

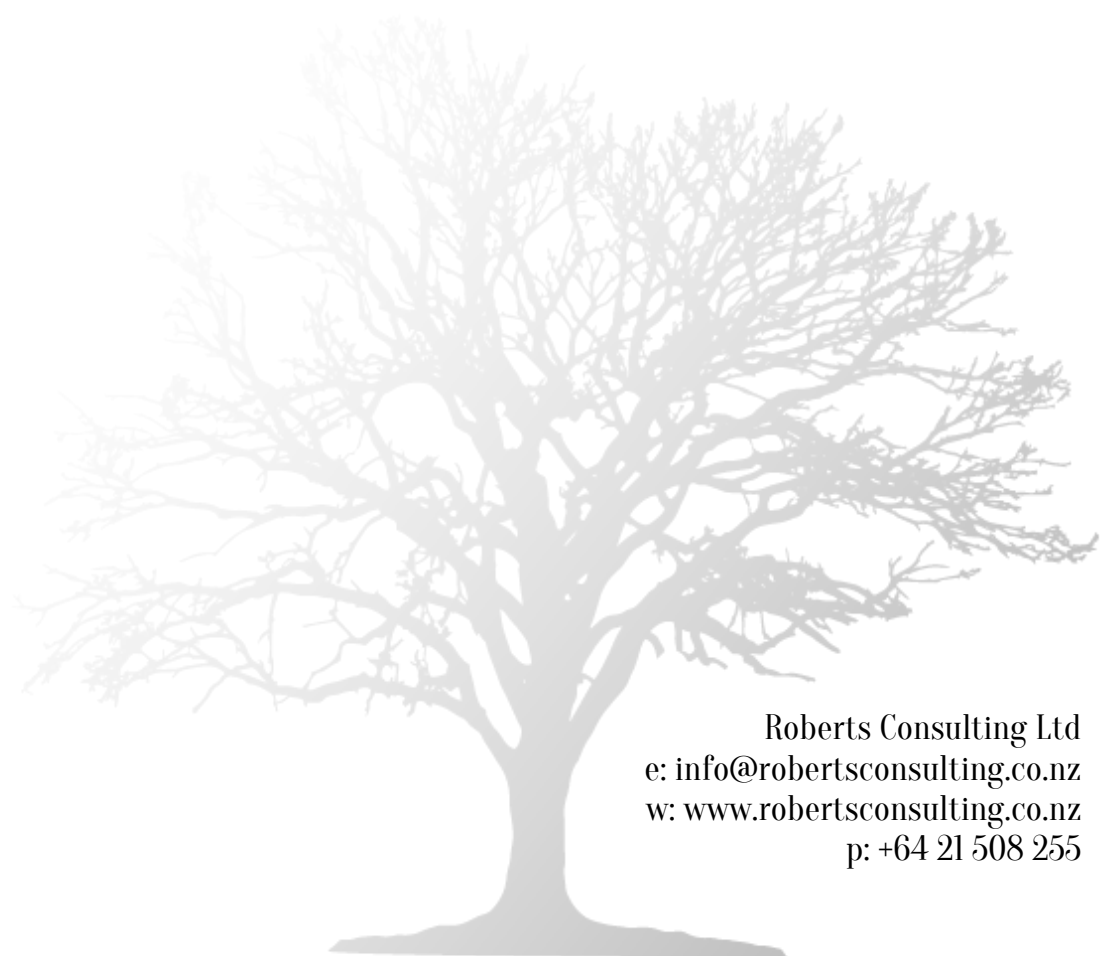
APPENDIX 3A:

**Arboricultural Report from Mark Roberts, Roberts Consulting
Ltd (2024)**

Arboricultural Report

LUC-2024-171 Application for work or the removal of a scheduled tree 27 King Street, Mosgiel

Prepared for: DCC Planning
Prepared by: Roberts Consulting Ltd
Date: May 27, 2024



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Author:

1. My name is Mark Roberts and I am the director of Roberts Consulting Limited.

Roberts Consulting Limited is an arboricultural collective that provides independent consultancy on arboriculture and tree-related matters including tree risk and hazard assessment, resource consent applications, tree management and maintenance plans, expert witness, Council hearing and mediation, quality and system auditing, and policy and procedure development.

