



ARBORICULTURAL REPORT RELATING TO PROPOSED DEVELOPMENT
ON LAND ADJACENT TO SILKSTONE SEWAGE WORKS, SILKSTONE.



On behalf of:

YORKSHIRE WATER SERVICES LTD
c/o AMEC Environment & Infrastructure UK Ltd
PROSPECT HOUSE
32 SOVEREIGN STREET
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Part 1	Tree Survey	DATE COMPLETED	10 th May 2011
Part 2	Implication Assessment	DATE COMPLETED	7 th October 2011
AUTHOR	Ian Barnes	OUR REF.	BA3262.2
SIGNED		PRINTED DATE	17/10/2011

SUMMARY

The trees on site have been inspected and found to be in a relatively poor overall condition, suffering from ongoing root zone alterations. The trees do offer a connection to the local landscape and provide valuable screening.

Unfortunately, the management of the site has been limited and various defective trees were observed. Many of the trees have defects or suffer from the effects of erosion and changes to the soils in the rootzone. Remedial works have been suggested to help simplify ongoing management for the site, which will require the loss of a proportion of the trees.

The proposal is to modify the access road and to stabilise the bank which will require the loss of trees to enable the development.

The retained trees can be improved with minor remedial tree works that will enhance the condition of the retained trees and both improve their immediate condition and improve their chances of being retained in the medium to long-term.

In addition to the improvements in existing trees, it is proposed to establish new trees, improving the long-term sustainability and significantly improve the level of screening for the proposal.

The proposed design will need to consider the requirements of the retained trees and the scheme can be installed to meet the guidelines detailed within British Standard 5837:2005 Recommendations - Trees in Relation to Construction; section 1, which provides key guidance.

Providing that the recommendations within this report are implemented the retained trees should be unaffected by the proposals and new planting should develop to further enhance the site underpinning the tree population for the future.

PART 1 - TREE SURVEY – SILKSTONE SEWAGE TREATMENT WORKS.

Author:	Signed:	Date of survey :	Our Ref:
I Barnes		4 th May 2011	BA3262

Prepared for Yorkshire Waster Services Ltd c/o Entec

1. **Objective:** To assess the condition of the trees and provide sufficient information to enable a decision on the planning aspects of the site and its potential development in relation to trees.
2. **Surveyor:** My name is Ian Barnes; I am an Arboricultural Association Registered Consultant, a Chartered Environmentalist, and Fellow of the Arboricultural Association and an International Society of Arboriculture Certified Arborist and Professional member of the Consulting Arborist Society.
3. **Qualifications and experience:** I have based this report on my site observations and the provided information; I have come to conclusions in the light of my experience. I have experience and qualifications in arboriculture and list the details in Appendix 1.
4. **Weather Conditions:** Bright & clear, visibility was good.
5. **Documents and information provided:** I have been provided with a site plan which shows the existing site layout and forms the basis of our site plan.
6. **Scope of this report:** This report is only concerned with the current condition of trees and their retention value in relation to redevelopment of the site. The trees have been assessed in line with the guidelines outlined in British Standard BS5837:2005 'Trees in Relation to Construction'. This provides information for the retention and protection of trees upon development sites. In addition site safety is considered, remedial recommendations are based on the continuing tree safety.

- 6.1. The statements made in this Report do not take account of the effects of extremes of climate, vandalism or accident, whether physical, chemical or fire. Barnes & Associates cannot therefore accept any liability in connection with these factors, nor where the prescribed work is not carried out in a correct and professional manner in accordance with current good practice. The authority of this report ceases at any stated time limit within it, or if none stated after two years from the date of the survey or when any site conditions change, or pruning or other works unspecified in the Report are carried out to, or affecting, the Subject Tree(s), whichever is the sooner.
7. **Limitations of use and copyright:** This assessment has been prepared for Yorkshire Water Services c/o Amec in connection to the proposed ground strengthening works located on the access path to Silkstone STW. All rights in this report are reserved. No part of it may be reproduced or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, or stored in any retrieval system of any nature, without our written permission.
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8. **The Terms of Reference:** This report has been based upon Visual Tree Assessment (VTA) methodology, as devised by Mattheck (1993) in addition to Hazard Evaluation devised by Matheny & Clark (1993). Guidance is also taken from Lonsdale (1999) *Principles of Tree Hazard Assessment and Management*. The format of the survey follows the

guidelines of British Standard 5837:2005 '*Recommendations for Trees in Relation to Construction*' and all protection zones are based upon Table 2 of section 5.0.

9. **Notes:** The trees have been assessed from ground level only in line with the guidelines outlined in British Standard BS5837:2005 '*Trees in Relation to Construction*'. This provides information for the retention and protection of trees upon development sites. Information upon the trees is located in the Tree Schedule in Appendix 2.
10. **Condition of Trees:** This inspection provides an initial assessment of tree condition, within the existing site along with landscape and environmental constraints. Alteration of a trees (even healthy trees) environment can be either detrimental to its health or affect its aerodynamic characteristics, the affects of site redevelopment upon tree health / stability cannot be fully forecasted or speculated within this report.
11. **Tree Identification:** The trees have been assessed and assigned an identification number, which has been recorded on the site plan BA3262TS included as Appendix 9, which is based upon the supplied site plans.
12. **Site Description:** The site is located to the south west of the nearby Silkstone sewage works and are located roughly 200 metres from the junction with Silkstone Lane.
 - 12.1. The trees are located in a narrow strip of land between the northern edge of the access path and the southern edge of the water course.
13. **Boundaries:** The area is relatively open with no definitive boundaries visible.
14. **Land Use.** The wider site is a mixture of open grassland and wooded areas, connected and bounded by a series of mature hedges.

15. **Treescape.** The area surrounding the group has a range of wooded areas which are connected throughout the local area.
16. **Amenity Value.** The trees have a relatively low overall amenity value due to the number of trees to be found locally and the limited visibility from the public domain.
17. **Age Class Mix.** There is a limited age range of trees on site with the trees being mature or early mature, younger trees that are present tend to be poorly located and have limited potential.
18. **Species Diversity.** The species diversity is typical for such a site, no rare species were recorded.
19. **Guidance Notes for Development:** Retained trees can be protected from the potential damage of the development process, through the establishment of a Root Protection Area (RPA) as recommended in BS5837. I have included a general information on developing close to trees in Appendix 4.
 - 19.1. The development process is potentially damaging to trees, I have included a general guide to the potential problems in Appendix 8.
 - 19.2. Retained trees close to the development will require management of the Root Protection Area (RPA). I have included details on fencing and ground protection methods within Appendix 6 & 7, which aim to avoid damaging the soil characteristics.
20. **Specific notes for this site:** As the existing tree stock is relatively old and is suffering the effects of a competitive environment. Emphasis should be placed upon the improved management of the trees in addition to limited replacement planting to maintain continuity following any site changes.

