LANDSCAPING UNDER BIG TREES

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Trees are complex, long-lived organisms with a permanent architecture.
Misunderstandings about tree roots have resulted in the loss of many valuable trees not readily replaced in our lifetimes.
What's wrong with this picture?

Conventional wisdom mistakenly says that tree roots spread out and down in a mirror image of the branches above, as the drawing shows.

from: 'Gardening Amid Tree Roots' by Thomas O. Perry
**Fig. 1.10  How roots grow.**

- The **Root Collar** is usually at or near the ground line and is identifiable as a marked swelling of the tree trunk.

- The **Framework of major roots** usually lies less than eight to twelve inches below the surface and often grows outward to a diameter one to two times the height of the tree.

- A complex network of smaller non-woody **Feeder Roots** grow outward and upward from the framework roots. These smaller roots branch four or more times to form fans or mats of thousands of fine, short, non-woody roots. These slender roots, with their tiny root hairs, provide the major portion of the absorption surface of a tree's root system. They compete directly with the roots of grass and other groundcovers.

- **Because Roots Need Oxygen** in order to grow, they don't normally grow in the compacted, oxygen-poor soils under paved streets.

Note: A few species have a **Taproot** that grows straight down three to seven feet or more until they encounter impermeable soil or rock layers, or reach layers with insufficient supplies of oxygen.
Root injury and tree health

- Root loss upsets the root:crown balance.

- The more roots cut, the greater the potential harm.

- Branch death and dieback are common symptoms.

- Symptoms may be immediate, or may take a few years to be evident.

- An ounce of prevention is worth a ton of cure.
Repeated cultivation for bulbs & perennials is not a good fit in tree root zones.
Use bulbs & perennials that don’t require routine digging and dividing.

Autumn crocus ‘Waterlily’
Disturbing a small area of the root system for sidewalk repair or new plantings can result in loss of a large portion of the root system.

from: "Root Injury and Tree Health" by Gary W. Watson, Morton Arboretum
CRITICAL ROOT ZONE PLANTING DETAIL
NOT TO SCALE

New landscape plantings may be desirable or required near preserved trees. This detail shows where plantings are acceptable in relation to a preserved tree's critical root zone (CRZ).

**SITE PERSPECTIVE**

Critical root zone (CRZ) is a circular area under trees to be protected from construction activities. A radius extended from the tree in question is equal to 1 ft. for every 1 in. of tree diameter measured at 4.5 ft. above ground.

**PROFILE PERSPECTIVE**

New tree, shrub, and groundcover plantings allowed with precaution to avoid tree roots.

New shrub and groundcover plantings only with precaution to avoid tree roots.

New groundcover plantings allowed only with precaution to avoid tree roots.

New tree, shrub, and groundcover plantings allowed here only. No new trees or shrubs.

New groundcover plantings allowed. No new trees.

New tree, shrub, and groundcover plantings allowed in CRZ radius.
At-grade irrigation options
Root pruning – make clean cuts!

New roots grow from a clean cut

No new growth from frayed ends of damaged roots
Their roots occupy the same soil spaces.

They come from inherently different ecological conditions. Over the long term, one or the other will lose out when they are placed too close together.
Figure 3. Sugar maple root development is reduced when lawn is present.
Fragaria ‘Pink Panda’
Tips for success

- Minimize root disturbance.
- Minimize soil and moisture changes.
- Match plants to habitat beneath the trees.
- Use smaller nursery stock to minimize digging.
- Plant in the fall.
- Use coarse organic mulch.
- Use surface-laid drip style irrigation lines during establishment of new plants.