2. I hold qualifications in horticulture, arboriculture, science (botany), and tree risk assessment. I am a past president of both the New Zealand Arboricultural Association and the International Society of Arboriculture and have over 25 years of professional experience.
3. While this arboricultural report is not for a Court hearing, I confirm that I have read the Court's Code of Conduct for Expert Witnesses, and this report complies with the instructions of that code. I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express.
4. This report covers both arboricultural matters and other matters. With regards to arboricultural matters, these are within my area of expertise, however, any comments regarding non-arboricultural matters are to be read as lay comments.

Scope of Work:

5. This report has been commissioned by Jane O'Dea, Associate Planner/Resource Consents, at the Dunedin City Council

I have been asked to provide comment on consent application LUC-2024-171, particularly in relation to the level of risk this tree poses to personal and public safety; network utilities; and buildings.

I have also been asked to provide my opinion on the appropriateness of the cabling solution offered by Peter Waymouth/Green Trees Ltd, and/or any other alternative measures to address concerns about the tree.

Conclusion Summary:

6. At the time of assessment, the tree looked to be in good health and exhibited vigour and vitality that was consistent for a tree of this species and age.

The branch unions were well formed, as were the trunk and root collar. Quercus is generally not considered as a species that is prone to failure, and I saw nothing in this tree to suggest that whole or partial tree failure was imminent or likely in the near future. As the tree was unlikely to fail, any risk associated with this tree must be considered as low.

In regard to the proposed work, I saw no reason to add structural support to this tree and would suggest that any added support would only suppress natural movement and possibly increase failure potential.

Application LUC-2024-171 is a request to remove scheduled tree T666 based on safety and the potential or imminent damage to property. As the tree is unlikely to fail and the risk associated with it is low, I do not recommend support of this application based on those criteria.

RE: Application for work or the removal of a scheduled tree T666 (LUC-2024-171)

Dear Jane,

I have reviewed the application, which includes the Greentrees Tree Report written by Peter Waymouth. I have assessed the tree for condition and undertaken a risk assessment using two different tree risk methodologies.

From an arboricultural perspective, the pin oak (*Quercus palustris*) at number 27 King Street, Mosgiel is a near specimen example of the species. I saw no structural issues to suggest that whole or partial tree failure was imminent or likely in the near future. The risk rating generated for this tree using two New Zealand Arboricultural Association approved tree risk methodologies is as low as either system can generate.

In my opinion, there is no current need to undertake maintenance pruning or instal cable supports in this tree. The tree did have good vigour and vitality, pruning such as a crown reduction could be undertaken with minimal impact on the health of the tree.

It would appear that some of the concerns held by the applicant are in part created by the Greentrees Tree Report. The report contains irrelevant content, incorrect use of methodologies, use of over-inflated figures, and examples of poor arboricultural practice. I am unsure what to make of this report.

On June 22, 2020, I assessed this tree for planning application LUC-2020-249. In my report, I noted that, "*The tree had good health and have vitality within the normal range for the species and age*", and that, "*I saw no structural issues to suggest that whole or partial tree failure was imminent or likely in the near future*". Of interest, application LUC-2020-249 included a Greentrees Tree Report written by Peter Waymouth. In 2020 Mr Waymouth did not appear to be concerned about the possibility of major branch failure. He noted that [the tree] "*was healthy & had good vitality*" and his focus was "*pruning back the branches overhanging the deck area, in an effort to reduce bird droppings*"

Having assessed the tree I cannot recommend support of this application.

