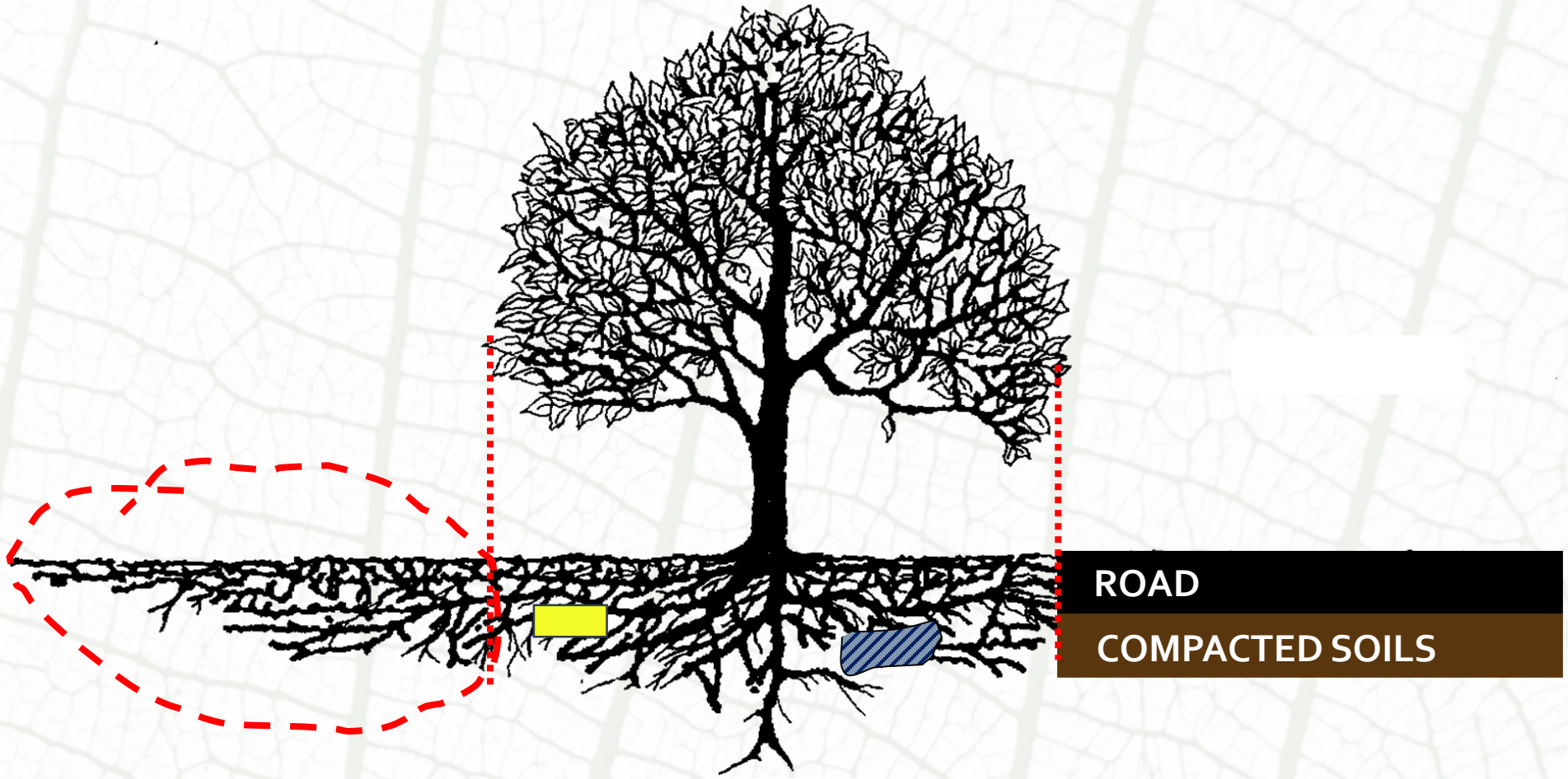
Notable Tree Heritage Root Protection

'The root zone Tree roots are often ignored, and the effects of damage may not be seen until months or years after work is complete. Tree roots require not only water and nutrients, but oxygen to breathe. They can be starved of these essential requirements by even minor work. The tree-root zone can often extend beyond the canopy of the tree. In many cases the tree-root zone can cover an area two to three times that of the canopy. It is possible to carry out construction work within this larger root zone, but there must be an area of root zone that is protected at all times. This area can be defined as any ground within the drip line of the tree or within half the height, whichever is greater.' - **WCC Working around Trees Guidelines**.