- 20.1. **Legal Status of Trees:** It is understood from the client that the trees are protected by (TPO) Tree Preservation Order. I have included general details on legislative tree protection within Appendix 5.
21. **Overview of trees.** The trees on site appear to have had very limited management, with any works limited to crown lifting to provide clearance of the access track.
- 21.1. The group and in particular T2 to T8 are affected by localised erosion, presumably the result of periods of flooding, a number of the trees are significantly undermined as shown in photograph 1 in Appendix 3, raising doubt over their long-term suitability to this location unless intervention works are carried out to stabilise the site.
- 21.2. Several of the large Oaks have suffered localised branch failures in particular T2 shown in the photograph 2 in Appendix 3 which has a large hanging limb which poses a risk to site users.
- 21.3. A number of the trees have been affected by historical excavations, in particular T2, which has localised root damage associated with the installation of the brick surrounded drainage outfall.
- 21.4. A number of the trees have been affected by historical soil level changes; thought to be associated with the installation of the track, in particular the Trees T2 to T6, T9 and the hedge T10 have suffered soil level changes as shown in photograph 3 in Appendix 3.
- 21.5. The Alder T11 is located on the opposite side of the water course, this tree has suffered from historical fire damage shown in the photograph 4 in Appendix 3. This tree can be expected to fail in the near future; ideally, this tree should ideally should be removed in the near future.
- 21.6. An understory of shrubby native and naturalised species are beginning to develop throughout the area.

- 21.7. A number of the trees contain common defects such as overdeveloping branches, poor unions, crossing and rubbing branches in addition to deadwood, though appear to be within safe limits, at the present time.
- 21.8. The trees could be significantly improved by remedial works, selective thinning works to retain the better trees, which would provide improved growing conditions for the retained trees through the provision of improved light levels.
22. **General Tree Pruning.** The trees require management to improve their condition. General works are detailed within the tree schedule in Appendix 2. This work is required regardless of development proposals and should ideally be undertaken within the next 12 months. These works should be viewed in isolation to the development proposal in planning terms.
23. **Conclusions.** The majority of trees do not represent an abnormal risk to site users.
- 23.1. Although the condition of The Alder T11 and the number of loose branches and deadwood located above the access track should be made safe, as soon as possible.
- 23.2. The group as a whole will benefit from works to improve the growing conditions through thinning works, which is a normal woodland operation, which is an ongoing requirement for the site.
- 23.3. Ideally, both the current and future value of the groups can be improved through additional planting to improve species diversity and bring the group into line with woodland groups found locally.
24. **Trees subject to statutory controls.** If the trees are covered by a tree

preservation order or located in a conservation area, works may be restricted. The works specified are necessary for reasonable management and should be acceptable to the local authority.

- 24.1. Ideally, any works should be planned to avoid times when birds are nesting, and be aware that a bat survey may be needed on significant tree hollows. The applicant should inspect the tree for the presence of bat activity. If bats are discovered during inspection or subsequent work, English Nature must be informed immediately, though this expects to be a very low risk in light of the relative young age of the planting.

PART 2 - TREE IMPACT ASSESSMENT – SILKSTONE SEWAGE TREATMENT WORKS.

Author:	Signed:	Date of Assessment:	Our Ref:
I Barnes		7 th October 2011	BA3262AIA

Prepared for Entec.

Document upon which this assessment has been made:-

Drawing No.	Title:
2010/D0023/10/1011	Access Track Modifications Proposed Access Track Plan & Modifications

- A. **Terms of Reference.** To survey the subject trees in order to assess their general condition and to provide a planning integration statement for the proposed development that safeguards the long term well being of the retained trees in a sustainable manner.
- B. The proposed site changes are located within the defined planning area detailed on the plan above. These areas are located within the Root Protection Areas of trees.
- C. The proposal is to construct a Gabion retaining structure to stabilise the bank and the road above.
- D. The proposal will require the loss of trees to provide space in which to undertake the works.
- E. Providing changes to the construction methods are adopted it is expected that the development can be undertaken with the trees being retained protected.

CONCLUSIONS

- A. **Overall condition of trees.** The trees generally are in reasonable overall condition, as detailed within in the tree schedule in Appendix 2 of our tree survey. However, a series of remedial works will be required regardless of proposal to develop the site.
- B. **Potential Risks.** In several locations, the proposals enter the Root Protection Area (RPA) of retained trees and as such offers a foreseeable risk to these trees. These areas are highlighted with magenta crossed hatching on the Arboricultural Implication Assessment Plan BA3262AIA attached to this report in Appendix 10.
- C. **Poor condition Tree Removals.** To improve safety and help simplify site management 2 poor condition trees within the development area are proposed to be removed to improve site safety. The poorer condition trees to be removed are classified R within the trees survey and are highlighted with red hatching on the Implication Assessment Plan BA3262AIA attached to this report in Appendix 10, these removals are required regardless of the site development and should ideally be viewed in isolation.
- D. **Development Tree Removals.** The proposal requires the removal of 7 trees, which are located in the footprint of the proposed site changes. These trees are highlighted in yellow hatching on the Implication Assessment Plan BA3262AIA attached to this report in Appendix 10.
- E. **Proposed Tree pruning.** Direct pruning of trees in relation to the proposal is expected to be limited. Pruning is expected to involve crown lifting to provide sufficient clearance for the passage of vehicles, pedestrians and to ensure sufficient space in which to carry out the proposal. All pruning will be limited to minor pruning of the outer lower canopies to achieve 5 metres clearance above vehicle access, 2.5 metres above the pedestrian areas and 2 metres from constructed features.
- F. **Retained Trees.** All proposed site alterations can be undertaken using methods that will enable the continued viability of the retained trees.

The proposal aims to protect the retained trees by adopting methods, which will lessen the impact of the proposed changes.