Yours sincerely



Mark Roberts
Roberts Consulting Ltd

Observations and reasoning

I assessed the tree on the morning of May 27, 2024. The tree was assessed from ground level, the weather was clear and calm.

7. Condition assessment

7.1 In general, at the time of the inspection the tree looked to be in good health and exhibited vigour and vitality that was consistent for a tree of this species and age.

7.1.1 As the tree was not in leaf, vigour was determined based on bud scars and response growth.

Bud scars are an indication of the location of the previous growing season's apical bud. Bud scars can remain visible on branches for a number of years, and by measuring the distance between these 'scars' you can build a picture of how the tree has been growing over a number of growing seasons (years).

Response growth is new wood set down by the tree in response to some sort of physical stimulus. For a tree to be able to set down (grow) new wood it must have the energy and/or reserves to be able to produce that new growth. The type and location response growth can also be used to determine what the tree is responding to.

7.1.2 Tree vitality was based on the size, location and distribution of leaf buds. The buds were evenly distributed across the entire canopy and large enough to indicate good health.

The distribution of buds can also be used to indicate the health and functionality of the root system. Where roots are damaged or in decline it is often observable in the points furthest from the roots, the uppermost growing tips.

7.2 The tree was roughly symmetrical in form and silhouette

7.2.1 A tree's symmetry can provide an indication of previous growing conditions and/or where load (external force) may be applied. Being symmetrical suggests that the load being applied to this tree is evenly distributed and/or evenly dispersed.

7.3 The tree has had some pruning work undertaken on it in the past which appears to have been carried out in accordance with industry-accepted pruning standards.

7.3.1 The callus wood around the edges of the pruning cuts was active, even, and well-formed

(as 7.1.1 above, callus wood is a type of response growth, its presence and state of development suggest good vigour)

7.4 The main branch unions appear stable and well-formed (image one).

7.4.1 A good, or structurally stable branch union is considered to be one where the angle of attachment is wide and branch-bark-ridge on the upper side of the union is raised. I did not see branches with narrow angles of branch attachment or included bark.

7.5 There was nothing on the trunk to suggest or indicate mechanical strength loss or uneven load distribution.

7.6 The root plate appeared to be stable, and I saw no indication of any recent movement or disturbance (image two).

- 7.6.1 I did not see any signs of symptoms or fungal pathogens, and there was nothing in or about the root plate to suggest or indicate the presence of root decay.

(as 7.1.2 above, there was also nothing in the canopy to suggest or indicate the presence of root decay)

- 7.7 I saw nothing to suggest that the tree had become recently exposed or was likely to become recently exposed in the near future.
- 7.8 There are powerlines running along King Street on the eastern side of the tree. The tree did not encroach into the Notice Zone for the high or low voltage lines.

The Notice Zone is an area around the power lines that is managed by the line/network owner. The size of the area is determined by the voltage of the lines.

8. Risk assessment

I am trained and qualified in using the three most commonly accepted international tree risk assessment methodologies; Quantified Tree Risk Assessment (QTRA), Tree Risk Assessment Qualification (TRAQ), and the Tree Risk-Benefit Management and Assessment system called VALID. I am a registered International Society of Arboriculture TRAQ trainer and I teach this methodology throughout Australia and New Zealand.

I assessed the tree using two methodologies to provide a numerical/quantitative rating (QTRA) and a quantitative/trait-based rating (TRAQ).

- 8.1 Using QTRA the current risk posed by the tree in terms of catastrophic tree failure onto people and/or property is less than 1/1,000,000.

- 8.1.1 The Quantified Tree Risk Assessment (QTRA) method quantifies the risk of tree failure as a probability and enables a tree owner or manager to manage the risk in accordance with widely applied and internationally recognised levels of risk tolerance.

