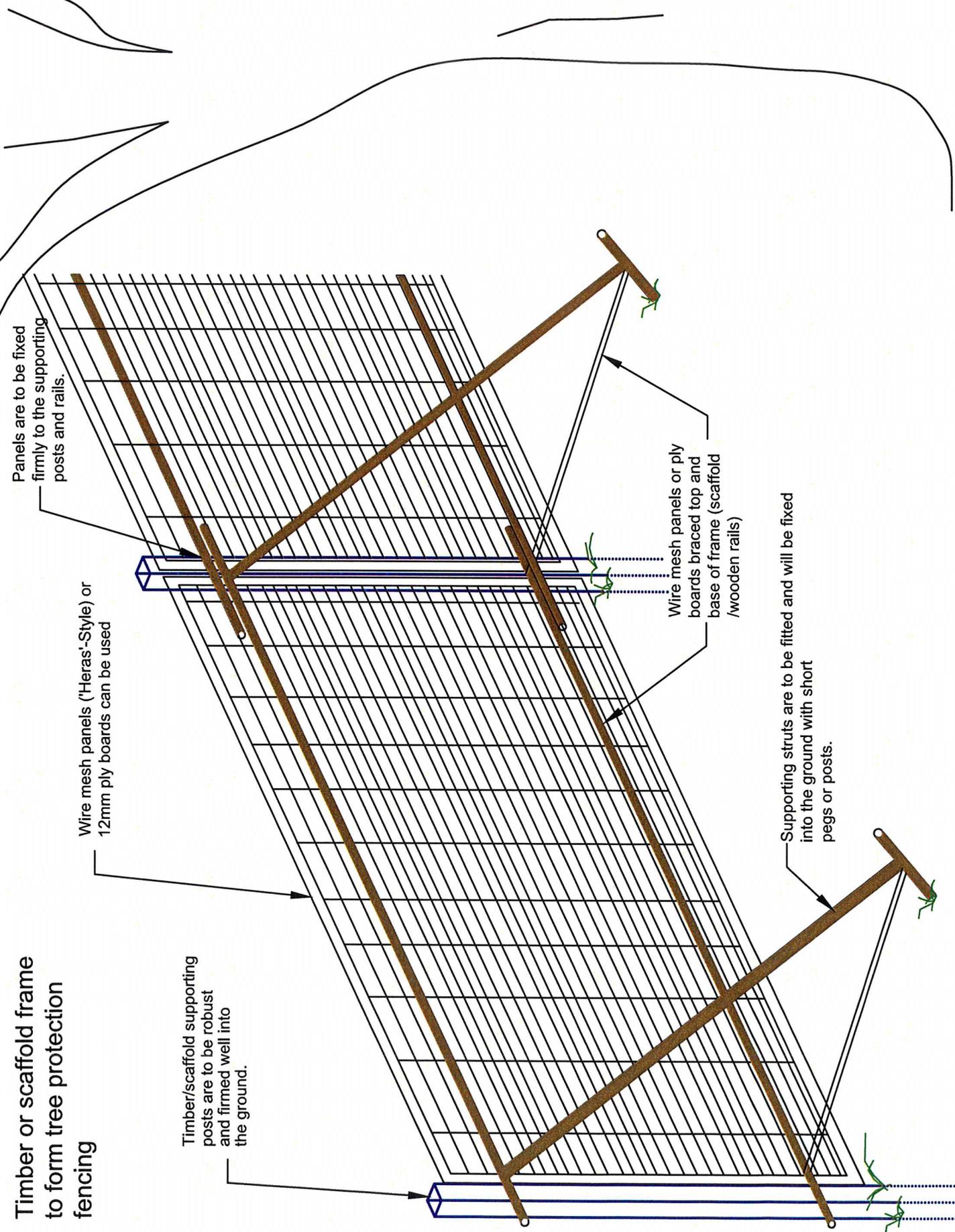
50 X 100mm angled supporting struts affixed internally (quantity as required).

(Supporting posts fixed into position using concrete. All post holes to be hand excavated. Post holes to be no larger than 300 X 300mm.)

## Heras Fencing

Heras fencing describes the 2.4m galvanised steel mesh panelled fencing normally supplied with pre-cast concrete bases. **Bases are to be replaced with a fixed frame to which panels are clamped/ firmly fixed.** For extra stability, scaffold poles/4x4 wooden posts are to be firmed into the ground as supporting posts and supporting struts are to be attached at a 45 degree angle on the 'tree-side' of the fencing and fixed into the ground. Supporting posts will be braced at the top and base for added support.

# Timber or scaffold frame to form tree protection fencing



**ACS Consulting (London)**

Tree Management Consultants

Justin Plaza 3  
341 London Road  
Mitcham  
CR4 4BE

T: 020 8687 1214  
F: 020 8687 2456  
E: info@treebiz.co.uk

**Title:**  
Example of Tree Protection Fencing

**Note:**  
Steel scaffold or timber can be used to support boards or wire mesh panels

**Date:** Jan. 07

**Ref:**  
**Note:** Sketch Plan Only - Not to Scale

## Tree Protection Fencing

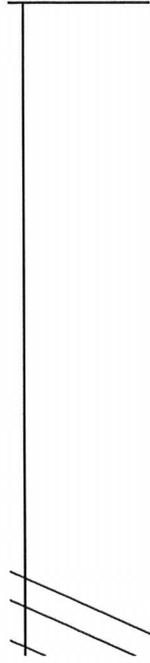
Scaffold Framework supporting 'Heras' type panels with signs attached.



Wooden Framework with 'Heras' type panels attached.



