Treestyle
CONSULTANCY

## Appendix E - Guidance for Working in Root Protection Areas (RPAs)

## 1.0 Introduction

The following sets out the guidance for working in RPAs that should be followed to ensure successful tree retention. It is based on the guidelines and recommendations set out in British Standard 5837 2012 Trees in relation to design, demolition, and construction - Recommendations (hereinafter BS5837) and the National Joint Utilities Group: Guidelines for the planning, installation, and maintenance of utility services in proximity to trees. Volume 4, issue 2. London: NJUG, 2007 (hereinafter NJUG 4).

## 2.0 General Guidance for Working in RPA's

### 2.1 What is the purpose of this guidance?

The purpose of this guidance is to set out the general principles that must be followed when working in RPAs as follows.

a) pre site commencement: to demonstrate that tree protection issues have been properly considered and sets out how they must be implemented, and

b) post site commencement: to inform all site personnel of their obligations towards protected trees and how to meet them.

### 2.2 What are RPAs?

RPAs are the areas of root protection were.:

a) roots must not be severed, cut, or broken i.e. no excavation, no soil stripping

b) ground levels must not be changed i.e., no soil stripping, no soil level raising

c) soil must not be compacted - no movement of vehicles. All RPA's close to the construction area are illustrated on the tree protection plan within this report. Any and all works within RPAs must be carried out with great care if trees are to be successfully retained.

### 2.3 When must this guidance be followed are:

This guidance must be followed by all personnel entering into or working within an RPA.

The main scenarios where this guidance must be followed are.

a) demolition,

b) construction of new hard surfacing,

c) construction of new structures,

d) subterranean construction,

e) underground and above-ground utility apparatus, and

f) landscaping activities.

Broad definitions of surfacing, services, structures, and landscaping are set out in the following sections.

**2.4 Arboricultural supervision:**

- All work within RPAs must be carried out with care if trees are to be successfully retained. An arboriculturist must be consulted if there is any risk of misunderstanding or misinterpretation. Ongoing work must be inspected regularly, and, on completion, the work must be signed off by the Arboricultural consultant.

**3.0 Demolition within RPA's**

**3.1 Basic principles:**

- Demolition within the RPA should accord to the principle that the tree and soil structure take priority, and the most reliable way to ensure this is to preserve the RPA completely undisturbed.
- The ability of a tree to tolerate some disturbance and alteration of its growing conditions depends on specific circumstances, including prevailing site conditions, and in general, the older the tree, the less successfully it will adapt to new conditions.

**3.2 Avoiding physical damage to the roots during demolition:**

- To avoid damage to tree roots, existing ground levels should be retained within the RPA. Intrusion into soil (other than for piling) within the RPA is generally not acceptable, and topsoil within it should be retained in situ. However, limited manual excavation within the RPA might be acceptable, subject to justification.
- Such excavation should be undertaken carefully, using hand-held tools and preferably by compressed air soil displacement.
- Roots, whilst exposed, should immediately be wrapped, or covered to prevent desiccation and to protect them from rapid temperature changes. Any wrapping should be removed prior to backfilling, which should take place as soon as possible.
- Roots smaller than 25 mm diameter may be pruned back, making a clean cut with a suitable sharp tool (e.g., bypass secateurs or handsaw), except where they occur in clumps. Roots occurring in clumps or of 25 mm diameter and over should be severed only following consultation with an arboriculturist as such roots might be essential to the tree's health and stability.
- Prior to backfilling, retained roots should be surrounded with topsoil or un- compacted sharp sand, or other loose inert granular fill, before soil or other suitable material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots

## 4.0 Construction of New Hard Surfacing within RPA's

### 4.1 Basic principles:

- The design should not require excavation, including changes of soil levels other than the removal of turf or other surface vegetation.
- The new hard surface must avoid localised compaction by evenly distributing the loading over the track width and wheelbase of any vehicles expected to use the access.
- New permanent hard surfacing should not exceed 20% of any existing unsurfaced ground within the RPA.
- If the new surface is likely to be subject to de-icing salt application, an impermeable barrier should be incorporated to prevent contamination of the rooting area and run-off should be directed away from the RPA.
- Where a permeable surface is to be used by vehicular traffic, a geotextile should be used at the base of construction to help prevent pollution contamination of the rooting area below.
- Where there is a risk of water-logging suitable land drainage must be incorporated.
- The new hard surface should be resistant to or tolerant of deformation by tree roots and should be set back from the stem of the tree and its above ground root buttressing by a minimum of 500 mm to allow for growth and movement.
- Mature and over-mature trees are more prone to suffer because of these changes than young and middle-aged trees. Adverse impact on trees can be reduced by minimising the extent of these changes within RPAs.
- The actual specification of the surfacing is an engineering issue that needs to be considered in the context of the bearing capacity of the soil, the intended loading, and the frequency of loading.
- Product and specification are beyond the scope of this guidance and must be provided separately by the appropriate specialist.

### 4.2 Sub-base and finishing layers:

- Appropriate sub-base options for new hard surfacing include three-dimensional cellular confinement systems. Alternatively, piles, pads or elevated beams can be used to support surfaces to bridge over the RPA or following exploratory investigations to determine location, to provide support within the RPA while allowing the retention of roots greater than 25 mm in diameter.
- Suitable surface finishes include washed gravel, permeable tarmac or block pavers set on a sand base.
- In some situations, limited width floating concrete rafts constructed directly on to the soil surface may be acceptable, but the design must not include any strip supports.

**4.3 Edge retention:**

- The excavation needed for the placement of kerbs, edgings, and their associated foundations and haunching's can damage tree roots. Within the RPA, this should be avoided either by the use of alternative methods of edge support or by not using supports at all.