- G. **Construction Activity.** Traditional construction has the potential to damage trees irreparably I have therefore included a guide in Appendix 8 which outlines the threats to trees.
- H. **Site Protection.** Protection will revolve around the need to prevent compaction or excavation within the soil profile or significant changes to the existing soil levels close to retained trees. To this end '**Prevention is better than Cure**', to avoid the soil changes simply requires appropriate site organisation and management where as the cure can be both costly and comes with few guarantees. Tree Protection should be in place before commencement on site.
- I. **Protective Fencing/Barrier.** The area within the **Root Protection Area (RPA)** requires barriers/fencing and management to avoid potentially damaging alterations to the soil within the root zone. This should be undertaken immediately after any tree works. This should be in place before any demolition, construction or ground works are undertaken.
 - a. Before commencement of any site works or construction the permanent tree Protective Barrier that is shown as the Red line with circular inserts should installed in the position shown on the Tree Protection Plan BA3262PRO attached to this report in Appendix 11. Protective Barriers are to be constructed using Heras Panels (Solid or Mesh) supported on traditional supports though connected using High Security none tamper connectors which incorporates an Anti-lift Device and a Brace to improve stability. Both the support and the foot of the brace need to be located using Soil Pins to prevent movement.
 - b. This fencing will need to remain in place for the duration of the active development. An example of the fencing is included in Appendix 6. The minimum distance of the fencing refers to the protective distances which are outlined within BS5837:2005 Table 1 Section 7.0. These distances are detailed within the Tree Schedule Appendix 2 of our Tree

Survey BA3262TS and are included on the site plans BA3262AIA in Appendix 10 & BA3262PRO in Appendix 11. This primary / permanent tree protective barrier needs to be in place for the duration of the build

- c. The fencing on site should only be removed during the landscaping phase, where final levels should be undertaken by hand when close to the RPA.

J. **Construction / Access:** To avoid changes in the soil condition within the RPA, general access precautions will be required during the demolition and construction phase. The construction works are located next to and in some cases within the RPA and special precautions for the access of operatives and or plant will be required. Details for temporary pedestrian access into the RPA are included in Appendix 7. This type of temporary above ground protection is highlighted in Yellow on the attached Protection Plan BA3262PRO attached to this report in Appendix 11.

- a. As much of this work is located within the Root Protection Area it will need to be undertaken carefully and much of this is expected to be undertaken by hand.

K. **Location of Services.** I have not seen any proposal for service runs, however these will need to adopt sensitive installation methods and the use of a traditional trenching will need to be avoided within the Root Protection Area. Trenching will need to be undertaken using moling or directional drilling at a depth to pass below the trees roots, with entry and exit pits being located outside the trees RPA.

- a. Where this is not possible, services will need to be installed in line with the guidance contained within the National Joint Utilities Guidelines (NJUG volume 4, issue 2, 19/11/2007) for the installation of services close to trees.

L. **Tree Planting.** A specific tree planting scheme has not been provided but is referred to on the cross section. In light of the space available I would propose that there is sufficient space in which to establish several new trees in addition to shrub planting. This aims to provide both an improvement and continuity of tree

cover for the site following the completion of the scheme.

M. Conclusion. The development proposals does require tree losses, however these changes are generally restricted to the internal views and are unlikely to be affect the wider landscape. In addition, the improvement in site safety and management and the additional new trees will be a significant improvement in the medium to long term.

- a. The retained trees, subject to the changes highlighted above meet the guidelines outlined in British Standard 5837:2005 Recommendations - Trees in Relation to Construction.
- b. Subject to appropriate conditions, tree protection and site management and methods, I consider that the proposed site changes can be undertaken with limited risks to retained trees.
- c. I can see no reason why this scheme should not proceed subject to appropriate conditions outlining tree protection and providing that the points suggested within this report are incorporated within the planning approval and appropriately managed.

SUGGESTED CONDITIONS

- A. Standard conditions relating to the creation and management of Tree Protection and its maintenance for 5 years which can be formalised within an Arboricultural Method Statement.

APPENDIX 1 - BRIEF QUALIFICATIONS AND EXPERIENCE OF IAN BARNES

Qualifications:

Higher Diploma in Arboriculture (H.N.D Arb)
National Diploma in Horticulture & Arboriculture (N.D.Ht/Arb)
Arboricultural Association Technicians Certificate (Tech.Cert. (Arbor.A))
ISA Certified Arborist

Membership grades by peer review:

Chartered Environmentalist (CEnv)
Corporate Member Institute of Horticulture (MI Hort)
Fellow of the Arboricultural Association (F.Arbor.A)
Professional member Consulting Arborist Society UK.

Registration Schemes:

Arboricultural association Registered Consultant (49)

Practical experience:

I have worked in the Arboricultural Industry since 1987. Firstly as a climbing Arborist in both the public and private, sector, undertaking a wide range of practical operations on a variety of sites, before becoming a gang foreman. I set up and ran my own Arboricultural contracting business for 15 years, though this is now under new ownership. I have developed an arboricultural consultancy practice over the last 20 years, working throughout England for clients in both the public and private sector.

Continuing professional development:

As part of my on going education, I am a member of a range of related Arboricultural bodies. Including the Arboricultural Association (AA), International Society of Arboriculture (ISA), Royal Forestry Society (RFS), Forestry Contracting Association (FCA), and Arboricultural Mortgage & Insurance Users Group (AMUIG), which has been incorporated into the Consulting Arborist Society (CAS) of which I am a professional member. I am a corporate member of the Institute of Horticulture (MI Hort) and a Fellow of the Arboricultural Association (F.Arbor.A). An inclusive member of the British Mycology Society (BMS) in addition to being a Chartered Environmentalist (CEnv).

I am a registered consultant of the Arboricultural Association.

I regularly attend seminars and training events on issues relevant to Arboriculture these include events focusing on General Tree Management, Veteran Tree Management, Tree Health, Tree Pest management, Tree Diseases management, Trees Biology & Morphology, Tree Stability, Wind Loading of Trees, Tree Risk Assessment, in addition to keeping an upto date level of CPD.

I am a licensed user of the Quantified Tree Risk Assessment (QTRA) System and regularly attend updates.

I am a trained user of Picus 'Acoustic' Tomography and Picus Treetric and have attended training to extend my knowledge in this area.

I am trained and a licensed user of tree thermography as an aid to detecting defects in trees.

Relevant experience:

My career to date has involved me in a variety of tree care, dealing with trees in many different environments, and with differing management aims, these included: Tree planting schemes, including Woodland Design & Management, Detailed Health and Safety Appraisals, Tree inventories / population surveys, Management & selection on both proposed and active development sites, Advice upon trees in relation to structures, Additional areas of work such as Contract Specification & Management, Planning applications, Expert Witness. This has provided me with a range of experience, enabling me to comment upon trees and their management, in line with current best practice. Full CPD and training record can be forwarded upon request.

APPENDIX 2 - TREE SCHEDULE & EXPLANATORY NOTES

The following survey has been prepared from a visual assessment taken from ground level without any detailed investigation. Observations are based upon the body language of the trees and any visual indicators present at the time of inspection. This survey should be regarded as a preliminary overview; ongoing inspections will be required as specified individually. In most situations the health, condition and safety of trees should be checked on a cyclic basis, alternating between early and late seasons to ensure a full picture of tree health is established. Inspections should only be carried out by a suitably qualified arborist.