## APPENDIX 3

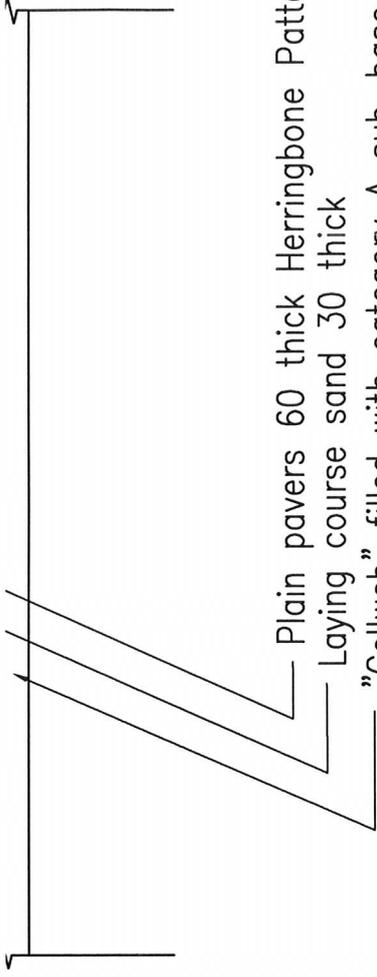


- Plain pavers 60 thick Herringbone Pattern
- Laying course sand 30 thick
- Porous asphalt base 70 thick
- "Cellweb" filled with category A sub-base 200 thick

BLOCK PAVED

WEDGEWAY CONSTRUCTION

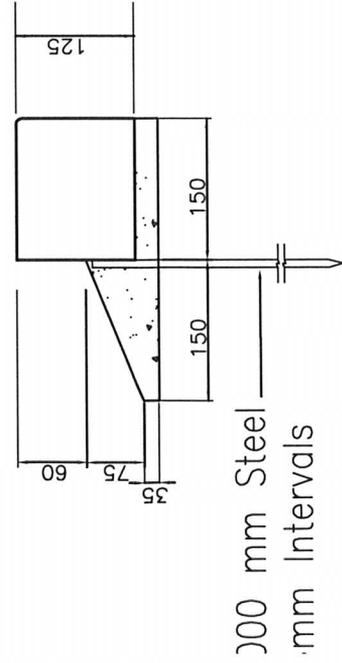
ers, Laying Course and Porous Asphalt to arily replaced with an additional 200mm of category A sub-base separated with a arram, for use by Construction Traffic.



- Plain pavers 60 thick Herringbone Pattern
- Laying course sand 30 thick
- "Cellweb" filled with category A sub-base 150 thick

FLEXIBLE "CELLWEB"

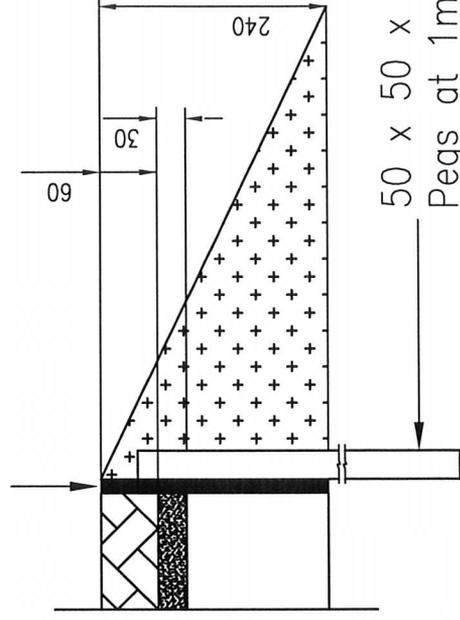
FOOTWAY CONSTRUCTION



300 mm Steel  
mm Intervals

KERBING TYPE "BN1"

Treated Timber 25mm  
Thick by 240mm Deep



50 x 50 x 800 mm Treated Timber  
Pegs at 1m Intervals

## Low-invasive Surface (LIS) Construction Methodology

The following design criteria for low-invasive surfaces (LIS) will need to be considered when installing new hard surfacing within the BS Root Protection Areas (RPAs) of retained trees:

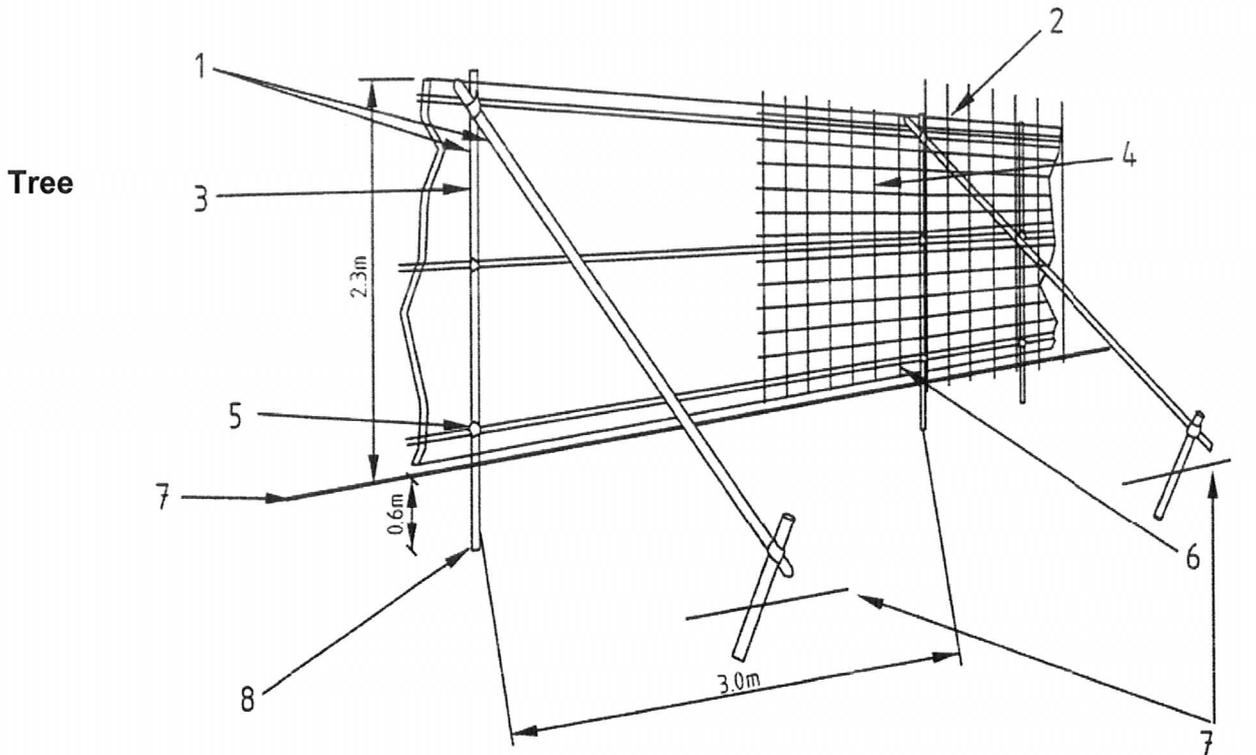
- Maintain oxygen diffusion through new surface to rooting area (3-12% by volume, **Ref 1**)
- Maintain sufficient passage of water to the rooting area (12-40% by volume, **Ref 2**)
- Maintain existing ground levels to avoid unsustainable root damage (severance and/or asphyxiation)
- Avoid compaction by maintaining a soil structure sufficient to sustain root growth (soil bulk density below 1.6g/cc, **Ref 1**)

The above criteria will provide the conditions for continued tree growth and preservation.