International risk tolerance is set as;

- i. An unacceptable risk is greater than 1/1,000. At this level, risk will not usually be tolerated.
- ii. Between 1/1,000 and 1/10,000 risk will usually not be tolerated and is normally considered unacceptable to impose that level of risk on others.
- iii. Between 1/10,000 and 1/1,000,000 risk is considered tolerable where imposed on others, especially if actions can be taken to maintain the risk As Low As Reasonably Practicable.
- iv. Less than 1/1,000,000 where the risk is broadly acceptable, where no actions are required and the risk is As Low As Reasonably Practicable

- 8.2 A risk rating of 1/1,000,000 is considered As Low As Reasonably Practicable (ALARP).

- 8.2.1 In terms of tree management, a tree owner/manager would not normally invest money on an ALARP tree to reduce or mitigate the risk because the expense is unlikely to change the risk potential of the tree.

- 8.3 Using TRAQ the current risk posed by this tree in terms of catastrophic tree failure onto people and/or property is 'Low' for the next four (4) years.

Four (4) years is the time frame provided by Mr Waymouth (QTRA is typically worked out on a 12-month time frame).

- 8.4 All tree risk assessment methodologies are predictions of likely events based on normal weather conditions. Normal weather includes the typical storms and peak winds that an area is likely to receive (based on what it has received over the past 30 years). We do not assess risk for extreme weather events as there is no way to tell if the event will happen and/or how extreme the event will be. In extreme weather events buildings and other engineered structures may also fail.

Comments on the application

9. Comments on the application

- 9.1 The applicant notes, *The sheer size of this tree is too great for the environment it finds itself in*

This comment is one based on personal perception, there are many examples of people and urban communities living near, under, and/or in very close proximity to large trees in their environment. Any risk associated with living near large trees is offset by the benefits the trees provide.

- 9.2 The applicant notes, *The tree has become so large that we now feel unsafe and insignificant living underneath it.*

I am unable to comment on how the applicant feels. In terms of safety contrary to the opinion of their arborist the likelihood of this tree actually causing harm to people is Low (considerably lower than the vast majority of everyday activities that we undertake i.e. driving, crossing the road, making dinner, playing sport). The likelihood of this tree causing significant damage to property is also Low.

- 9.3 The applicant notes that their *biggest concern is the tree losing a limb or worse falling on our home.*

The applicant's arborist appears to have created or at least inflated the actual risk associated with this tree. As above likelihood of this tree actually causing harm to people or significant damage to property is Low.

- 9.4 The applicant notes that they *have an elderly neighbour who* [believes that their] *home is also at risk of damage from falling limbs.*

Again the applicant's arborist appears to have created or at least inflated the actual risk associated with this tree, and in this instance possibly created an anxiety situation. As above likelihood of this tree actually causing harm to people or significant damage to property is low.

- 9.5 The applicant notes that [the] *power network is also at risk of damage from falling limbs.*

This is also incredibly unlikely to be able to happen. There is a requirement under the Electricity (Hazards from Trees) Regulations 2003 for the line/network owner to manage vegetation around their overhead lines. When vegetation grows towards the lines and enters the Notice Zone the tree owner is notified (they are informed that their tree is getting close to the powerlines). The Notice Zone is considered a safe distance from the lines where the offending branches can still be removed by any competent and capable person. It is my understanding that a letter has not been sent by the network to the applicant, suggesting that the tree is currently a safe distance from the

lines. If the tree encroached beyond the Notice Zone and grew into the Growth Limit Zone (GLZ) the line/network owner will remove the offending branches to prevent risk to their network.

- 9.6 The applicant notes that [the tree] *does not meet the 147 STEM points to be a protected tree on the DCC 2GP district plan.*

This is based on the applicant's arborist undertaking a STEM assessment, which did not happen. The applicant's arborist has assessed the tree using their own personal methodology. Any points or score resulting from their personal methodology cannot be considered as a STEM score.

- 9.7 The applicant notes that, *as a family* [they] *cannot financially afford to pay for this tree to be cabled let alone on top of another costly prune.*

I saw no reason to have the tree cabled or pruned. I do not believe that any work is required on this tree at the moment and that the proposed tree work will not reduce any actual risk (as the risk associated with this tree is low).