Similarly, numerous potential defects may not be detectable dependent upon timing of inspection, in particular, wood decay fungi, which may only occasionally produce external fructifications annually (rather than perennially), or may not provide external symptoms until an advanced state is achieved.

Reasonable risk management generally aims to provide a tree that can be regarded stable in a normal / foreseeable, regularly experienced storm events i.e. force 10 storms. The level of risk offered by the tree will be significantly greater as the wind speed that the tree is exposed to increases beyond this level. Additionally the threat from aerial parts i.e. tight unions may remain even following works, although failures of such parts are likely to be limited to small diameter branches and to periods of extreme weather.

As an arborist, I am a tree specialist and use my knowledge, education, training and experience to examine trees, recommend measures to enhance their beauty and health, and attempt to reduce the risk of living near trees. As a client, you may choose to accept or disregard these recommendations, or seek additional advice.

As an arborist I cannot detect every condition that could possibly lead to a tree or limb failure. Trees are living organisms that may fail in many ways, some of which we do not fully understand.

Conditions are often hidden within the tree and below the ground. As arborists, we cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Sometimes trees may appear "healthy," but may be structurally unsound. Like wise remedial treatment, like any medicine, cannot be guaranteed.

Treatment, pruning and removal of trees may involve considerations beyond the arboricultural perspective, such as property boundaries and ownership, disputes between neighbours, planning issues, sight lines, landlord-tenant matters etc. Arborists cannot take such issues into account unless complete and accurate information is given to them. Likewise, as an arborist I cannot accept any responsibility for the authorization or non-authorization of any recommended treatment or remedial measure.

Furthermore, certain trees are borderline cases as to whether they should remain or be removed. If conditions change a tree may need further monitoring in the future to determine its health and structure. Trees can be managed, but they cannot be controlled, and to live near a tree is to accept some degree of risk.

Mathematical abbreviations: > = Greater than, < = Less than.

Measurements / estimates: All dimensions are estimates unless otherwise indicated. Measurements taken with a tape or clinometer are indicated with a '*'. Less reliable estimated dimensions are indicated with a '?'.

Colour Coding – The line of information highlighted blue refer to those trees outside the security fence, this information is general generally recording an estimated of the mean heights, canopy spread or stem diameter to provide an indication of the group condition or protection requirements

Tree number: Numbered Tag attached to each stem usually on the inside face of the stem a roughly 2.5 metres. Were the number is followed by a C this demotes that the tag refers to a compartment or group.

Name: Tree species are detailed by their common name.

Age: I record the age as an estimate of the tree likely span for guidance only i.e.

- Y - Young** - Recently established
- MA - Maturing** – The first third of its likely expected life span
- M - Mature** - The middle one third of its likely expected life span
- OM - Over Mature** - The later one third of its likely expected life span
- S - Senescent** - Beyond its expected Life span possible of historical interest or in a state of decline

Height: I estimate height to the nearest metre to the mean height.

Height to 1st: I estimate height to the nearest metre to mean distance of separation between the ground and the underside of the canopy.

Diameter: These figures relate to a measurement of the stem at 1.5m above ground level and I record them in millimetres measure with a rounded down diameter tape. Figures prefixed with MS denote trees or shrubs with multiple stems.

No. stems: I record the number of significant stems that compose the tree i.e.

S - Single Stem.

M - Multiple Stemmed.

Canopy (N S E W): I estimate distance of the canopy radius to the nearest metre to provide a mean distance of separation between the stem and the outer canopy.

Vitality: Is a personal assessment of the trees growth rate in the current season, in comparison to other trees within the locality, region and an indicator of the tree likely response to site change.

D - Dead A dead or very low vitality tree
P - Poor A tree of low vitality
G - Good A tree of high vitality

L- Low / Declining A tree in noticeable poor state
F - Fair A tree of normal vitality

Safe Life: Is a personal assessment of the trees likely expected remaining safe life span assuming the tree is protected from significant change.

>40 Greater than 40 Years
 10-40 Years
 <5 Less than 5 years

20-40 years
 <10 Less than 10 years
 <1 Less than 1 years

Category / Condition Rating: This is based upon the criterion of BS5837: 2005 Recommendations for trees in relation to construction and describes the condition of the tree based on age, vigour, structure and health as follows:

TREES FOR REMOVAL - Category and definition Criteria Identification on plan

Category R - DARK RED Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed for reasons of sound arboricultural management

- 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 R category trees (i.e. 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 (e.g. Dutch elm disease), or very low quality trees suppressing adjacent trees of better quality
- NOTE Habitat reinstatement may be appropriate (e.g. R category tree used as a bat roost: installation of bat box in nearby tree).

TREES TO BE CONSIDERED FOR RETENTION

Category and definition Criteria — Subcategories:

- 1 Mainly arboricultural values,
- 2 Mainly landscape values,
- 3 Mainly cultural values, including conservation

Category A - LIGHT GREEN

Those of high quality and value: in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested)

- 1 Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)
- 2 Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups)
- 3 Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture).

Category B - MID BLUE

Those of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20 years is suggested)

- 1 Trees that might be included in the high category, but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage).
- 2 Trees present in numbers, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating than they might as individuals but which are not, individually, essential components of formal or semi-formal arboricultural features (e.g. trees of moderate quality within an avenue that includes better, A category specimens), or trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality
- 3 Trees with clearly identifiable conservation or other cultural benefits.

Category C - GREY

Those of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested), or young trees with a stem diameter below 150 mm

- 1 Trees not qualifying in higher categories.
- 2 Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit
- 3 Trees with very limited conservation or other cultural benefits.

NOTE Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150 mm should be considered for relocation.

Comments / Observations: General comments referring to tree health, structure and condition.

Management Options: Comments detailing remedial works required improving immediate safety or improve the management of the tree.

Priority: Guidance for the time scale in which works should be completed, from the date of the report.

Minimum RPA – Root Protection Area: Minimum distance in metres of position of protective fencing in line with Table 2 BS5837:2005. In order to avoid damage to the roots or rooting environment of retained trees, an area equivalent to a circle with a radius 12 times the stem diameter for single stem trees and 10 times basal diameter for trees with more than one stem arising below 1.5 m above ground level.

RPA – Root Protection Area (Radius) (M) – RPA given in metres from the centre of the stem.

RPA – Root Protection Area (Area) (M²) – The ideal total area for the RPA given in metres squared.

