

TREE PROTECTION GUIDELINE FOR CONSTRUCTION, EXCAVATION & TRENCHING FOR AERIAL AND UNDERGROUND FIBRE OPTIC CABLING

1. Introduction

Trees can be damaged or killed by a wide variety of construction activities. Such as broken or torn branches and root damage. Broken or torn branches can lead to diseases and insects inserting the trees through the open wounds.

Trees are never the same shape below ground as they are above, so it is difficult to predict the length or location of their roots. Typically, however, approximately 90-95 percent of a tree's root system is in the top 90--100 cm of soil 100 cm of soil, and more than half is in the top 30-50 cm. The part of this root system in which construction damage should be avoided is called the Root Protection Area (RPA).

One common method to identify the RPA is to define it as the "dripline"--the area directly below the branches/crown of the tree. However, many roots extend beyond the longest branches a distance equal to two or more times the height of the tree. For this reason, you should protect as much of the area beyond the dripline as possible.

On most construction or excavation sites space is limited and it is not possible to protect the entire canopy and root area. Just how close an activity can come without seriously threatening the survival of a tree depends on the species, the extent of damage, and the plant's health. Some healthy trees can survive after losing 50 percent of their roots. However, other species are extremely sensitive to root cutting, even outside the dripline. Most trees can survive significant canopy pruning but not all species respond with successful regrowth of a visually acceptable canopy.

This guideline is aimed at providing direction for approaching and executing canopy pruning and root zone excavations for the purposes of installing fibre optic cabling both above ground mounted on poles and below ground in trenches, whilst minimizing any negative impact on the health and visual integrity of existing street trees.

2. Minimising Impact of Construction & Excavation Activities

2.1 Soil Damage and Compaction

Tree roots need loose soil to grow, obtain oxygen, and absorb water and nutrients. Stockpiled building materials, heavy machinery, and excessive foot traffic all damage soil structure. Lacking good soil aeration, roots suffocate and tree health declines.

Prevent soil compaction by carefully selecting storage areas and traffic routes and installing protective fences and signs. If you can, reroute traffic, install root system bridges with steel plates suspended over railroad ties or spread a layer (15cm or more) of wood chips on the soil within the RPA. Trees that are pruned or removed during the construction process should be chipped on site and the chips used for soil preservation tactics such as this.

Improper handling or disposal of materials used during construction also can harm roots. All building debris and chemical wastes be hauled away for proper disposal, and not burned or buried on the site.

Avoid changes in soil pH (acidity). Increases in pH are particularly dangerous to many species. Alkaline clays or limestones should not be used for fill or paving, and concrete should be mixed on a thick plastic tarp or outside the site. Mixing trucks should never be rinsed out on the site.

2.2 Excavation

Up to 40% of a tree's root system could be cut during the installation of a nearby utility line. This however, reduces water and nutrient uptake, and may compromise the stability of the tree. If it is not possible to relocate the utility line outside the tree's RPA, you can reduce root damage by as much as 25% by tunnelling under the tree's root system. When digging a trench near a tree, begin tunnelling when you encounter roots larger than in 2,5cm in diameter. Drilling single holes or bridging critical areas as opposed to cutting deep trenches saves many critical roots.

For all digging operations, insist that exposed roots be cut cleanly to promote quick wound closure and regeneration. Hand

excavation, vibratory plows, chain trenchers, and hand tools are preferred than bulldozers and backhoes. Minimize damage by avoiding excavation during hot, dry weather; by keeping the trees well-watered before and after digging; and covering exposed roots with soil, mulch, or damp burlap/hessian as soon as possible.

2.3 Root Pruning

Trenching and digging in the soil near trees can cut roots, and this can damage the tree resulting in tree decline or the tree falling over. Tree roots greater than about 2.5cm diameter should not be damaged. In some cases, roots of 2.5cm – 8cm diameter represent the major structural roots holding the tree upright. When roots greater than 2.5cm are exposed, a trained professional / arborist should be contacted.

3. Proposed additions/ amendments to Specifications

With reference to the following documents:

Aerial fibre Working Specification, March 2020

Frogfoot FTTH Implementation Specification Rev 1.4

The following guidelines / specification are proposed to be added / incorporated into the above working documents to ensure that impacts on existing street trees in Kimberley are minimized:

- 3.1 Hand excavation only within the Root Protection Area (RPA) of any street trees
- 3.2 As per both documents, permission from the landowner (municipality or closest resident/ property owner) must be sought before any pruning of canopy or excavation within the Root Protection Area (RPA) is carried out.
- 3.3 Attempt to have a minimum 1meter setback from the root flare of the tree trunk for any trenches or excavations. A 2m setback is much preferred and if at all possible / reasonable, all cable routes and excavations should remain outside the dripline of the canopy completely.
- 3.4 Tunneling under roots is preferable to cutting through them. If a root 2,5cm or greater in diameter is encountered this must be protected and either bridged or tunnel under it.

3.5 Cutting of roots must be made with tools that result in a clean sharp cut. No tearing. Any pruning of roots 2,5cm or larger must be undertaken by a knowledgeable person (arborist) and treated with the correct sealant product to avoid disease entering the tree tissue.

3.6 All pruning to tree canopies as per the Aerial Fibre Working Specification March 2020