A precautionary approach to Notable Tree root protection



WCC Trees Plan Change

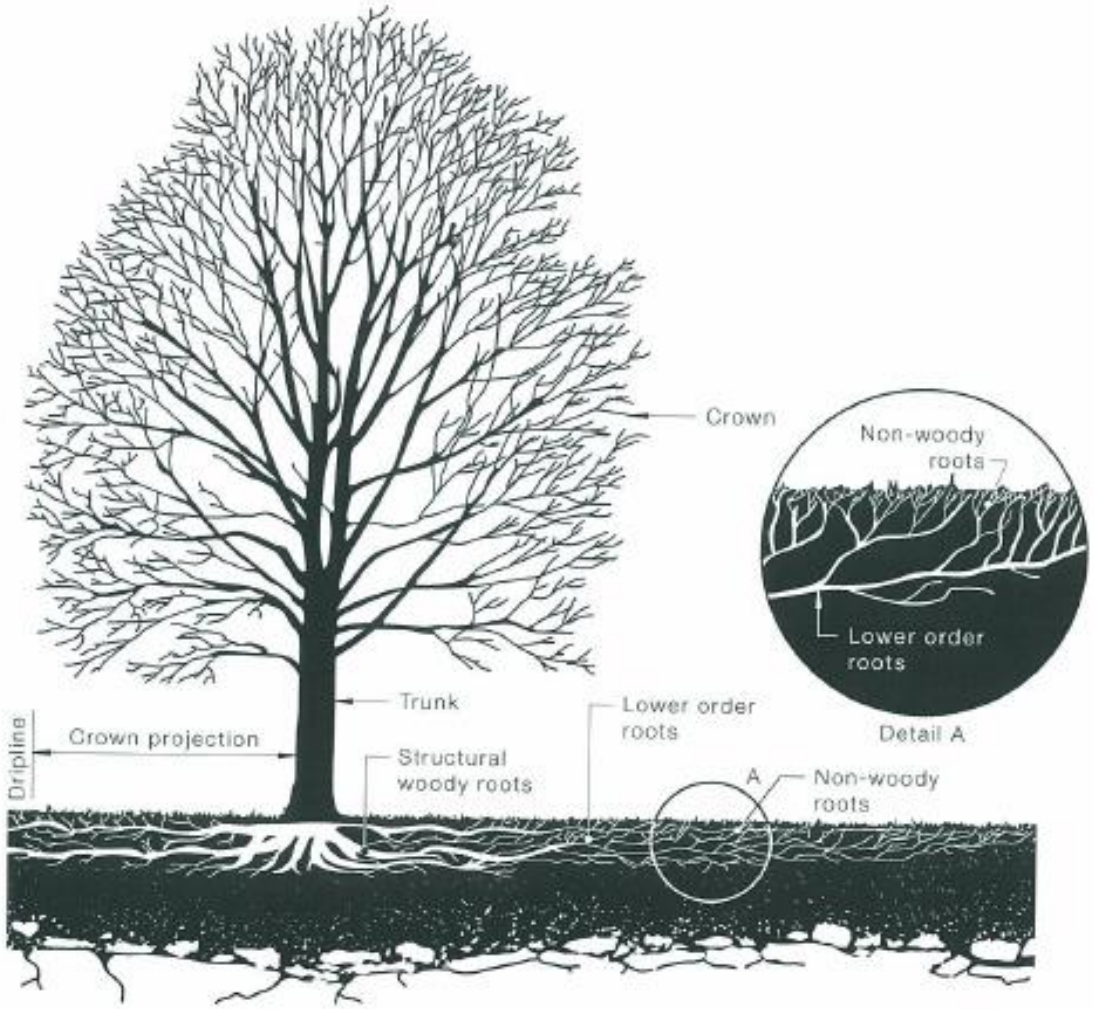


FIGURE B1 STRUCTURE OF A TREE IN A NORMAL GROWING ENVIRONMENT

There is such variation in root distribution and tree response, given the species, age and size, that general tree protection guidelines based solely on the dripline are not always dependable. A more appropriate guideline is trunk diameter (Arboriculture – Integrated Management of Landscape Trees, 4th Ed. 2004 Harris, Clark & Matheny).

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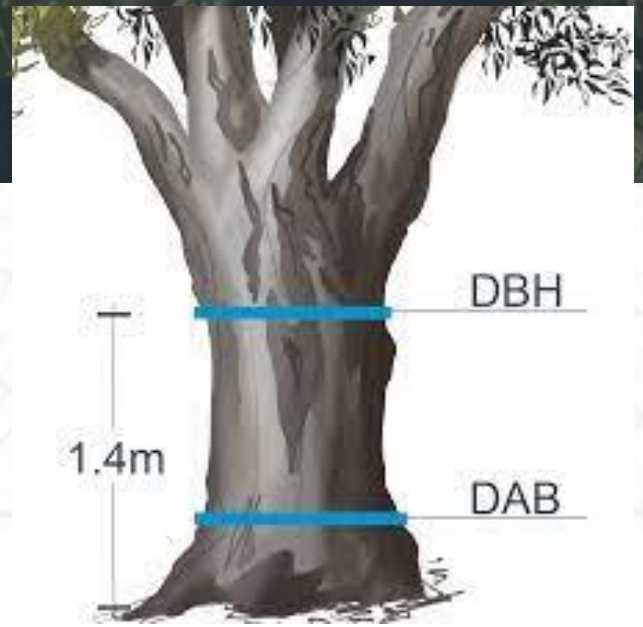
Best practice root protection Standards