Preliminary BS5837 Arboricultural Assessment - This should not be referred to as a specification of Arboricultural Works

TAG No.	Species	Age	Height	Canopy Height	North Canopy	South Canopy	East Canopy	West Canopy	Vitality	Safe Life	Category	Diameter @ 1.5m (mm)	Observations / Comments	Recommendations	Minimum RPA (Radius) (m)	Minimum RPA (Area) (m ²)
1	Ash	M	16	3.5	6	6	6	6	Poor	10-20	C3	800	Growing within a field on neighbouring land to the west. The stem is not fully visible surrounded by Dog Rose & Hawthorn. Branch failures are visible within the canopy. Large deadwood can be seen in the outer canopy. Significant epicormic shoots are visible throughout the canopy. Retention not thought to be sustainable.	Formative pruning required to improve main branch architecture. Retrench the canopy in stages to create a smaller canopy and reduce leverage on the branches. Consider veteran management to retain the stem and provide habitat.	9.6	289.5
2	Oak	M	18	3	8	7	7	7	Good	20-40	C2	750	Single stem with a slight lean with trunk shooting. Growing next to hard landscaping. Soil level has been reduced by recent excavation. Erosion can be seen below the buttress on the riverside. Ivy has started to develop on the main stem. Significant quantities of deadwood can be seen within the canopy. Branch failures are visible within the canopy. Loose branches are visible above the road. Crossing and rubbing branches are visible throughout the canopy. Good habitat potential.	Treat Ivy to prevent further growth. Crown clean conservation only.	9	254.5
3	Ash	Y	3.5	2	1.5	1.5	1.5	1.5	Poor	<10	C3	75	A recently established seedling tree Canopy is swamped by neighbouring trees. A poorly formed tree with little potential.	Ideally remove to simplify ongoing management.	0.9	2.5
4	Oak	Y	3	2	2	2	2	2	Poor	<10	C3	95	A recently established seedling tree. Ivy develops on the main stem. Canopy is swamped by neighbouring trees. A poorly formed tree with little potential.	Ideally remove to simplify ongoing management.	1.14	4.1

Preliminary BS5837 Arboricultural Assessment - This should not be referred to as a specification of Arboricultural Works

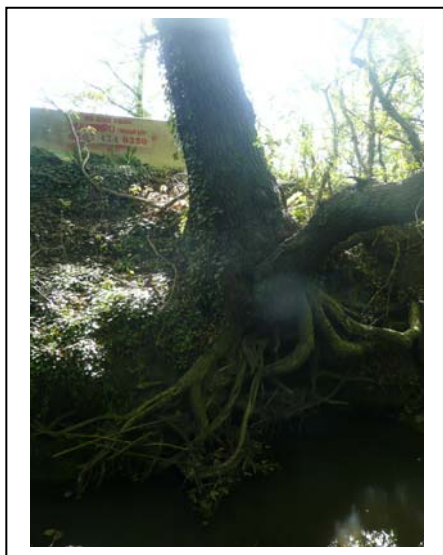
TAG No.	Species	Age	Height	Canopy Height	North Canopy	South Canopy	East Canopy	West Canopy	Vitality	Safe Life	Category	Diameter @ 1.5m (mm)	Observations / Comments	Recommendations	Minimum RPA (Radius) (m)	Minimum RPA (Area) (m ²)
5	Oak	M	16	1	5.5	6	3	3	Good	20-40	B2	460	Growing on a bank. Honeysuckle in addition to Ivy has started to develop on the main stem. Erosion below the tree is visible. Branch failures are visible within the canopy. Small diameter deadwood within the canopy. An attractive upright form.		5.52	95.7
6	Hazel	MA	4.5	2	3	1	1	3	Poor	<10	R	250 m	Growing close to water. Erosion has caused the roots to be partially exposed – Tree failure can be expected. A poorly located tree, which is unlikely to be sustainable.	Ideally remove and replace with a more suitable tree elsewhere.	2.5	19.6
7	Oak	M	18	5	8	8	8	6	Good	20-40	B2	1100 m	Tri-forked close to ground level Growing on a bank. Honeysuckle in addition to Ivy has started to develop on the main stem. Erosion below the tree is visible. Branch failures are visible within the canopy. Small diameter deadwood within the canopy. An attractive upright form.		11	380.1
8	Sycamore	M	12	2	3	3	6	0	Poor	10-20	C3	350	Growing close to water. Growing on a bank. Canopy is swamped by neighbouring trees. Large deadwood can be seen in the outer canopy. A poorly formed tree of little value.		4.2	55.4
9	Oak	M	12	2	4	5	7	4	Declining	<10	C3	620	Growing close to road. Soil level has been raised by recent level changes - no buttress is visible. Medium sized hollow visible in the main stem. Large diameter deadwood within the canopy. The leaves are small & sparse. Dense compact buds on the end of the tips. This tree is suffering decline.	Consider undertaking rootzone improvement though the tree is unlikely to survive. Consider veteran management to retain the stem and provide habitat.	7.44	173.9

Preliminary BS5837 Arboricultural Assessment - This should not be referred to as a specification of Arboricultural Works

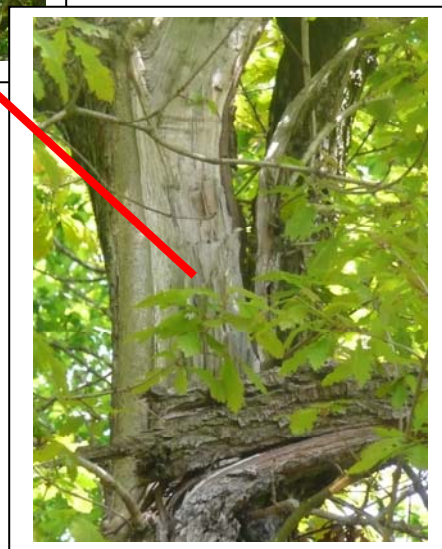
TAG No.	Species	Age	Height	Canopy Height	North Canopy	South Canopy	East Canopy	West Canopy	Vitality	Safe Life	Category	Diameter @ 1.5m (mm)	Observations / Comments	Recommendations	Minimum RPA (Radius) (m)	Minimum RPA (Area) (m ²)
10	Mixed Informal	MA	7	0	2	2	2	2	Good	10-20	C2	upto 350 m	Elm, Oak, Sycamore & Hawthorn Growing next to hard landscaping. Soil level has been raised by recent works to lift the road levels. An attractive informal hedge.	Ideally select the best trees to be retained and allow to mature, The remainder of the hedge should be flailed and managed as a dense screen.	3.5	38.5
11	Alder	M	18	2	4	4	9	4	Declining	<5	R	400	Single stem with a significant lean. Significant structural defect is visible. Large cavity is visible within the main stem. Recent fire damage to the stem. Retention not thought to be sustainable.	Remove and treat stump to prevent regrowth. High Priority for Safety.	4.8	72.4
12	Sycamore & Hazel group	M	6	2	5	5	5	5	Fair	20-40	B2	upto 500 m	Ivy has started to develop on several stems. A reasonable group though due to highly competitive environment the group is expected to become a poor collection of trees.	Ideally, the group should be thinned out to more even centres to provide improved growing conditions.	5	78.5

APPENDIX 3 – PHOTOGRAPHS

Photograph 1 – Typical examples of the erosion seen on the southern bank, below the line of mature trees.



