

Engineering reports for urban trees

Applicants seeking to undertake a tree damaging activity under the Urban Forest Act 2023 may provide a report by a qualified engineer to support their application.

Engineering reports are generally used when applicants are seeking to remove a tree they suspect is causing (or threatening to cause) damage to a substantial building or structure.

This factsheet provides information on what needs to be considered in an engineering report for a tree damaging activity application.

Contributing factors to structural damage

Most houses are constructed with their footing and slab systems founded in the soil. In the ACT, soil is typically reactive clay which shrinks in dry conditions and expands when wet.

Variation in the moisture content across a building's footprint can lead to movement, causing floors to be out of level and cracks in brickwork and plasterboard.

Some moisture variation and minor cracking is normal and expected in residential buildings. However, at some sites abnormal moisture conditions can occur which worsens cracks and movement. In some cases this can lead to severe cracking and movement.

Whilst a large tree can impact soil moisture and contribute to the movement of footings, other factors also have an impact. These include overwatered gardens, blocked drains and pipes and inadequate surface water drainage.

Causation or correlation

Engineering reports need to properly consider all factors that may be contributing to structural damage and provide evidence of causation, not just correlation.

Correlation indicates a relationship between variables (such as a tree and a structure), while causation indicates one variable (such as tree roots) directly causes change in another variable (such as a structure).

What does an engineering report need to include?

An engineering report should include:

- information about the methods and material used to assess the site and building (referencing relevant Australian standards, guides and published articles)
- details on the condition of the infrastructure and if there are any defects or issues from construction (for example no footings or pipes installed incorrectly)
- photographs showing evidence of the assessment and causation
- recommendations and any mitigation measures considered, for example:
 - would addressing drainage systems (such as gutters, downpipes or landscaping) be effective?
 - would cutting and removing a causal root be sufficient?
 - would installing a root barrier be appropriate?
 - is the structure significantly damaged and compromised by the tree?
 - what affect would the proposed activity have on the building in the short and longer term?



Reports should consider the following

- Has movement been a drop, lift or lateral movement? How was the movement measured?
- What is the soil type on site? How was this determined?
- Is any movement due to soil moisture content or variation? How has this been assessed?
- Has the structure been affected by drought or shrinkage?
- Is the site sloping? Is the footing and slab system on uniform foundation material?
- Are the plumbing pipelines properly connected and adequate?
- What structural details of the building have been examined? How sensitive to movement is the structure in question? How could it be repaired, and to what extent?
- Has consideration been given to the age and staging of differing building elements?
- Is the building of sound condition and adequate construction? Are there existing construction details which may adversely impact the building?
- In which way has the tree affected the structure? Evidence of causation is required (such as exposure of roots found growing close, alongside or under the foundation of the structure).

Other considerations

When considering an application to remove a tree under the Urban Forest Act 2023, the decision maker will take into account if all other reasonable remedial treatments and risk mitigation measures have been determined to be ineffective.

Prior to (or in addition to) seeking an engineering report, consider engaging a qualified arborist to provide advice on potential mitigation measures that could be put in place to address the issue while retaining the tree.

Information on the soil type on site, including signs of soil compaction around the tree roots and soil erosion around the tree base will also be taken into consideration. Consider monitoring and documenting changes in the structure and comparing this with precipitation statistics.

Removing a tree in close proximity to a structure may cause substantial variation in soil moisture, leading to differential settlement and cracking.

These issues need to be considered and addressed by the engineer when making recommendations about remediation. The report should also rule out other potential causes of structural damage, such as poor construction, soil subsidence or water damage.

Benefits of trees in the urban environment