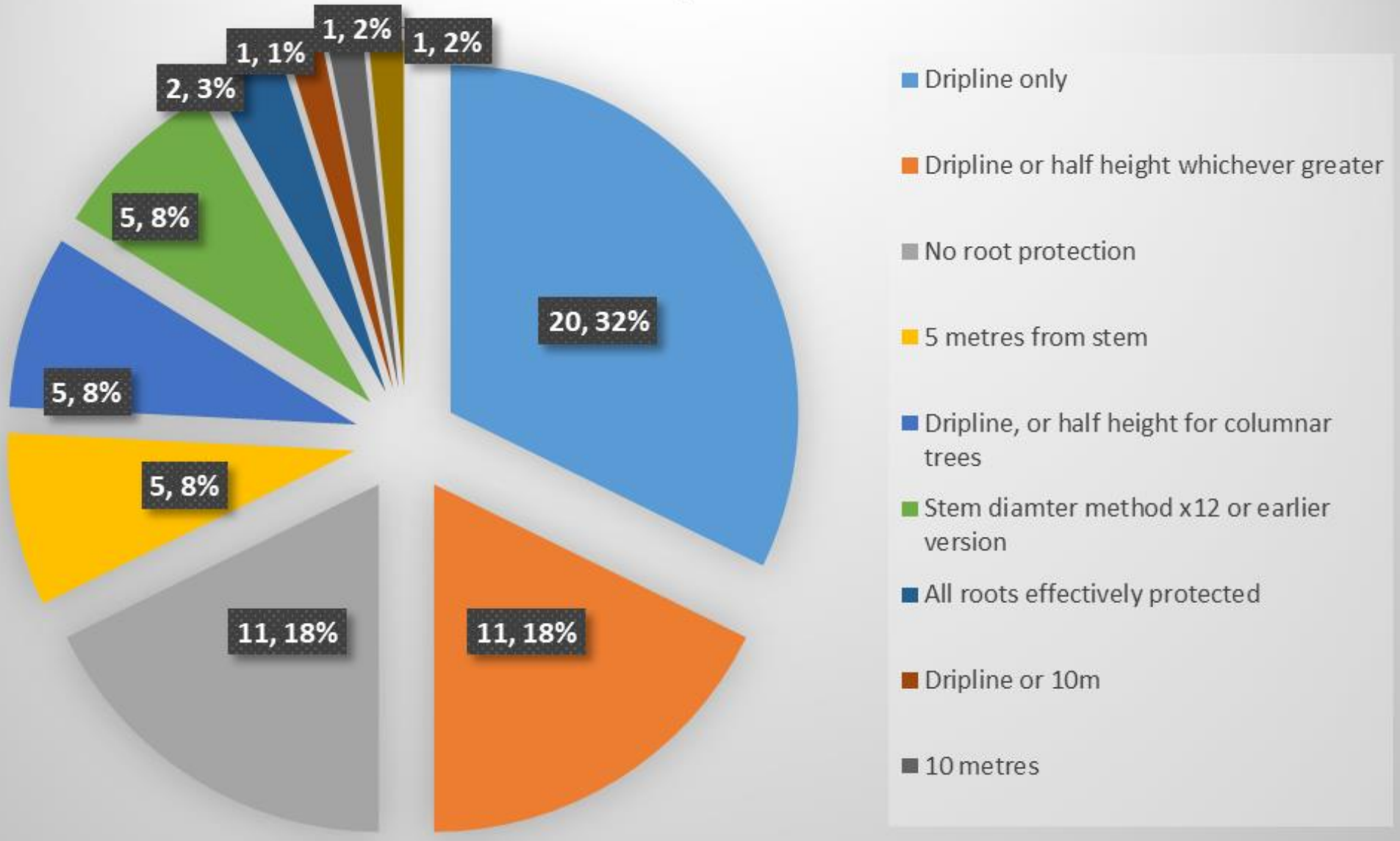
Tree Care on construction/development sites:

- Australian Standard: AS 4970 - 2009 Protection of Trees on Development Sites
- British Standard: BS 5837:2012 Trees in relation to design, demolition and construction. Recommendations
- American National Standard: ANSI A300 (Part 5)-2012: Management of Trees and Shrubs During Site Planning, Site Development, and Construction

NZ Arb also supports and recommends the following international tree protection zones as:

- The Tree Protection Zone (TPZ) which is a is a circle taken from the centre of the trunk with a radius equal to 12 times the diameter of the trunk measured at 1.4m (DBH) above ground level. An incursion of any more than 10% of the area of the TPZ is considered a 'major incursion'
- The Structural Root Zone (SRZ) which is a circle taken from the centre of the trunk with a radius equal to 3.31 times the diameter of the trunk measured just above the above the root buttress. No works should take place within the SRZ