Photograph 2 – The historically failed limb in the canopy of Oak T2 - located above the access Track.



Photograph 3 – Impact damage on the lower stem of T9, which shows a lack of buttress formation.



Photograph 4 – Fire Damaged stem of the poor condition Alder T11.



APPENDIX 4 – GENERAL GUIDANCE NOTES FOR DEVELOPMENT CLOSE TO TREES

Protection of trees on development sites is achieved by creating a circular zone around each tree that has a radius of 12 times the trunk diameter (10 times trunk diameter for trees with an 'm' suffix). This has been included on our site plan BA3262TS included as Appendix 8 and the magenta line around each of the trees indicates this area. Ideally, this area should remain free from soil disturbance, as it is likely that tree roots will be found within this zone.

Ideally, building lines should ideally be at least 2 meters outside the Root Protection Area and Service runs should be routed outside the Root Protection Area. This has been included on our site plan BA3262TS included as Appendix 8 and is indicated by the blue line around each of the trees. Limited use maybe made for parking, drives or hard surfaces within the Root Protection Areas, subject to advice from a qualified arboriculturist.

Retained trees, generally require a combination of fencing and management of the Root Protection Area, to avoid potentially damaging alterations to the soil characteristics within the rootzone. This can be most simply achieved through fencing, and specific methods to enable access into the root protection area.

The development process has the potential to damage trees irreparably I have therefore included a general guide regarding the threats to trees from construction in Appendix 7. Protection aims to prevent compaction or excavation within the soil profile or significant changes to the existing soil levels. The minimum distance of the fencing refers to the minimum protective distances out lined within BS5837:2005 Table 1 Section 7.0. These distances are detailed within the Tree Schedule in Appendix 2. The creation of the Root Protection Area will need to be undertaken following the initial tree works and remain in position for the whole of the Demolition, Construction and Completion phase.

On occasions, developments can be undertaken within the root protection area. The ability of trees to tolerate some disturbance depends on individual circumstances including prevailing site conditions. Accordingly, the advice of an arboriculturist should be sought for any operations within the root protection area. It should be noted that, in general, the older the tree, the less successfully it will adapt to new conditions.

Where it is intended to undertake demolition or construction operations within the root protection area, precautions should be taken to maintain the condition and health of the root system and in particular to prevent physical damage to the roots during demolition or construction by compaction or severing. Developments must preserve the soil structure at a suitable bulk density for root growth and function. I have included information upon the methods of construction within Appendix 6.

In certain circumstances, traditional developments can be located closer to retained trees than suggested by the Root Protection Area. These areas may change its shape but not reduce its area to provide adequate protection for the root system and will need to consider the likely tolerance of the tree to root disturbance or damage. For individual open grown trees only, it may be acceptable to offset the distance by up to 20% in one direction, subject to normal conditions regarding development within the root protection area and only where additional space can be provided to achieve the desired area.

APPENDIX 5 – LEGISLATIVE TREE PROTECTION

Trees can be protected by planning legislation in several ways which include being located within a National Park or on a Site of Special Scientific Interest, located within the grounds of a Listed building, conservation area or by being subject to a current Planning condition.

In general, the main type of protection for trees adopted by the Local Planning Authority (LPA) on potential development sites is the Tree Preservation Order (TPO).

The protection of trees is a duty of the LPA under the Town and Country Planning act 1990 and aims to encourage rational discussion and consideration of trees within the design process.

The following guidelines are proposed to encourage rational discussion and consideration of trees within the design process.

Legislation indicates that protection should be used to protect healthy trees that are likely to have a reasonable safe useful life expectancy. Generally, those classified with a condition rating of (A) Excellent & (B) Good are worthy of a TPO.

Those classified (C) Fair are generally poorer and therefore unlikely to qualify for a TPO on grounds of poor appearance, management issues or unlikely to have a sufficient safe life expectancy.

Those trees classified (R) Removals, generally contain structural defects, have a short safe useful life expectancy or are dangerous and therefore would not qualify for a TPO as indicated within the legislation.

The presence of a TPO should be expected upon development sites for the above reasons. It can however only be regarded as a material consideration, as can any other tree or significant natural feature, within the planning process, and cannot be used as a means of preventing development.

Any trees protected or otherwise, which are located on or close to the site can be expected to be regarded as a material consideration or offer a design constraint within the development process.

APPENDIX 6 – PROTECTIVE FENCING

The retained trees will require protection to prevent any potentially negative effects from development processes. A barrier should be used to define a **Root Protection Area**. This must be established around the retained trees examples are included below and must remain in situ undisturbed for the duration of the development as detailed with BS5837:2005 (section copied below). An example of a poster / flyer is included below and should be circulated to all site operatives.

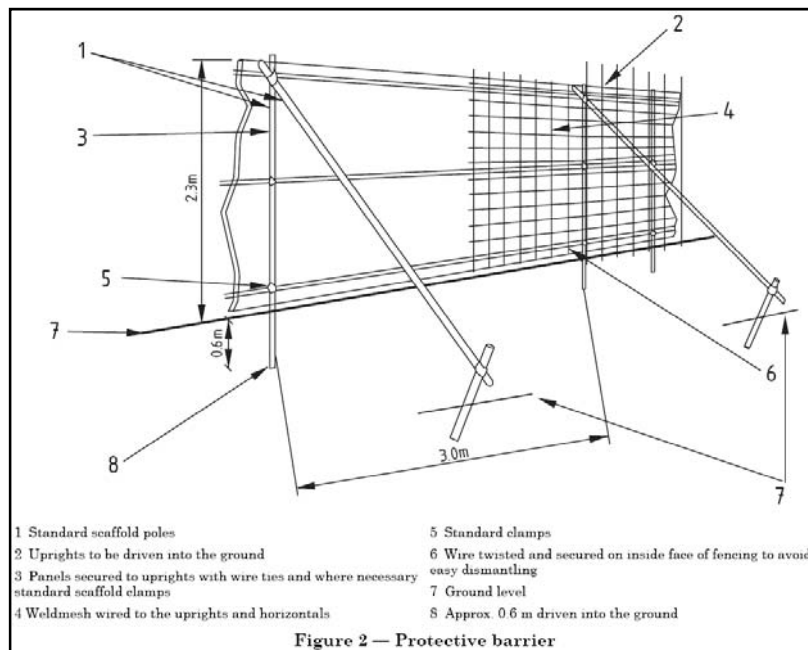
9.2 Barriers

9.2.1 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 tree(s). On all sites, special attention should be paid to ensuring that barriers remain rigid and complete.

