9 Cathedral Square - Tree Assessment

This tree report was commissioned by Lynette Ellis, Manager Planning and Delivery - Transport, Christchurch City Council. The report provides an assessment of potential effects and tree related recommendations for the proposed development of 9 Cathedral Square.

The proposal includes the construction of building foundations and a canopy supported by pillars, the relocation of underground utility services and changes to levels within the vicinity of three Common Lime (*Tilia x europaea*) trees in raised planters on the southern side of Cathedral Square.

Cathedral Square, including the road corridor where the trees are located is listed in the District Plan as a Heritage Item, and the trees are part of the heritage fabric of the site. Two of the raised planters contain commemorative plaques, including a tree presented by Operation Deepfreeze (USN) in 1973 (32586) and a tree planted by Her Majesty the Queen in 1977 (32587).

A memorandum was provided to Richard Holland, Team leader Asset Planning Transport on 24 August 2018 regarding the potential for the proposed building encroachment into Cathedral Square to have a significant adverse effect on the trees due to excessive pruning and construction related damage. At that time the applicant's drawings (A03.003, dated 28 May 2018) showed the trees at less than half their actual size, and the construction requirements and methodologies within the vicinity of the trees had not been outlined by the applicant.

The trees will require clearance pruning for the proposed veranda during construction and for the ongoing maintenance and use of the site, and at that stage it was not possible to quantify the extent of pruning required. To assess the potential effects especially in relation to the pruning required it was necessary to establish the proximity of the trees to the proposed building foundations, canopy and pillars, and confirm the access requirements (e.g. scaffolding, crane access, etc.) and all other construction requirements that may affect the trees.

Since the 24 August 2018 memorandum was produced, further site investigations have been carried out. This included measuring the trees in relation to the proposed structures and the use of ground penetrating radar to estimate the extent of tree roots that extend beyond the planters.

A site meeting with the applicant and Council staff was held on 25 March 2019 to clarify the building construction requirements and the likely effects on the trees. At the meeting the following points were clarified.

- The extent and expected situation of the building frontage, pillars and edge of the building canopy in relation to the trees.
- The anticipated construction methodologies.
- The alteration of services in the pavement between the building and the trees.
- The construction of building foundations and changes to the pavement levels.

The information provided by the applicant at the site meeting has addressed the main concerns that were outlined in the 24 August 2018 memorandum. This tree assessment is based upon the information provided by the applicant at the site meeting and the site measurements provided in the resource consent application.

It is expected that the proposed building development can proceed with minor potential effects on the trees.

- The tree canopies are not expected to be significantly modified, as a relatively small percentage of the tree canopies will require pruning due to the change in site use, and encroachment of the building canopy and possibly the pillars.
- It is expected that the relocation of utility services, the construction of building foundations and changes to the pavement levels can be carried out without resulting in significant adverse effects on the health of the trees.

Effects on tree canopies

The proposed building canopy will encroach into the tree canopies (as shown in Figure 1 below).

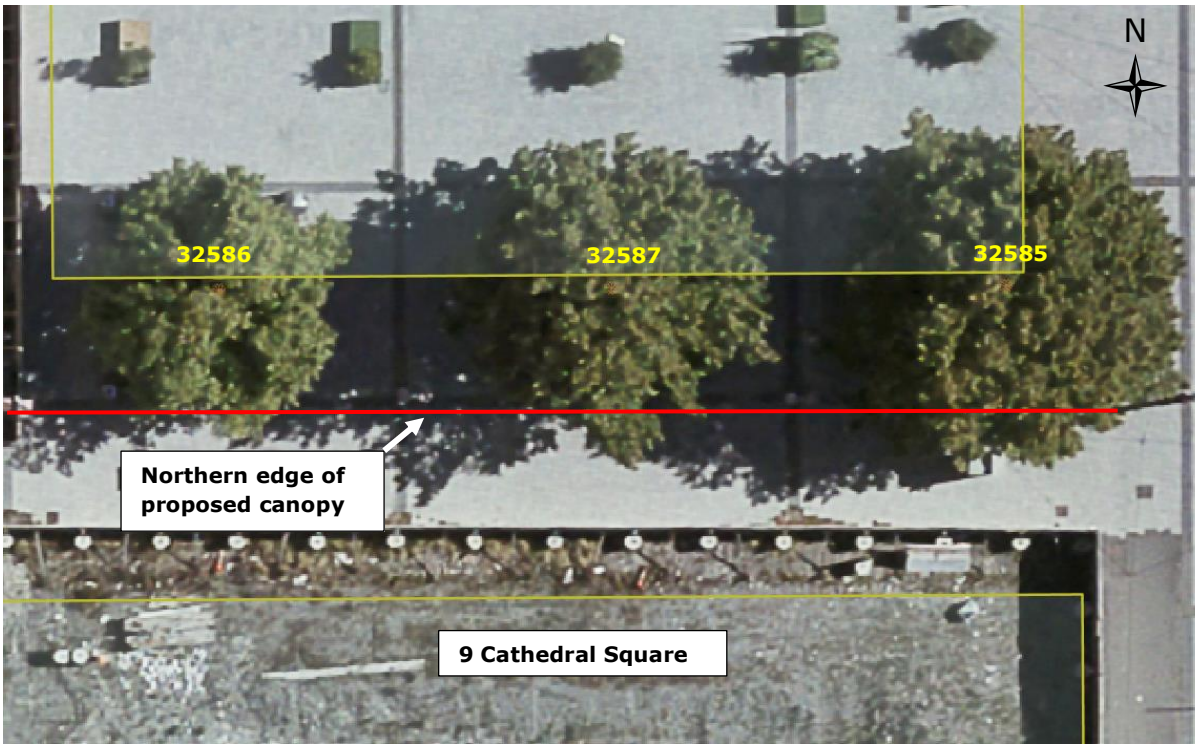

Figure 1: Proximity of the propsoed building canopy to the trees.