**4.4 Installing new hard surfacing on top of existing surfacing:**

- In some instances, existing surfacing can be retained and used as a base for new surfacing. Normally, this will not result in significant excavation that could expose roots so special precautions are not necessary.
- If large roots already protrude above the proposed sub-base level, then the precautions and procedures set out above must be observed.

**5.0 Construction of New Structures within RPA's**

**5.1 Basic principles:**

- Construction within the RPA should accord to the principle that the tree and soil structure take priority, and the most reliable way to ensure this is to preserve the RPA completely undisturbed.
- The ability of a tree to tolerate some disturbance and alteration of its growing conditions depends on specific circumstances, including prevailing site conditions, and in general, the older the tree, the less successfully it will adapt to new conditions.
- Where alternative design solutions are not available such that construction is proposed within the RPA, the potential impact of the proposals on the tree should be assessed and a tree protection plan and Arboricultural method statement produced.
- Details of design proposals should be developed in conjunction with the project arboriculturist and, where required, input from a suitably qualified engineer.
- In order to demonstrate that the proposals are technically feasible such details should be included within planning applications. The exception to this is the installation of underground utility apparatus, where it can be demonstrated that this is achievable by the use of trench-less technology and where entry and retrieval pits can be formed outside the RPA.
- Where utility operations do not require planning permission, including those performed by statutory undertakers, they should still be undertaken in accordance with these principles.

**5.2 Avoiding physical damage to the roots during construction:**

- To avoid damage to tree roots, existing ground levels should be retained within the RPA. Intrusion into soil (other than for piling) within the RPA is generally not acceptable, and topsoil within it should be retained in situ. However, limited manual excavation within the RPA might be acceptable, subject to justification. Such excavation should be undertaken carefully, using hand-held tools and preferably by compressed air soil displacement.
- Roots, whilst exposed, should immediately be wrapped, or covered to prevent desiccation and to protect them from rapid temperature changes. Any wrapping should be removed prior to backfilling, which should take place as soon as possible.
- Roots smaller than 25 mm diameter may be pruned back, making a clean cut with a suitable sharp tool (e.g., bypass secateurs or handsaw), except where they occur in clumps. Roots occurring in clumps or of 25 mm diameter and over should be severed only following consultation with an arboriculturist as such roots might be essential to the tree's health and stability.
- Prior to backfilling, retained roots should be surrounded with topsoil or un- compacted sharp sand, or other loose inert granular fill, before soil or other suitable material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots.

**6.0 Subterranean construction within RPAs**

**6.1 Basic principles:**

- Where it is proposed to form subterranean structures, e.g., basement extensions, within the RPA, it is essential to avoid excavating down through routable soil if trees are to be retained. In some cases, it might be technically possible to form the excavation by undermining the soil beneath the RPA. 7.0 Underground and above-ground utility apparatus within RPAs

**7.1 Basic principles:**

- Mechanical trenching for the installation of underground apparatus and drainage severs any roots present and can change the local soil hydrology in a way that adversely affects the health of the tree. For this reason, particular care should be taken in the routing and methods of installation of all underground apparatus.
- Wherever possible, apparatus should be routed outside RPAs. Where this is not possible, it is preferable to keep apparatus together in common ducts. Inspection chambers should be sited outside the RPA. Where underground apparatus is to pass within the RPA, detailed plans showing the proposed routing should be drawn up in conjunction with the project arboriculturist. In such cases, trench-less insertion methods should be used with entry and retrieval pits being sited outside the RPA. Provided that roots can be retained and protected excavation using handheld tools might be acceptable for shallow service runs.

## 8.0 Landscaping within RPA 's

### 8.1 Basic principles:

- The general treatment of areas around newly planted and existing trees should allow for adequate infiltration of water and free gas exchange, reduction of water evaporation and the retention of an open soil structure to encourage root growth.

### 8.2 Soil compaction and remediation measures:

- Soil that has been compacted will not provide suitable conditions for the survival and growth of vegetation, whether existing or new, and is a common cause of post-construction tree loss on development sites.
- Compacted soil will adversely affect drainage, gas exchange, nutrient uptake, and organic content, and will seriously impede or restrict root growth. The risk of soil compaction is greatest in soils with significant clay content and in wet conditions.
- Soil compaction should be avoided around existing vegetation, including trees, and in areas where new planting or seeding is proposed.
- Where soil compaction has occurred in the vicinity of existing trees, Arboricultural advice should be taken before carrying out any remedial or other works within RPAs to mitigate risk of further damage to roots.
- Remedial works may include sub-soil aeration using compressed air, and the addition of other materials, preferably of a bulky, organic nature (but excluding peat), to improve structure. Heavy mechanical cultivation such as ploughing or rotavation should not occur within the RPA.
- Any cultivation operations should be undertaken carefully by hand in order to minimise damage to the tree, particularly the roots. Decompaction measures include forking, spiking, soil auguring and tilthed radial trenching. Care should be taken during such operations to minimise the risk of further damage to tree roots.

### 8.3 Use of herbicides:

- The use of herbicides in the vicinity of existing trees should be appropriate for the type of vegetation to be killed, and all instructions, warnings and other relevant information from manufacturers should be strictly observed and followed. Care should be taken to avoid any damaging effects upon existing plants and trees to be retained, species to be introduced, and existing sensitive habitats, particularly those associated with aquatic or drainage features.

### 8.4 Tree work within RPAs:

- Care should be taken to ensure during tree removal or remedial work that damage to the retained trees and/or disturbance to the RPA is avoided. Precautions should include dismantling techniques to reduce the risk of accidental damage, and ground protection measures where excessive pedestrian movements or use of plant and machinery might lead to compaction. If temporary access is required for plant or vehicles within the RPA, this should be provided by means of temporary ground protection.