NZ District Plan root protection methods

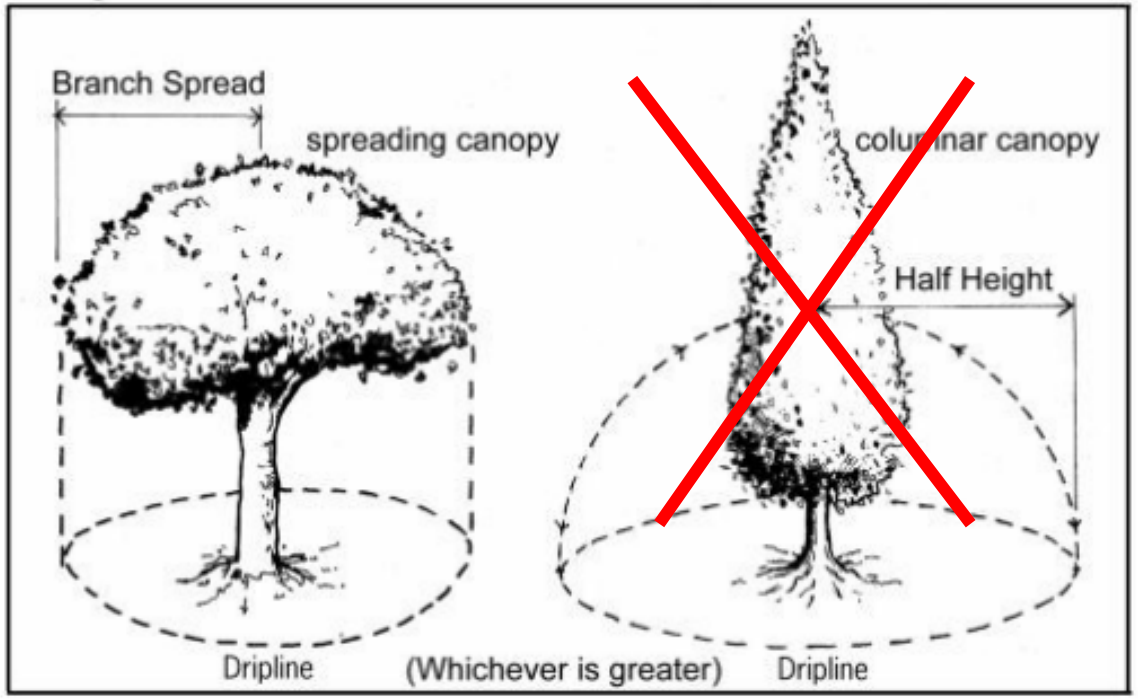


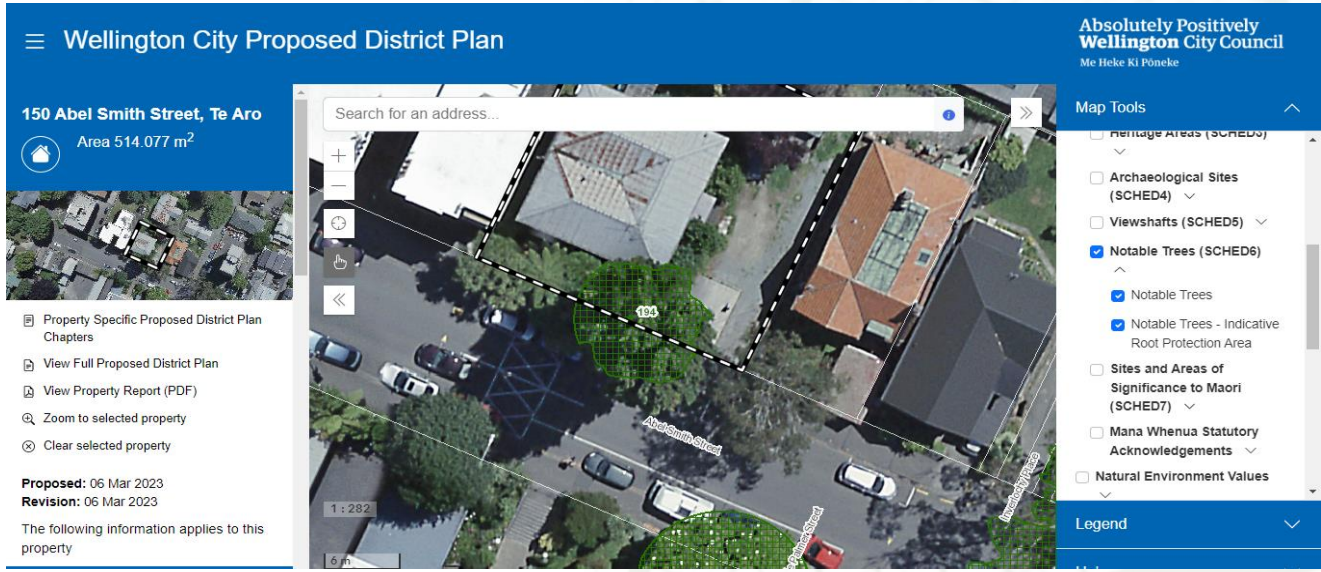
WCC Proposed Notable Tree RPA 2023

ROOT PROTECTION AREA

DEFINITION

means for a tree with a spreading canopy, the area beneath the canopy spread of a tree, measured at ground level from the surface of the trunk, with a radius to the outer most extent of the spread of the tree's branches, and for a columnar tree, means the area beneath the canopy extending to a radius half the height of the tree (whichever is greater).