The building canopy will be approximately 10.0 metres high and will extend to the outer edges of the upper tree canopies, as shown in Figure 2.

At the site meeting the applicant confirmed that the building canopy and pillars can be installed with only minor tree pruning being required, as those features are modular and can be craned into place and attached without affecting the trees.

The applicant also confirmed that additional pruning for construction access and scaffolding will not be required. This will negate the potential risk of additional pruning being required during construction.

Minor pruning within the upper tree canopies will be required for construction and initial tree clearance from the northern edge of the building canopy.

It is expected that the majority of the tree canopies can be retained under the building canopy, and minor pruning may be required for construction and initial clearance of the pillars.

Figure 2: Proximity of propsoed building canopy to the largest tree (32585).

The existing standard is to provide at least 1.0m clearance from buildings/structures, and this extent of pruning is not expected to result in a significant change to the shape of the trees.

Raising the height of the tree canopies will assist with construction and site use. The lower canopies of the trees are currently approximately 2.7 to 3.0 metres above ground, and the tree canopies could be raised to achieve 3.5 to 4.0 metres ground clearance without resulting in a significant change to the shape of the trees.

The proposed building canopy will result in a reduction in sun light to the southern sides of the tree canopies during mid-summer. It is expected that the potential adverse effects of the shading created by the building canopy will not be significant. A relatively small percentage of the tree canopies will be shaded during mid-summer only, and the majority of the tree canopies will not be shaded by the building canopy at any time.

The subject trees are not yet fully grown. The largest Cathedral Square tree of the same species and within a raised planter is approximately 25 percent larger than the subject trees. The natural canopy shape of the tree species is broadly columnar (more upright than broadly spreading). It is expected that the canopies of the subject trees will continue to grow and develop around the edge of the proposed building canopy without having a significant effect on the long term development of the trees.

Following construction, periodic pruning of the trees will be required to maintain clearance from the building canopy and pillars. Any initial and future pruning of the trees is expected be managed by Council and carried out by Council's tree maintenance contractor.

Clearance of debris produced by the trees is expected to be managed by the building owner.

Effects at ground level and below ground

The subject trees are located centrally within raised planters, with the tree bases approximately 3.0 metres from the southern sides of the planters. Previous ground penetrating radar investigations along the southern edge of the planters identified only one isolated area where tree roots have grown beyond the edge of a planter (tree 32586).

The proposed building foundations will be constructed approximately 4.5 to 5.0 metres from the southern edges of the tree planters, and beyond the canopy spread of the trees. The clearance distance between the trees and the building foundations is appropriate, and is not expected to result in a significant reduction in root mass, soil volumes, water or drainage available to the trees. It is expected that the construction of the building foundations will not result in adverse effects on the tree root systems or canopies.

The relocation of underground services will occur within the road corridor area between the raised planters and the proposed building foundations. This will require trenches to be excavated within the paved area on the southern side of the trees. The utility service works can be carried out using methodologies that identify, retain and protect tree roots, and it is expected that this can occur without resulting in an adverse effect on the tree root systems or canopies.

Changes in paving levels are required within Cathedral Square to match the proposed building floor levels. This will result in an increase in the height of the paving by approximately 0.5 metre at the eastern end of the site. Due to the majority of the tree roots systems being confined to the planters, the proposed changes in paving levels are not expected to result in an adverse effect on the trees.

Further design work is required regarding the changes in paving and any modifications to the raised planters. The raised planters may be providing structural support to the tree root systems. Also, there may be opportunities to increase the amount of soil available to the trees, which could benefit the trees in the long term.

Recommendations for any conditions of approval

1. A suitably experienced and qualified arborist should be engaged by the applicant to provide tree protection advice and supervision to ensure that tree protection occurs during the building development works.

2. The applicant should produce a tree protection plan that is to be approved by the Council's Arborist before the commencement of any site works within the vicinity of the subject trees. The tree protection plan should be comprehensive and address all aspects of the works, including any associated utilities and infrastructure.

3. Further arboricultural assessments should be carried out prior to and during construction to confirm that the final design and construction methodologies are appropriate, and to ensure that the protection of trees is achieved.

4. The applicants arborist should be on site to assist within tree related investigations, provide tree protection advice and supervise any activities within the vicinity of the trees that have the potential to cause damage to the trees.

5. All tree pruning should be managed by Council, carried out by Council's tree maintenance contractor, and be limited to the extent of pruning that is specified by the Council's Arborist.

6. Any debris produced by the trees that affect the building and associated structures should be managed by the building owner.

Laurie Gordon
Arborist