Site analysis of the soil type and its Californian Bearing Ratio (CBR) will be required prior to determining the specific depth of products to be adopted for the LIS. For example, footpaths normally require a depth of 100mm and, 150mm to 200mm depths are used for residential driveways, while greater depths may be required for the passage of heavier traffic such as for construction access and delivery vehicles.

1. The use of a three dimensional cellular confinement system within an LIS 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 using Geotextile membranes and the introduction of the three dimensional Cellular Confinement System (CCS). The CCS is laid directly onto the unchanged soil levels within the Root Protection Area (RPA) of retained trees.
2. Retained trees must first be protected during all stages of the development including demolition, by the erection of fencing as shown in the diagram below and with reference to specifications and the Tree Protection Plan (TPP). Installing the LIS may require the re-positioning of the tree protection fencing to a secondary location in line with TPP and associated method statement. This follows the recommendations set

out in Section 9 and 11 of the British Standard (BS) 5837:2005 'Trees in Relation to Construction – Recommendations'.

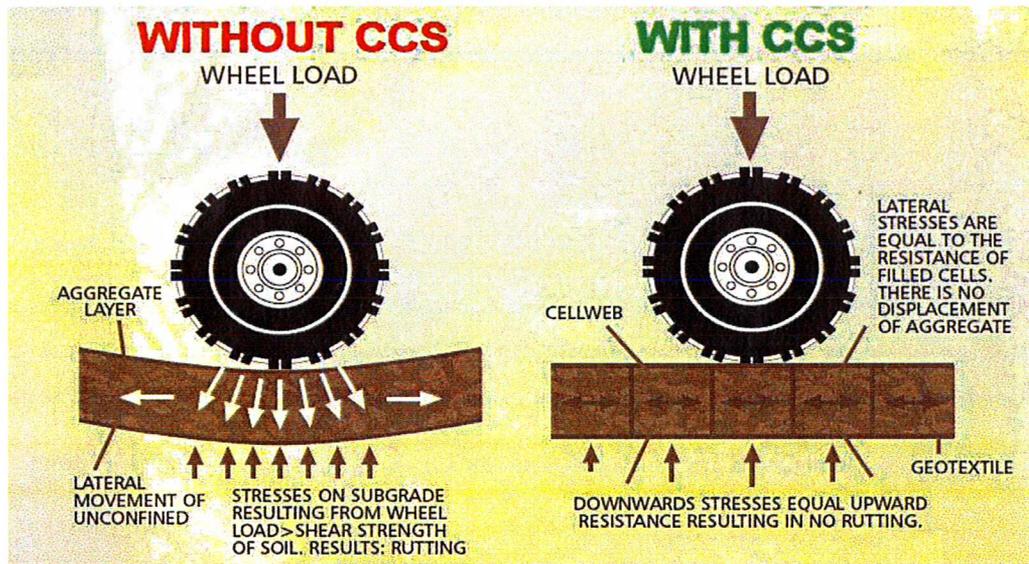


- |  |  |
|--|--|
| 1 Standard scaffold poles  | 5 Standard clamps  |
| 2 Uprights to be driven into the ground  | 6 Wire twisted and secured on inside face of fencing to avoid easy dismantling |
| 3 Panels secured to uprights with wire ties and where necessary standard scaffold clamps | 7 Ground level   |
| 4 Weldmesh wired to the uprights and horizontals   | 8 Approx. 0.6 m driven into the ground   |

**Protective Fencing Detail after Fig. 2 BS 5837** (alternative materials can be used, though all fencing is to be 'fit for purpose')

3. If ground levels are to be raised more than 150mm (**Ref 3**) within the RPA 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. Ideally, the LIS 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 CSS. Where the LIS 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 LIS will need to be designed to meet the above criteria.

5. The effect of the CSS produces a **composite mattress**, with high flexural stiffness and load support capabilities. This will prevent soil rutting and mechanical root damage by confining the porous infill materials within the CCS.



### Illustration of Stress Distribution

(Images used with the kind permission of Geosynthetics Ltd, 01455 617139, [www.geosyn.co.uk](http://www.geosyn.co.uk))

6. The use of a non-woven Geotextile beneath the cellular mattress acts as a separation/filtration layer. The CCS should be filled with **no-fines** stone in the 20-40mm range. This operation will be carried out avoiding the use of heavy machinery within the RPA of retained trees. Once filled, the perforated cellular wall structure provides mechanical interlock for infill materials, increasing the shear strength while allowing lateral drainage and gaseous exchange.
7. The system will be used as a permanent base for a wearing course and/or will provide a temporary site access for root protection. The minimum thickness available for CCS material is 75mm and is available up to 300mm thickness; the material required is dependant on the load bearing capacity of the final surface. **A Structural Engineer should design all engineering solutions to surfaces.**
8. A **pre-commencement site meeting** with the appointed Demolition and/or Ground Works Contractor, Site Manager, Arboricultural Consultant, LPA Tree Officer and appointed Engineering Consultant, will agree the stages and specification for the installation of the LIS. A qualified Arboricultural Consultant will supervise any works within the RPA's of retained trees.