BS5837 -1991 Trees in Relation to Construction

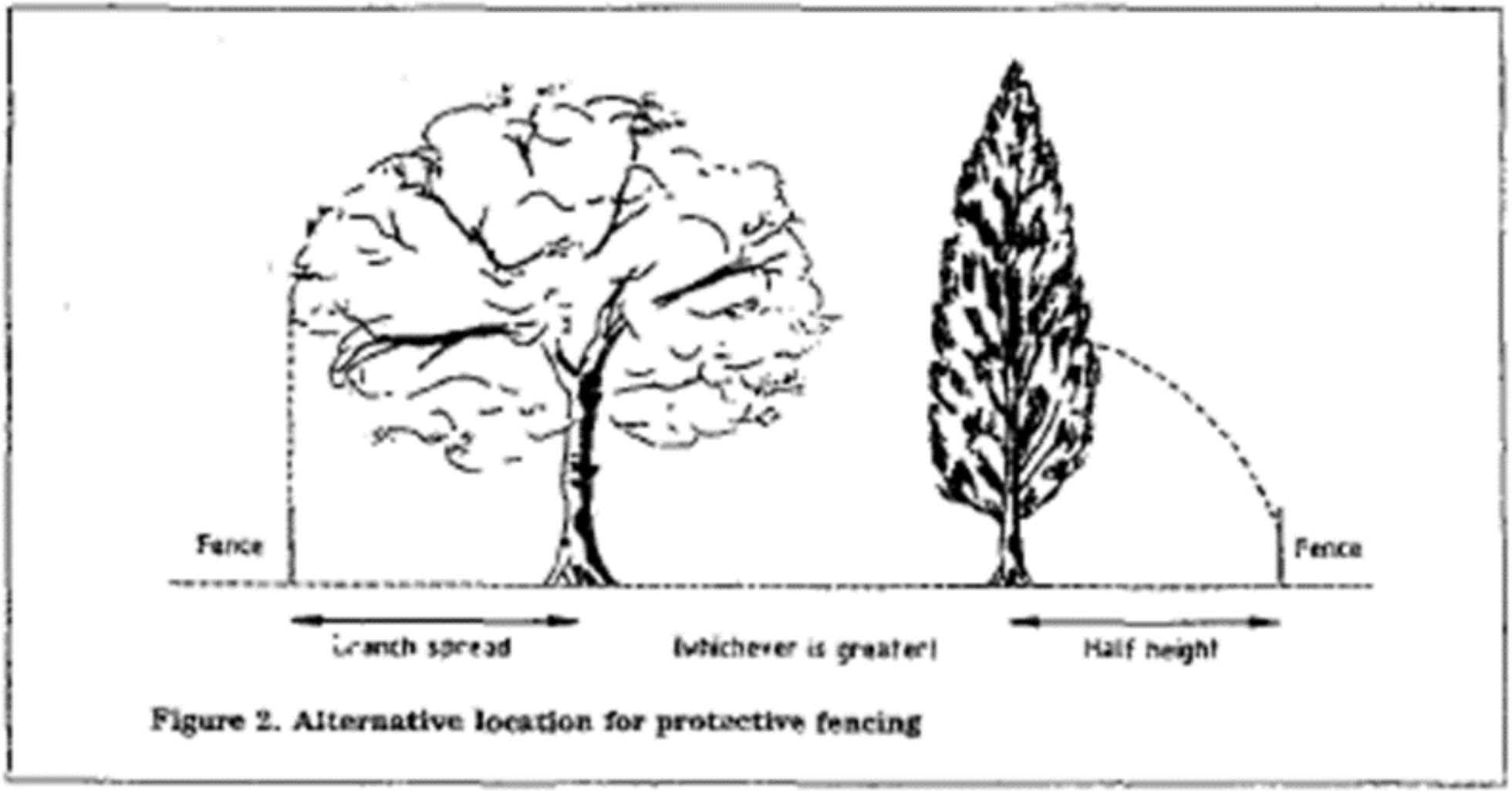
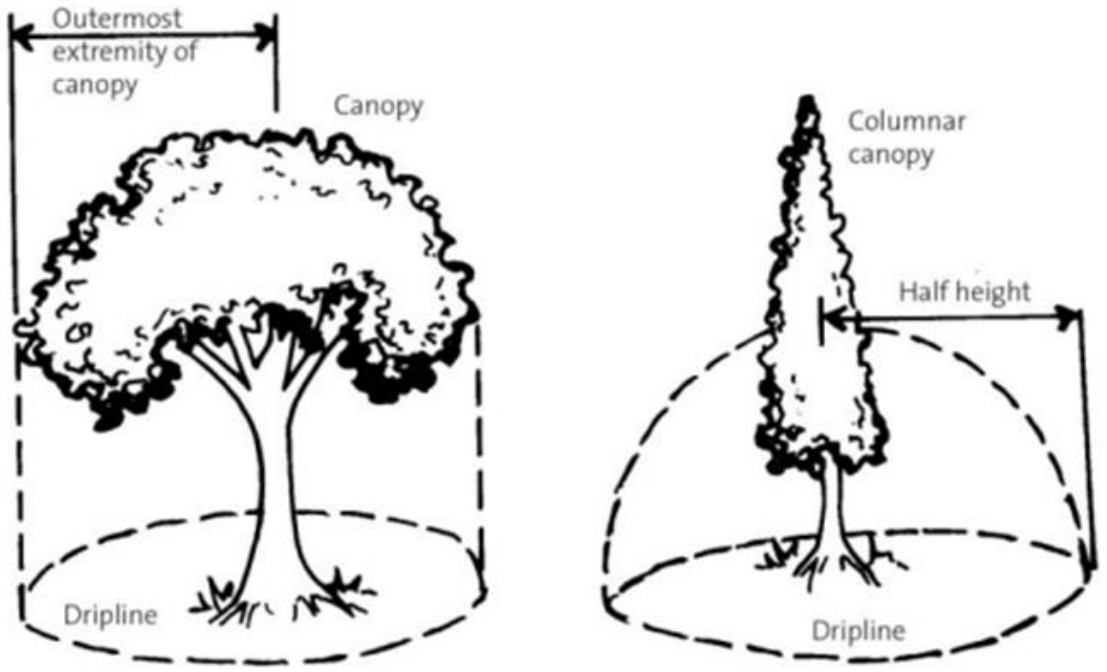


