

APPENDIX 5

ACS Consulting (London)
Tree Management Consultants
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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.

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 – this can be calculated by multiplying the distance of the tree trunk's circumference (at 1.5m above ground level) by 4 (NJUG 10) 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.

- 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 No 10 1995, '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.

In the Precautionary Area:

- (2) ■ **Don't** excavate with machinery. Use trenchless techniques where possible. Otherwise dig only by hand.
- When hand digging, carefully work around roots, retaining as many as possible.
 - **Don't** cut roots over 25mm in diameter, unless the council's Tree Officer agrees beforehand.
 - Prune roots which have to be removed using a sharp tool (eg. secateurs or handsaw). Make a clean cut and leave as small a wound as possible.
 - 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.
 - **Don't** repeatedly move/use heavy mechanical plant except on hard standing.
 - **Don't** store spoil or building material, including chemicals and fuels.
- (3) Frost can damage exposed roots. If trenches are to be left open overnight, cover the roots with dry sacking. Remember to remove the sacking before backfilling.

NJUG GUIDELINES FOR INSTALLING AND MAINTAINING UTILITY SERVICES CLOSE TO TREES

DAMAGE TO TREES

- (1) Tree roots keep a tree healthy and upright. Most roots are found in the top 600mm of soil. They 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 pavement and into front gardens, but they can also grow under the carriageway.

If roots are damaged, for example by trenching, the tree may fall or lose its vigour and decline.

- (2) Tree trunks can be easily damaged, so be careful when working near them. For example, **don't** lean paving slabs against trees, **don't** chain machinery to them or nail site notices to their trunks.

PROTECTING ROOTS

- (1) Establish a protection zone around each tree: the Precautionary Area. See Fig. 1.

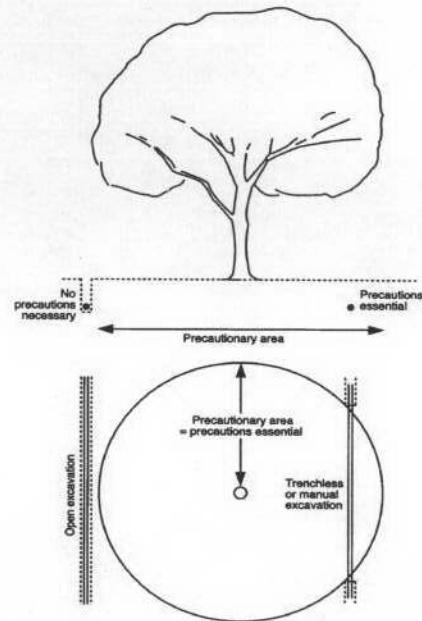


Fig. 1 To determine the Precautionary Area measure the girth of the tree at chest height. Multiply this by 4 and draw a circle of this radius from the centre of the tree.

APPENDIX 7

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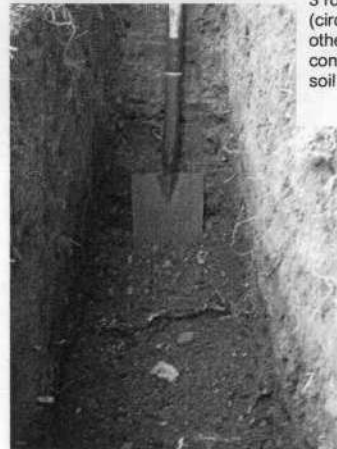
Root Investigation record

Trial pit 1.



Fine roots are present in the upper soil horizon of the sandy profile. One root is located deeper.

Trial pit 2



3 roots of a similar size (circa 10mm) and other fine roots mostly confined to the upper soil horizon.