## **Stages for Installation of the LIS (with CCS)**

- Stage 1**      **Erection of Tree Protection Fencing** (see Tree Protection Plan).
- Stage 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 RPAs of retained trees are to be cut to or just below ground level rather than grubbed or ground out, which can damage roots of retained trees.
- Stage 3**      **Remove existing hard surfaces** (paving, tarmac etc.) Machinery operating on existing surfaces or outside the RPAs and tree canopies could, under specialist arboricultural supervision, be used to carefully remove existing wearing surfaces. 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 a new LIS).
- Stage 4**      **Install the non-woven Geotextile** directly over soil grade level (levelled where necessary, by the infill of no-fines gravel, washed aggregate or structural soil (min. 20% sand content) and fix in place.
- Stage 5**      **Lay the CCS over the Geotextile**, which is secured open under tension during the infill process with steel staples or wooden pegs.
- Stage 6**      **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 or gabions will be appropriate.
- Stage 7**      **Fill the CCS** ensuring any machinery works only on already filled areas. Typical infill consists of no fines angular granular material 20-40mm, **which will remain uncompacted.**
- Stage 8**      **Install wearing surface.**

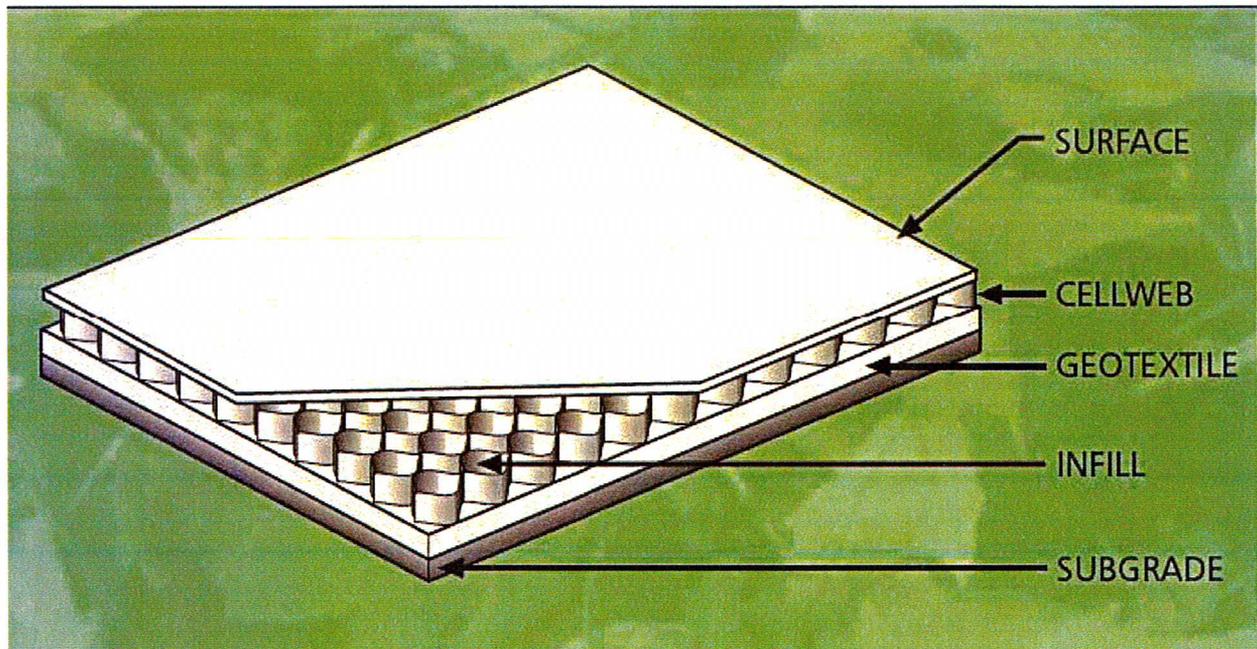
## Pervious Surfacing Options

### Small Block Paving

- Lay a second layer of Geotextile separation fabric over the infill CCS.
- Lay a sharp sand-bedding layer to recommended depth.
- Place block paviors as per manufacturer's instructions.

### Washed Gravel

- Place second layer of Geotextile separation fabric over the infill CCS.
- Place pea shingle/ gravel aggregate to required depth.



### Makeup of Final Surface

(Images used with the kind permission of Geosynthetics Ltd, 01455 617139,  
[www.geosyn.co.uk](http://www.geosyn.co.uk))

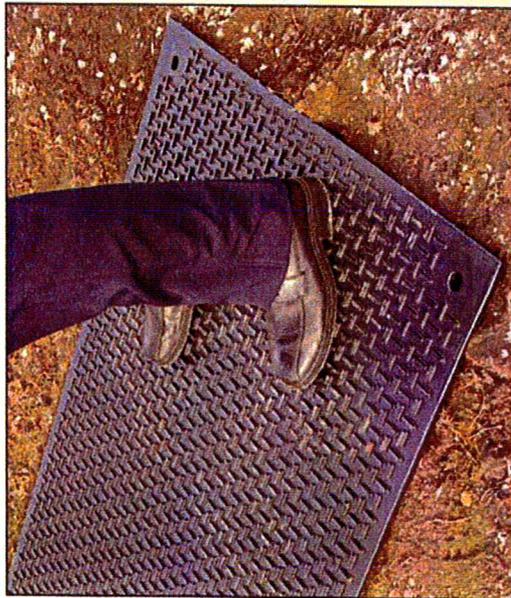
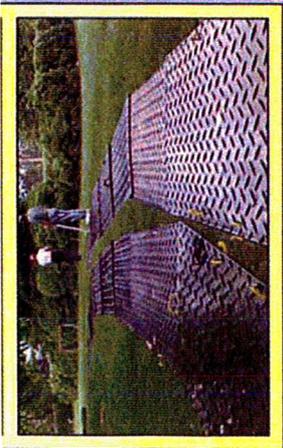
- References: 1 – Tree Roots in the Built Environment 2006, Roberts Jackson Smith HSO  
2 - Tree Root Growth Requirements, Dr Kim. D. Coder, University of Georgia. July 2000  
3 – Arboriculture, Tree Management of Shade Trees and Vines 2004, Harris, Clarke, Matheny

## APPENDIX 4

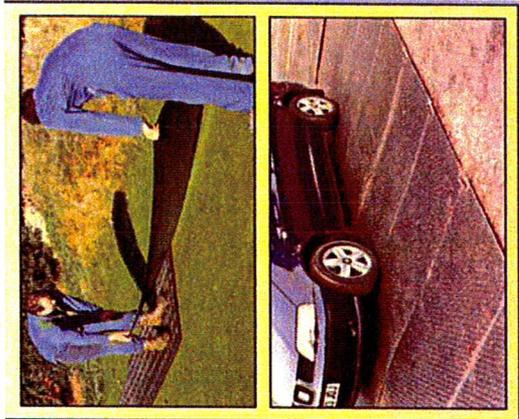
Example of ground protection, which is best laid over 50mm of a compressible material such as woodchips or sharp sand for optimum tree root protection.