Figure 2. Alternative location for protective fencing

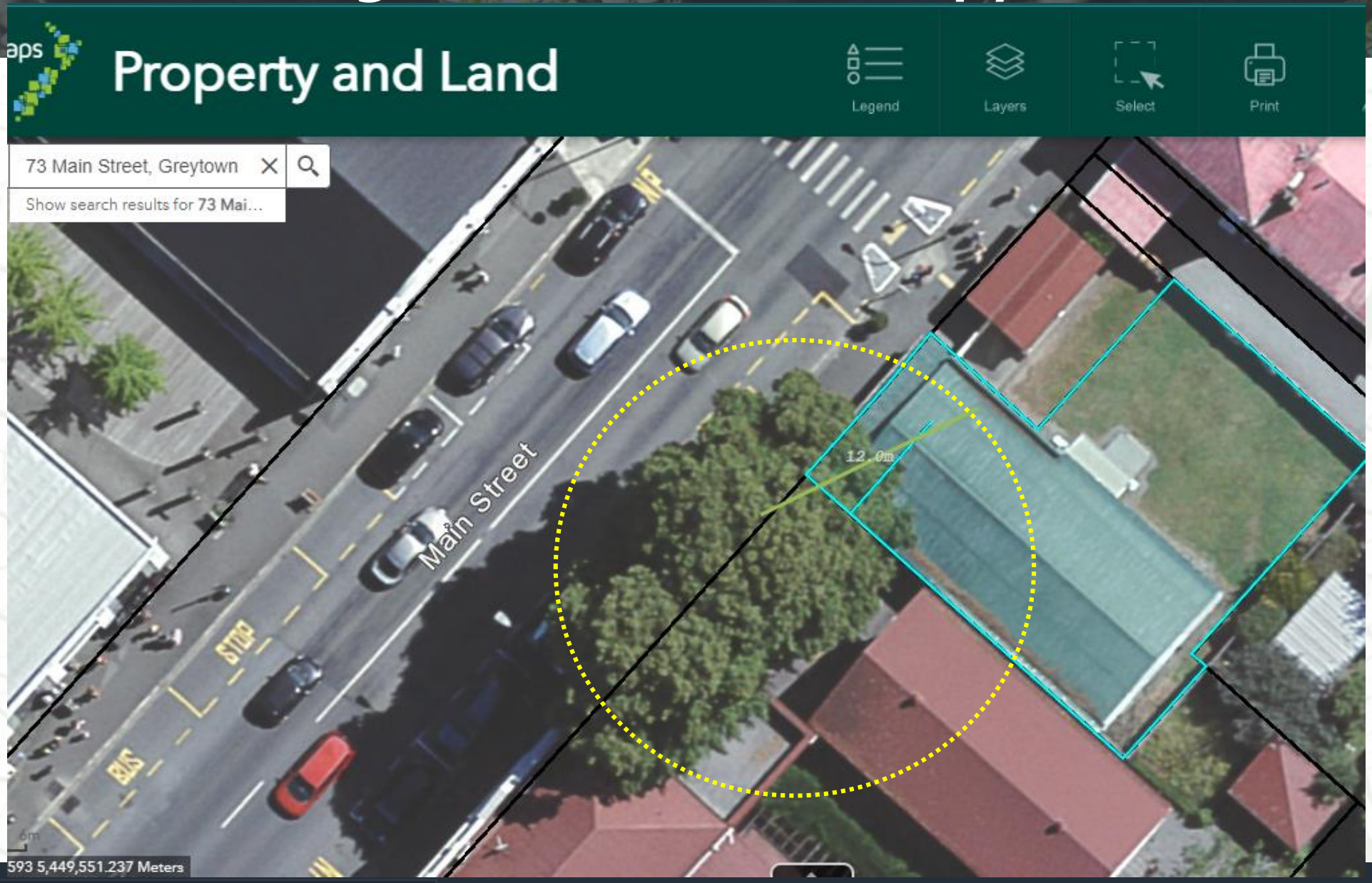
Wairarapa District Plan 2004

WAIRARAPA COMBINED DISTRICT PLAN
PART C – CONSENT PROCESS



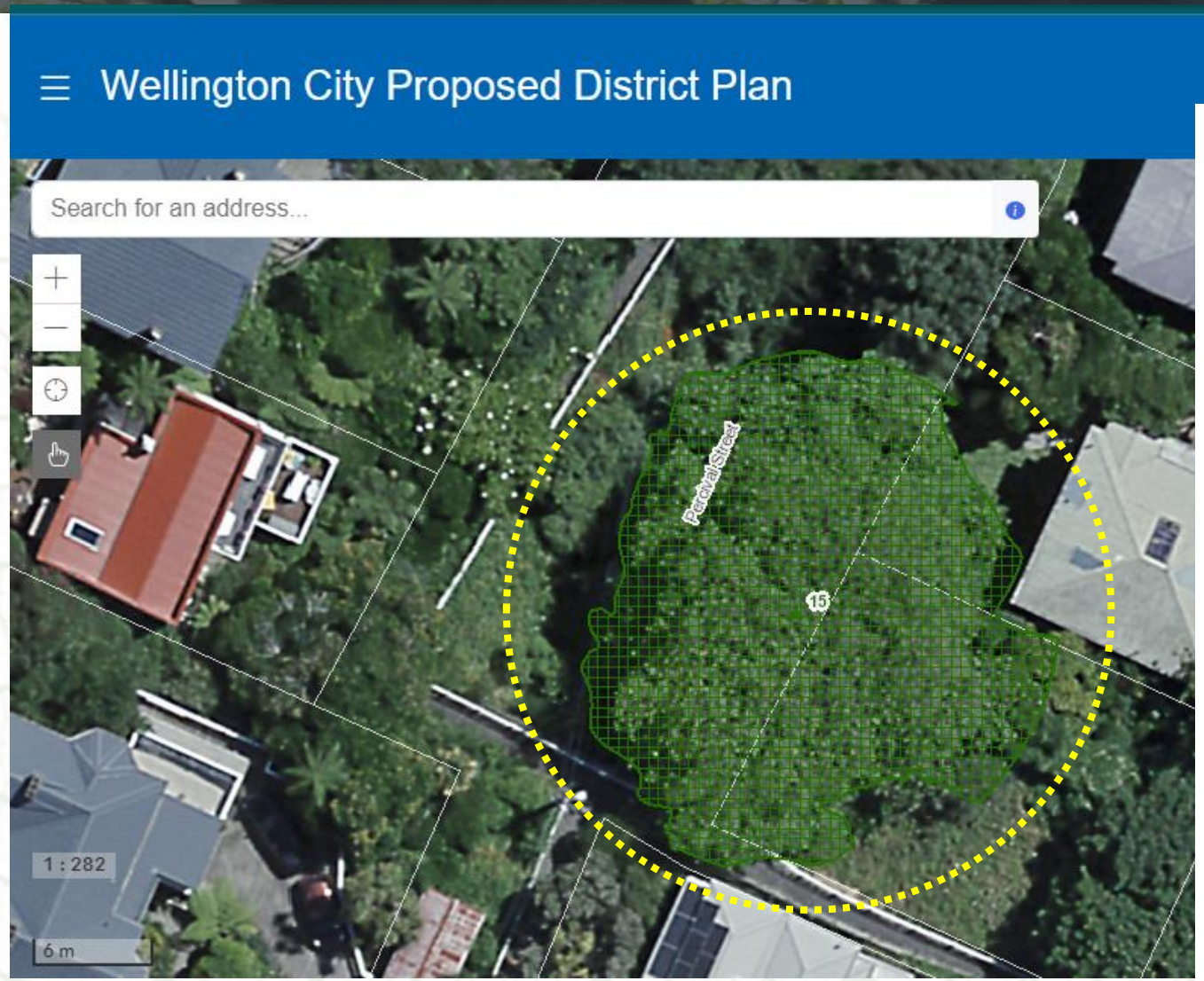
Note: Dripline equals whichever method gives greatest measurement

Half tree height can exceed canopy extent



'The '12 times stem diameter' method generates larger RPAs around 90% of the time for trees with a stem diameter of 90cm or greater (this likely applies all WCC Notable Trees)' Jez Partridge Research Paper 2021.