9.2.2 In most cases, barriers should consist of a scaffold framework in accordance with Figure 2 comprising a vertical and horizontal framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3 m. Onto this, 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.

NOTE the above is preferred because it is readily available, resistant to impact, can be re-used and enables inspection of the protected area.

9.2.3 It may be appropriate on some sites to use temporary site office buildings as components of the tree protection barriers.



The fence should display warning signs with the wording “Root Protection Area – Strictly No Entry” an example is included below.

Refer to tree schedule minimum distance of protective fencing

Once erected, the fencing must be regarded as the boundary of the site and not crossed or removed or otherwise altered. Absolutely no entry must be allowed into these zones for persons or materials and the site should be organised to ensure that protected zones are safe from cement washings, fuels or any other potentially toxic materials.

Example of Root Protection Area signage, copies of this should be attached to FENCING at 8 metre centres.



APPENDIX 7 – GROUND PROTECTION

Access within the **Root Protection Area** - To enable Foot Traffic and Scaffolding within the Root Protection Area the following system can be adopted, with the agreement of the Consulting Arborist or LPA. This is detailed within Section 9.3 of BS5837:2005 (section copied below).

9.3 Ground protection

9.3.1 Where it has been agreed during the design stage, and shown on the tree protection plan, that vehicular or pedestrian access for the construction operation may take place within the Root Protection Area (RPA), the possible effects of construction activity should be addressed by a combination of barriers and ground protection. The position of the barrier may be shown within the RPA at the edge of the agreed working zone but the soil structure beyond the barrier to the edge of the RPA should be protected with ground protection.

9.3.2 For pedestrian movements within the RPA the installation of ground protection in the form of a single thickness of scaffold boards on top of a compressible layer laid onto a geotextile, or supported by scaffold, may be acceptable (see Figure 3).

9.3.3 For wheeled or tracked construction traffic movements within the RPA the ground protection should be designed by an engineer to accommodate the likely loading and may involve the use of proprietary systems or reinforced concrete slabs (see 11.8 and 11.9.)

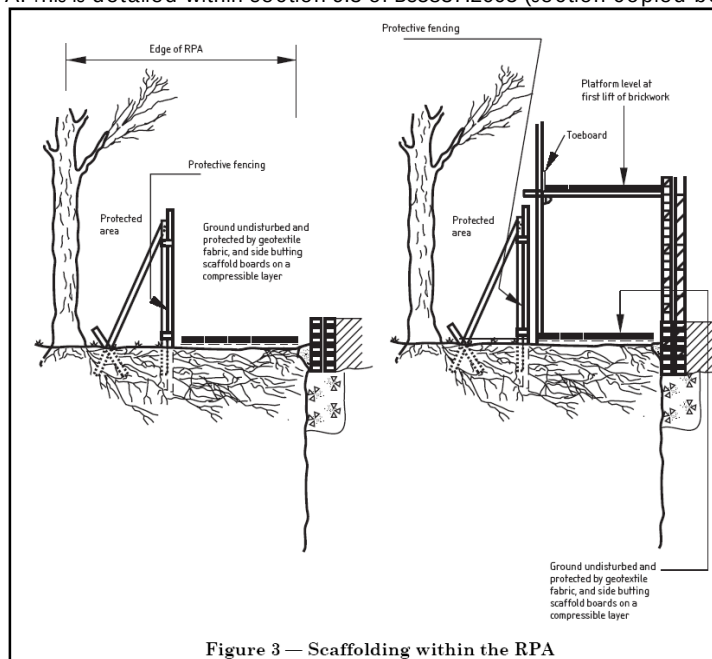


Figure 3 — Scaffolding within the RPA

Access within the RPA with machinery or for the storage of materials can be incorporated into the site protection scheme or method statement. Material storage can be achieved using a staged scaffolding system with an appropriate ground protection system below, further details upon request. Vehicle entry, within the RPA will require specific engineering solutions which mimic the above ground protection ideals detailed in Diagram 1.

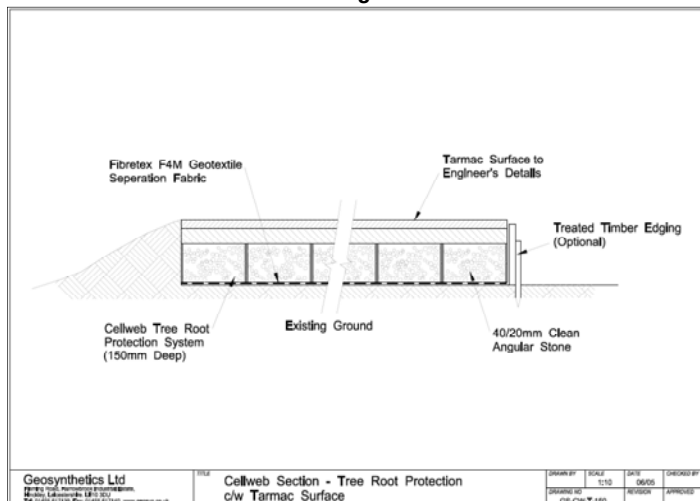
In general the creation of hard standing within the RPA needs to be avoided by providing sufficient space between the retained trees and constructed features. Where land is at a premium and where soil conditions allow, specific No-Dig hard standing can be created to provide pedestrian footpaths, parking areas and even Access Roads suitable for vehicles.

These systems are not generic and need to be designed by arborists to suit the particular site characteristics along with Structural engineers to ensure the support characteristics of the materials are suitable to the task in hand. These generally are separated into two types Above Ground Construction and Below Ground Construction.

Examples of the Above Ground Construction methods can be incorporated in to a site design and detailed within the **Arboricultural Method Statement AMS**. Where levels on site enable the final levels to be above the existing ground level a **WEIGHT TRANSFER BLANKET** or **SUPPORTED DECK** can be constructed to restrict damage to the tree roots assumed to be within the volume of retained soil within the RPA.