**Greentek**  
GUARANTEED TO DO WHAT IT SAYS  
-OR YOUR MONEY BACK!

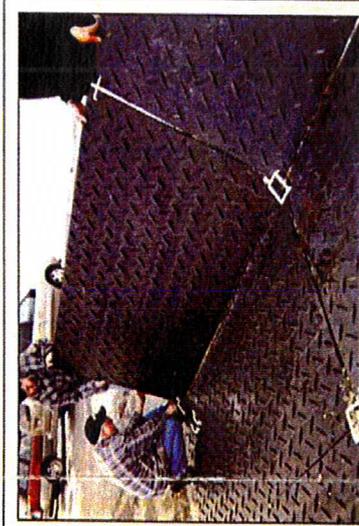
**Tel: 0113 267 6000**  
**Fax: 0113 267 2222**



**WALK TOP** - Ideal for car parks and walk ways.

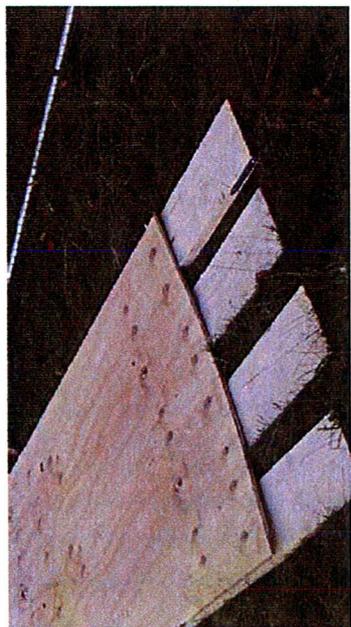


Ground plates can be useful for dissipating loads, at sensitive construction locations.



**DOUBLE LINK JOINERS** - lock Ground-Guards into one large working platform.

OSB boarding fixing scaffold  
Boards below can be very effective ground protection for lighter traffic such as pedestrians, wheel-barrow and occasional passes with light dumper vehicles for example.



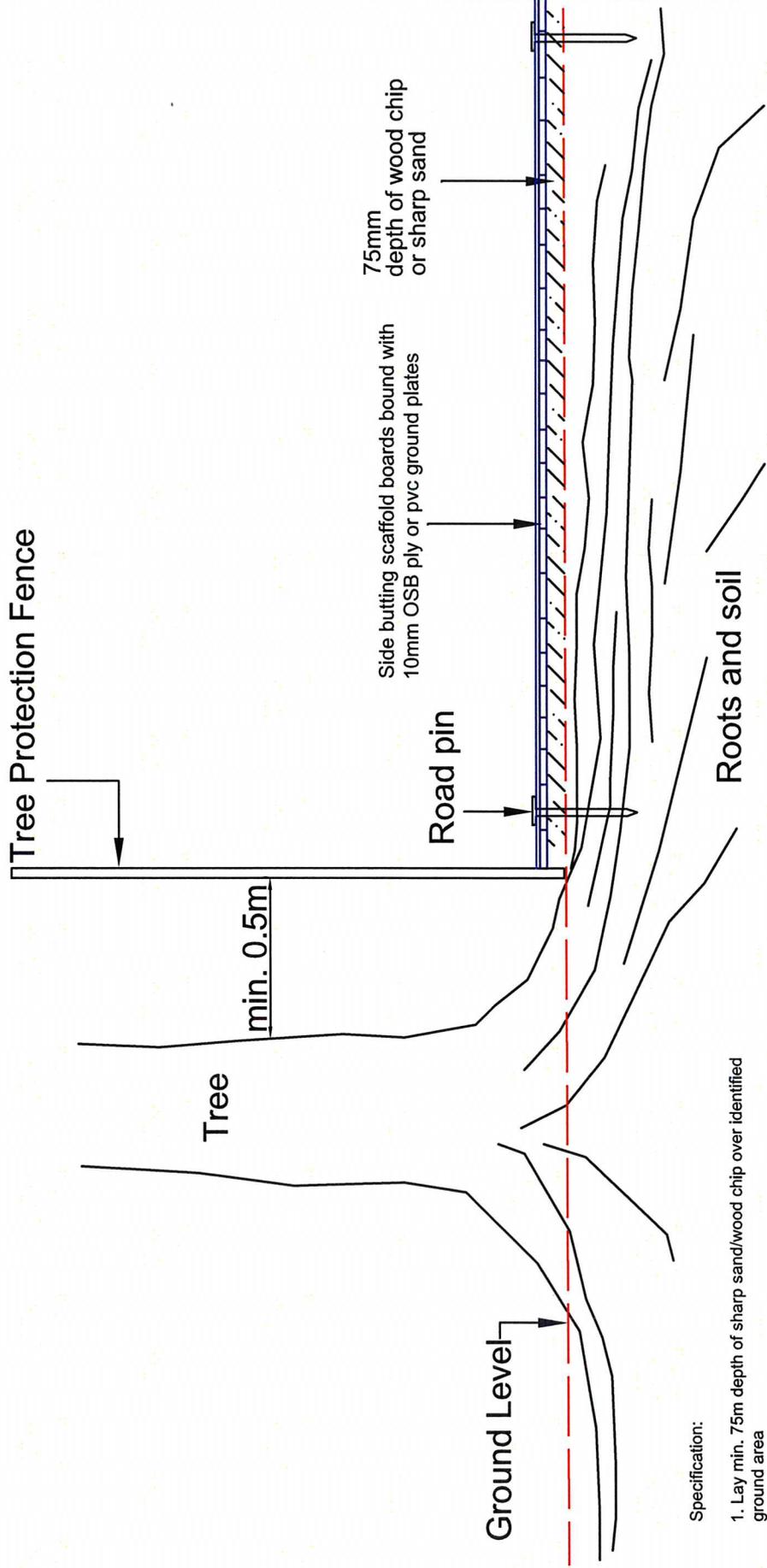
# ACS Consulting (London)