Dripline RPA method v 12 *x* trunk diameter method



Benefits of a larger RPA

1. Larger area of protected roots (especially important for veteran tree)
2. Better protection of roots during construction e.g fencing and ground protection
3. Hard surfacing can be better controlled
4. Trenches for services can be better controlled
5. Design of building foundations better controlled
6. Potentially require clearance between canopy edge and new building
7. Potentially require changes to design of a new building within RPA
8. Precautionary approach prevents potential for significant tree damage whilst allowing development if deemed appropriate

Root Protection Area submission summary

- In nearly all cases consideration of RPA will only need to occur when development or underground works are proposed close to a Notable Tree. In such situations a Consultant Arborist would normally provide advice as part of the Resource Consent process
- Council's proposed RPA method is an inferior version of the 1991 BS5837 method which was withdrawn in 2005 and replaced with the 12xstem diameter method, which is now become International best practice
- Council's proposed RPA method (dripline, or half tree height for columnar trees) is only used by around 8% of NZ Councils (based on my own research)
- Council's online Notable Tree map shows the RPA for each tree as following the canopy extent of each tree. It would be straightforward for Council to change this to the 12xstem diameter extent as all Notable Tree stem diameters were collected as part of the Notable Tree assessment process.
- The 12 x stem diameter method is recommended by NZ Arb Association
- There appears to be no 'columnar' Notable Trees in the District Plan meaning that Council is effectively using just a tree's dripline only to demark the RPA extents for all Notable Trees. The method proposed by Council is therefore not actually going to being used.
- The 12xstem method produces a larger RPA than the 'dripline or half height method' 90% of the time where the trunk diameter is at least 90cm when compared against the 'dripline or half height' (based upon my own research)
- A larger RPA will provide Council with more ability to protect Notable Tree roots, and enable Council to better prevent or mitigate potentially significant root damage or loss, and should not be thought of as a 'no go' zone.
- Think of the RPA, using the 12xstem diameter method, as a 'precautionary area'. A Level 6 Consultant Arborist may subsequently advise that that this RPA can be reduced in extent if they consider that some root loss is acceptable. Starting off with a larger RPA provides more flexibility and better protection
- Council did not compare the costs and benefits of alternative RPA methods in its Notable Tree Section 32 Report, and I therefore believe that the S32 report was not undertaken in accordance with RMA requirements
- Council does not appear to have engaged a Consultant Arborist to advise on DP Notable Tree Rules and Standards, as there is no record of any such advice to Council being received in public documents
- Porirua City Council is planning to use the 12xstem diameter method for its Notable Tree RPA and I would expect more Wellington Region Councils to switch to this best practice method as plans are reviewed
- Council's Parks and Gardens Manager, who is a qualified arborist and former NZ Arb Association President, has advised Council to use the 12xstem diameter method to determine a Notable Tree's RPA. That advice has been rejected by Council which seems unreasonable.

Notable Trees in Terminal Decline can be removed as Permitted activity

Plimmer's Oak: The tree without a heart in the centre of Wellington

Kate Green · 05:00, Dec 28 2021

ROSS GIBLIN/STUFF

The Plimmer's Oak Notable Tree could be removed without the need for a Resource Consent as it likely fits the description of a tree that is in 'terminal decline

BS5837 -1991 Trees in Relation to Construction

Table 1. Protection of trees: minimum distances for protective fencing around trees

Tree age	Tree vigour	Trunk diameter	Minimum distance
		mm	m
Young trees (age less than ⅓ life expectancy)	Normal vigour	< 200	2.0
		200 to 400	3.0
		> 400	4.0
Young trees	Low vigour	< 200	3.0
		200 to 400	4.5
		> 400	6.0
Middle age trees (⅓ to ⅔ life expectancy)	Normal vigour	< 250	3.0
		250 to 500	4.5
		> 500	6.0
Middle age trees	Low vigour	< 250	5.0
		250 to 500	7.5
		> 500	10.0
Mature trees	Normal vigour	< 350	4.0
		350 to 750	6.0
		> 750	8.0
Mature trees and overmature trees	Low vigour	< 350	6.0
		350 to 750	9.0
		> 750	12.0

NOTE 1. It should be emphasized that this table relates to distances from centre of tree to protective fencing. Other considerations, particularly the need to provide adequate space around the tree including allowances for future growth (see 4.3), and also working space (see 6.7), will usually indicate that structures should be further away.

NOTE 2. With appropriate precautions, temporary site works can occur within the protected area, e.g. for access or scaffolding (see 8.3).