Weight Transfer Blankets can be constructed from various materials an example is 'Cellweb' or similar which work on the principal of a vehicles weight being transferred side wards and avoids the formation of compaction within the rootzone and can be readily be detailed within conditions. Final surfacing can be fine gravels, resin bonded gravel or porous paving / Key block or porous tarmac.

Above Ground Foundation – No Dig – Three dimensional CellWeb



Supported Decks can be either simple timber deck or more complex pile with a cast platform design. Damage is limited to the location of the piles. The bridging section avoids compaction and maintains aeration and water ingress. Again this can be incorporated into a site design and detailed within the Arboricultural Method Statement AMS.

Examples of the Below Ground Construction methods can be incorporated in to a site design and detailed within the AMS, though tend to require heightened monitoring. Where levels on site are marginally above the final required level, careful excavation and replacement of the excavated soil with an appropriate medium will enable continued root development within an engineering sub base. These methods aim to retain the tree roots assumed to be within the volume of retained soil within the RPA.

APPENDIX 8 – THREATS TO TREES DURING DEVELOPMENT

The following operations are all very damaging to trees, I have included a poster that demonstrates these points, and this might be useful for full circulation:

Compaction of the soil - Compaction will destroy the soil structure by removing the spaces between soil particles preventing the uptake of oxygen and nutrients. Compaction is caused by storage of materials, including bricks, soil, gravel and cement, and even a single vehicle movement will cause damage. Compacted ground will also damage soil drainage which may then become waterlogged.

Excavations - any excavations close to the tree are likely to cause root severance. The closer excavations occur to the tree the more severe the damage. Root severance will lead to loss of vigour of the tree, reduce uptake of water and nutrients, allow access for decay organisms and increase likelihood of wind throw.

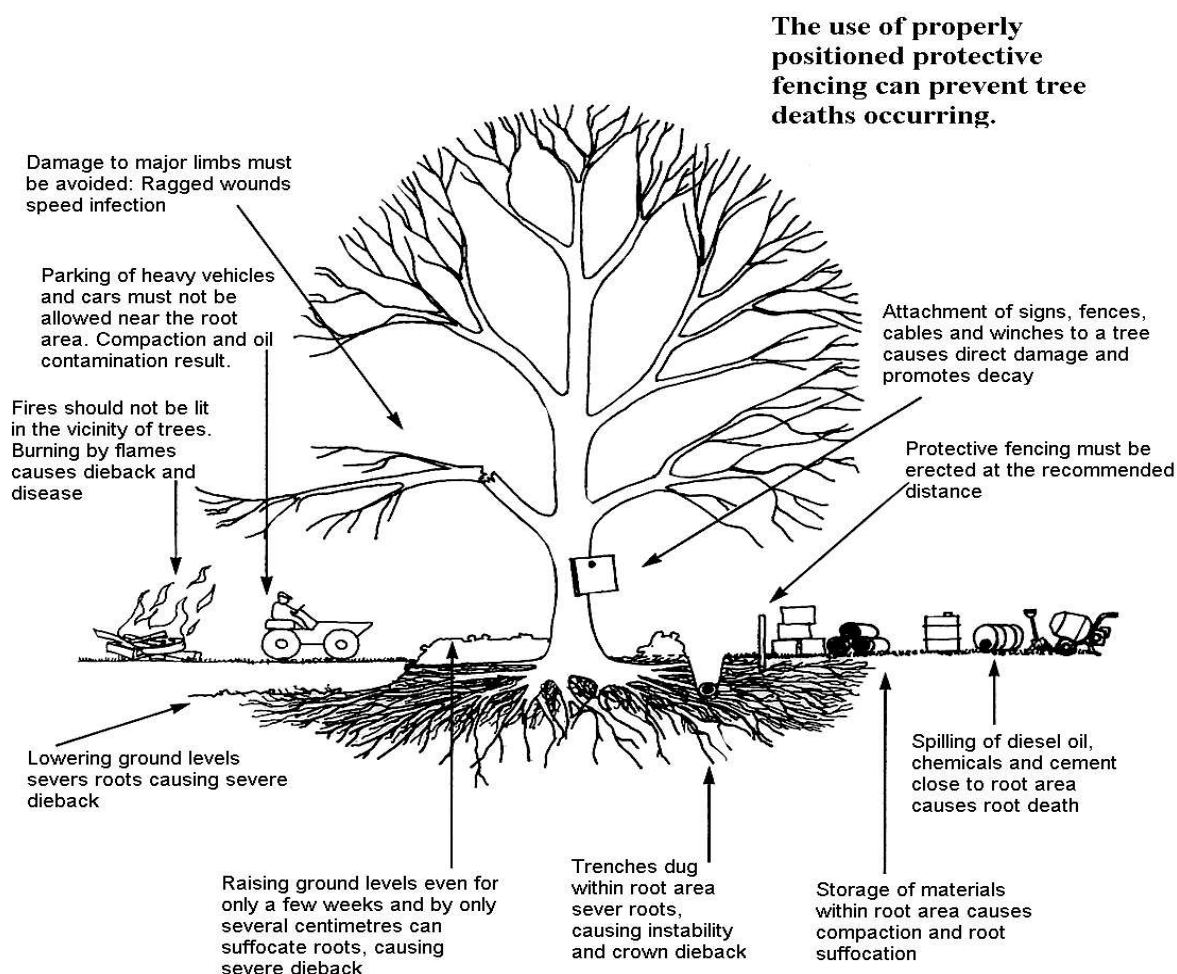
Ground level changes - both reduction and raising of soil levels will be detrimental even if this is only by a few centimetres. Reducing ground levels will sever roots, and can increase the drainage of a site thereby reducing water availability. Raising ground levels will cause compaction, suffocate roots and damage fibrous roots.

Impact damage - this can be caused by machinery - including torn branches and damage to bark and trunks. This will lead to entry for decay organisms and reduced vigour.

Soil contamination - this can be caused by spillage of oil, fuel and chemicals and mixing cement or other materials. Allow for sloping ground – keeping toxic material down hill from trees and aim to store them 10m from the Protected Zone to allow for leaching through the soil.

Fires - both the intense heat and direct flame will damage the trees causing loss and damage to both major roots and fibrous roots. Intense heat will damage the trees vascular system under the bark even if the bark does not appear burnt.

Common causes of Tree Death



APPENDIX 9 – TREE SURVEY PLAN

Drawing No – BA3262TS - Attached

APPENDIX 10 – ARBORICULTURAL IMPLICATION ASSESSMENT

Drawing No – BA3262AIA - Attached

APPENDIX 11 – ARBORICULTURAL PROTECTION PLAN

Drawing No – BA3262PRO - Attached