Urban & Rural Tree Management

Justin Plaza 3  
341 London Road  
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CR4 4BE

T: 020 8687 1214  
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## Ground Protection Example



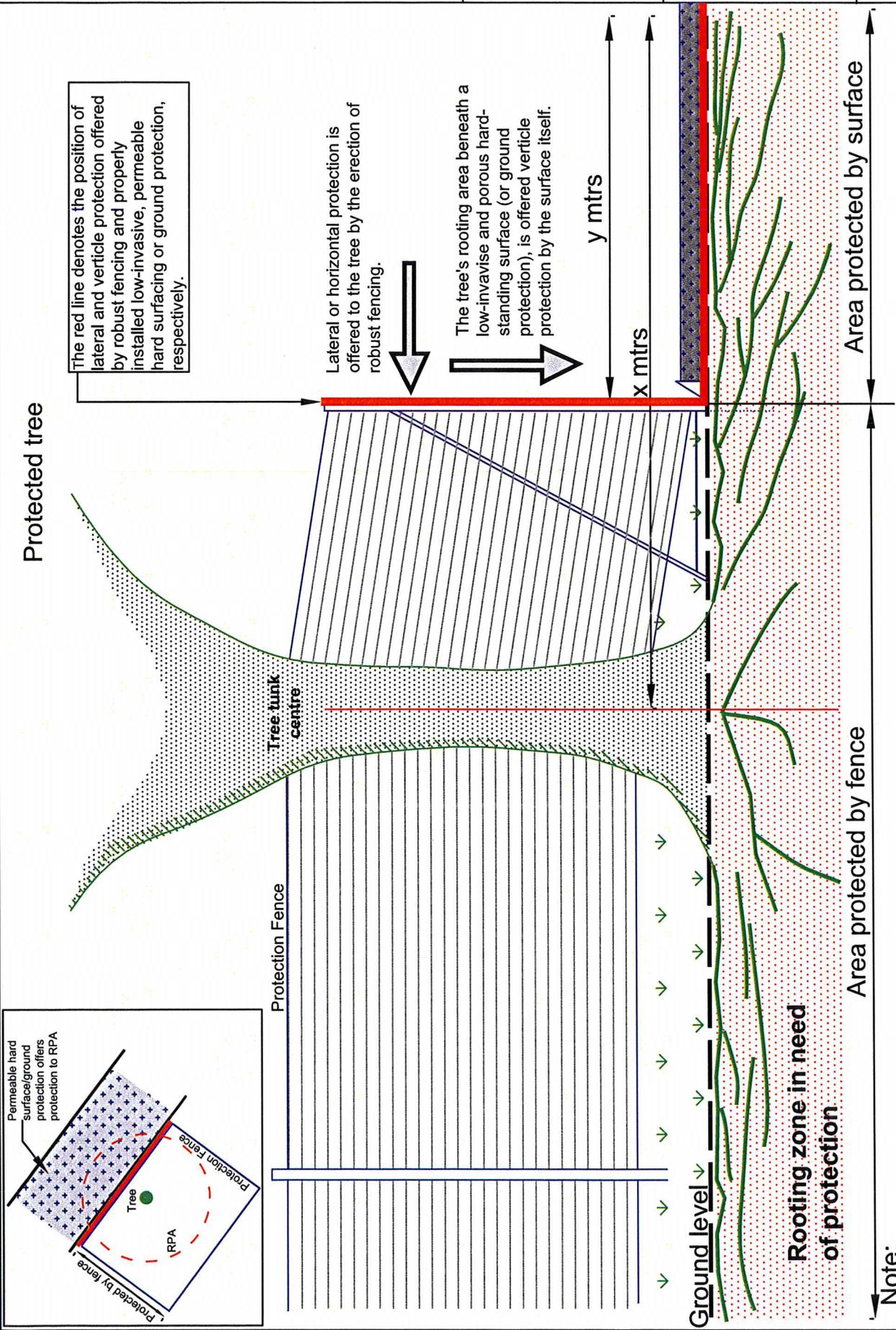
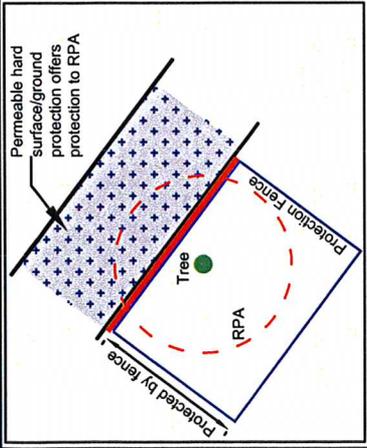
### Specification:

1. Lay min. 75m depth of sharp sand/wood chip over identified ground area
2. Lay side-butting scaffold boards/15mm poly propylene road plate over sand/wood chip
3. Fix ground protection cover into place with pins/pegs
4. Erect protection fence (where feasible).
5. Erected scaffolding can act as protection fencing.
6. Remove ground protection upon completion/landscaping only.

Date:

Ref:

Note: Sketch Plan Only - Not to Scale  
Not all site features shown



The red line denotes the position of lateral and vertical protection offered by robust fencing and properly installed low-invasive, permeable hard surfacing or ground protection, respectively.

Lateral or horizontal protection is offered to the tree by the erection of robust fencing.

The tree's rooting area beneath a low-invasive and porous hard-standing surface (or ground protection), is offered vertical protection by the surface itself.

**Note:**

In this example, the BS RPA radius of the tree is calculated at x mtrs. A proportion (y mtrs), of the RPA, is covered by new permeable hard surface (or ground protection). Provided that hard standing is constructed in accordance with the principles of BS 5837:2005 para 11.8.1 and having been designed with specialist advice from an engineer and arboriculturalist, **the RPA of the tree is not reduced.**

<p><b>ACS Consulting (London)</b></p> <p>Tree Management Consultants</p> <p>Justin Plaza 3 341 London Road Mitcham CR4 4BE</p> <p>T: 020 8687 1214 F: 020 8687 2456 E: info@treebiz.co.uk</p>	<p><b>Title:</b></p> <p>Tree/Root Protected Area</p> <p>© ACS Consulting (London) 2007</p>
<p><b>Date:</b> Jan 08</p>	<p><b>Ref:</b></p> <p>Note: Sketch Plan Only - Not to Scale Not all site features shown</p>

## APPENDIX 5

# Arboricultural Site Supervision

**Site:** 1 Hyde Park, London  
**Inspected By:** H .Applevard  
**Client:** RPC  
**Site Agent:** Shaun Clark

**Date of Inspection:** 15/02/2007  
**Time of Inspection:** 3:30pm

## Tree Protective Fencing

Tree protection in correct location

**Comments/Action**  
No action at this time



Effective fencing in position

## Agreed Construction Exclusion Zone

No debris within construction exclusion zone

**Comments/Action**  
No action at this time

## Amendments to Documentation Required

No amendments required

**Comments/Action**  
Building works outside scope of Method Statement



Fencing with signs

## Remedial Works

## General Comments

Tree protection and on-site supervision effective and understood.

## APPENDIX 6

# Hand Digging In the Vicinity of Trees

## Method Statement

### 1.0 Introduction

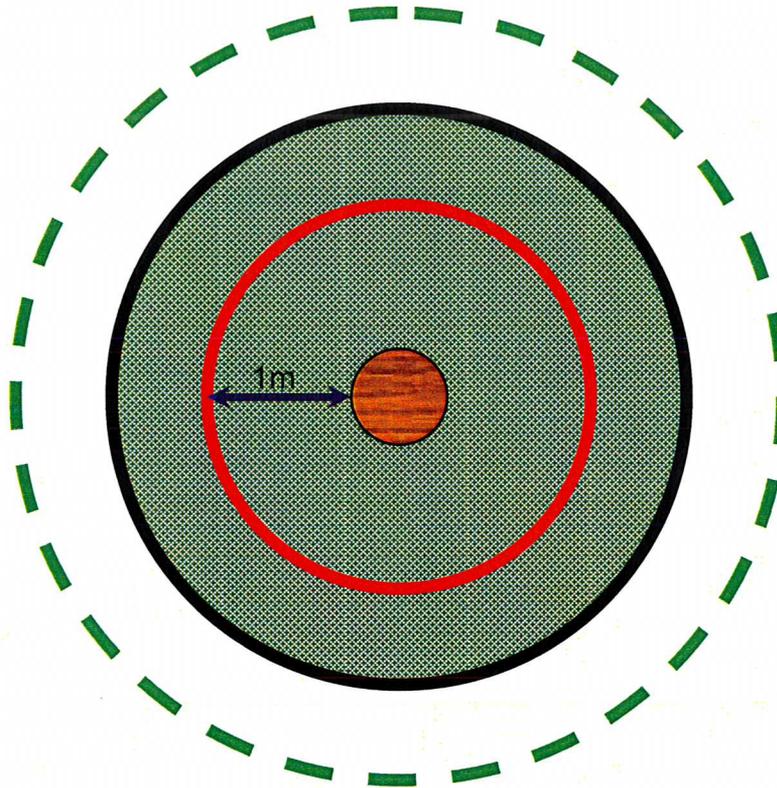
- 1.1 Within and adjacent to areas of construction, trees valued as important landscape assets may exist. It is possible such trees are protected by legislation in the form of a Tree Preservation Order, conservation area or by planning conditions. In either case, disregard of the tree's well being by causing damage to the roots, trunk or branches may be an offence. Consent from the Local Planning Authority may be required to undertake works that may have an impact on the tree prior to commencement.
- 1.2 Whilst the trunk and branches of a tree can be seen and therefore more easily avoided, tree roots are concealed beneath the ground. Their hidden nature can lead to inadvertent damage from construction processes. Dependant upon the extent of any root damage, the whole tree can be adversely affected. It is for this reason that it is necessary to ensure adequate precautions are adopted when considering construction in the vicinity of trees.
- 1.3 Hand digging rather than excavation by mechanical means has proved to be an effective way of limiting the effects of construction on nearby trees. It is often considered impractical, time consuming and costly to excavate by hand when machinery exists specifically for the purpose of digging. However, avoidance of unsustainable damage being caused to important trees through hand digging may far out weigh subsequent costs associated with legal penalties and loss of amenity.
- 1.4 Below are detailed the basic principles to acknowledge in respect of tree roots and the practical steps that can be taken to effectively avoid causing unsustainable damage to trees.
- 1.5 It is assumed that all operations are commenced only AFTER having undertaken and recorded appropriate risk assessments in line with current and relevant Health & Safety legislation, common industry practice and guidance.

## 2.0 Tree/Root Damage – How it can occur

- 2.1 The majority of tree roots exist in the upper **600mm to 1000mm** of soil. Excavations of the soil in the vicinity of trees, to this depth, can be harmful to tree roots and consequently the tree.
- 2.2 Tree root systems comprise two main root types, those that **anchor** the tree in the ground and those that **supply** the tree with water and elements. Roots that support the tree are woody and those that are involved with the **conduction** of water and nutrients are non-woody or fibrous. Both types of roots can be damaged directly by severing or crushing. Fibrous roots can die from asphyxiation by **soil compaction** and/or soil contamination. Trees differ in their tolerance of root loss or disturbance, according to their species and condition or both.
- 2.3 The larger the root damaged, the greater the impact on the tree.

## 3.0 Hand Digging in the Vicinity of Trees – The Process

- 3.1 First it is necessary to consider all available options to construct beyond the likely range of influence on the tree's condition – normally beyond 1m from the tree's trunk and within an area below the tree's canopy or by referring to Table 1 of BS 5837:2005 'Trees in Relation to Construction. Recommendations'. This area is called the Precautionary Zone or Root Protection Area. **When it is established that no options are available other than to construct within this zone, hand digging will be needed.** When considering hand digging, an appointed specialist supervisor/consultant will be able to advise during construction and must be on site at the commencement of works.
- 3.2 Before beginning to dig, mark out the precautionary area with ground marker paint, clearly on the ground. This will identify the area within which hand digging must take place. **For safety, ensure there are no underground services that may cause injury if damaged.** Any existing protection fencing is to be located to the nearest position of construction and fixed in place, between the tree and area of construction. It will be clearly visible to operators thereafter where hand digging will need to be undertaken. The use of mechanical digging equipment to remove the top surface layer (50-100mm) is to be avoided and hand tools are required for this exercise too.

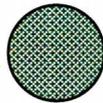


### TREE PROTECTION ZONE

#### Key to Diagram



Trunk of Tree



Spread of canopy or branches



**PROHIBITED ZONE – 1m from trunk.** Excavations of any kind must not be undertaken within this zone unless full consultation with Local Authority Tree Officer is undertaken. Materials, plant and spoil must not be stored within this zone.



**PRECAUTIONARY ZONE – beneath canopy or branch spread.** Where excavations must be undertaken within this zone the use of mechanical excavation plant should be prohibited. Precautions should be undertaken to protect any exposed roots. Materials, plant and spoil should not be stored within this zone. Consult with Local Authority Tree Officer if in any doubt.



**PERMITTED ZONE – outside of precautionary zone.** Excavation works may be undertaken within this zone however caution must be applied and the use of mechanical plant limited. Any exposed roots should be protected.

## **DAMAGE TO TREES**

Tree roots keep a tree healthy and upright. Most roots are found in the top 600mm of soil and often grow out further than the tree's height. The majority of these roots are very fine; even close to a tree few will be thicker than a pencil. Most street tree roots grow under the footway but may also extend under the carriageway. If roots are damaged the tree may suffer irreversible harm and eventually die.

## **PROTECTING ROOTS - DO'S and DON'TS**

There are three designated zones around a tree each of which has its own criteria for working practices.

### **THE PROHIBITED ZONE**

**Don't** excavate within this zone.

**Don't** use any form of mechanical plant within this zone

**Don't** store materials, plant or equipment within this zone.

**Don't** move plant or vehicles within this zone.

**Don't** lean materials against, or chain plant to, the trunk.

**Do** contact the local authority tree officer or owner of the tree if excavation within this zone is unavoidable.

**Do** protect any exposed roots uncovered within this zone with dry sacking.

**Do** backfill with a suitable inert granular and top soil material mix as soon as possible on completion of works.

**Do** notify the local authority tree officer or the tree's owner of any damage.

### **THE PRECAUTIONARY ZONE**

**Don't** excavate with machinery. Where excavation is unavoidable within this zone excavate only by hand or use trenchless techniques.

**Don't** cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.

**Don't** repeatedly move / use heavy mechanical plant except on hard standing.

**Don't** store spoil or building material, including chemicals and fuels, within this zone.

**Do** prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cut and leave as small a wound as possible.

**Do** backfill the trench with an inert granular material and top soil mix. Compact the backfill with care around the retained roots. On non highway sites backfill only with excavated soil.

**Do** protect any exposed roots with dry sacking ensuring this is removed before backfilling.

**Do** notify the local authority tree officer or the tree's owner of any damage.

### **THE PERMITTED ZONE**

**Don't** cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.

**Do** use caution if it is absolutely necessary to operate mechanical plant within this zone.

**Do** prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cut and leave as small a wound as possible.

**Do** protect any exposed roots with dry sacking ensuring this is removed before backfilling.

**Do** notify the local authority tree officer or the tree's owner of any damage.

- 3.3 When hand digging, using typical hand tools, carefully work around roots, retaining as many as possible. Using a brush will expose roots cleanly before deciding whether it will be necessary to prune. Care must be taken not to damage roots including the roots' bark.
- 3.4 Retain all roots with a diameter greater than 25mm. Where such roots must be removed, after consulting a trained arboriculturalist (e.g. Local Authority Tree Officer or the appointed Consultant), these roots must be pruned with sharp cutting tools such as a handsaw, secateurs or pruners. The cut must leave the smallest wound possible and the root must be left as long as practicably possible. Roots in excess of 50mm diameter are to be retained and protected by surrounding the root with uncompacted sharp sand, void-formers or other compressible materials.
- 3.5 Where roots do not exist, e.g. beyond the depth of the rooting area, mechanical excavation should not be considered without specialist supervision.
- 3.6 All spoil is to be deposited beyond the precautionary zone. Soil build-up can cause roots to die.
- 3.7 As soon as practicable, exposed roots are to be covered with loose backfill material such as soil/sand mix to offer immediate protection. When excavating for the introduction of posts, pads or piles, the sides of the pits should be lined with a geotextile material to prevent the potential for lime scorching of small diameter roots.
- 3.8 Where it is impossible to avoid completing the construction in one day for example, any exposed roots or their cut ends are to be covered with sacking material over night to prevent drying out and to add protection. This is particularly important in winter months, where frost can cause further damage to roots.
- 3.9 Upon completion of the hand digging, where appropriate protection fences are to be re-located and fixed in their original position.

Attached is an extract from the National Joint Utilities Group publication V4 2007, 'Guidelines for the planning installation and maintenance of utility services in proximity to trees'. In addition Table 2 from BS 5837:2005 'Trees in Relation to Construction. Recommendations' is provided.

**Before considering hand digging and determining precautionary zones or root protection areas, specialist arboricultural advice should be sought.**

**Table 2 after BS 5837:2005 'Trees in relation to construction-Recommendations'**

**5.2.2** The RPA should be calculated using Table 2 as an area equivalent to a circle with a radius 12 times the stem diameter for single stem trees and 10 times the basal diameter for trees with more than one stem arising below 1.5m above ground level.

<b>Number of Stems</b>	<b>Calculation</b>
Single stem tree	RPA (m <sup>2</sup> )= $\frac{(\text{Stem diameter(mm) @1.5m} \times 12)}{1000} \times 12$
Tree with one or more stem arising below 1.5m above ground level	RPA (m <sup>2</sup> )= $\frac{(\text{Basal diameter above root flare (mm)} \times 10)}{1000} \times 10$
Note: The 12 X multiplier is based on NJUG 10 [9] and published work by Matheny Clark [10]	

**5.2.3** The calculated RPA should be capped to 707m<sup>2</sup> e.g. which is equivalent to a circle with a radius of 15m or a square with approximately 26m sides.