I also believe that the proposed system of cable supports would most likely increase the risk potential of this tree, that the proposed system would reduce the natural movement of the canopy, that it would increase loading, and create a branch or even whole tree failure situation.

- 9.8 The applicant notes that *4C Will Street, Abbotsford has just had Scheduled Tree (T1191) consented for removal from the DCC 2GP District plan for similar concerns as we have for our tree (T666).*

The two applications have very little in common. The ash tree at 4C Will Street had a history of repeated and predictable branch failure, whereas the oak does not. The ash tree had been compromised through developments under its dripline, whereas the oak has not. The defined living area under the ash tree was very different to that of the oak. The size and fall distance of branches were considerably different between the ash and oak, and the species failure profile for ash is very different from oak.

Comments on the attached report

10. Comments on the Greentrees Tree Report; Tree Report for a listed Pin Oak tree (T666) 27 King St, Mosgiel. Written for Phillipa and Darren Bain, by Peter Waymouth, and dated April 17, 2024

- 10.1 There is a single page included at the start of the report with a greentrees.co.nz web address and the word Quotation written in the header at the top of the page. The page contains five photos of a cable support system in an oak tree and a block of text. The text states that the tree work shown in the photos was completed in Mosgiel in March 2015. That a 'major leader' failed in March 2023. That the leader became hung-up and that the cables remained intact. The last paragraph says that the cable system shown has a 30-year life.

I have to assume that the page is there to provide a visual for a cable support system, and what the cost of such a system might be.

Looking at this page.

- 10.1.1 There is no indication of who did the work, but the work is on a structurally compromised tree. The tree is very different from the one at number 27 King Street. The tree in the photos has three trunks that do not appear to be structurally bound together. They are effectively separate trunks that

are being forced apart through natural growth. The canopy of the tree shows multiple branches with narrow unions and included bark. The image is of a tree with a genetic disposition for inclusion and as a result should not have been considered as a candidate for cabling.

- 10.1.2 The cable clamps used to hold the loops (the eyes) at the end of each cable have been tightened so tightly that the cable is deformed. Whoever installed the cables has created multiple points of weakness at each end of each cable.
- 10.1.3 The cables appear to have been installed in the lower third of the tree. Standard best practice as described in the International Society of Arboriculture's Best Management Practice for Tree Support Systems, and the New Zealand and Australian Minimum Industry Standard for Tree Support Systems (MIS 310) is to install systems in the upper half to two-thirds of the tree.
- 10.1.4 To say that the system has a 30-year life is a misleading statement. While the installed steel cable may survive for 30 years, modern cable support systems have a recommended installed life of no more than 8 years. The reason for this because trees grow therefore the support that the cable is required to provide alters over time, and because modern (synthetic) cables weaken and degrade in UV light.
- 10.1.5 The support system shown on this page is a static system consisting of 4 steel cables bolted into the tree. The suggested support system shown on pages 18 and 19 of the report, is a dynamic system with up to 17 synthetic cables. Synthetic cables are typically installed non-invasively (not bolted to the tree) and have an eight-year installed life according to the manufacturer. The two systems are basically noncomparable.
- 10.2 On page four of the report Mr Waymouth describes drilling three small holes into the base of the tree to '*ascertain whether any root collar rot was present*'. I am not aware of anyone in New Zealand or elsewhere in the world still using or having used that technique in over 20 years. It is hit-and-miss at best, and not needed in this instance. In Mr Waymouth's visual assessment of the tree, he says that the tree '*is a healthy robust pin oak*', that '*woundwood response has produced neat callus circles*', and that this '*indicates that the tree is functioning optimally, in defending against decay fungi*'. So why drill holes in the tree to see if fungi are present?

In his TRAQ assessment under the Trunk, Root and Collar sections he notes that there are no concerns. Four years ago he also said the tree was healthy and had good vitality.

- 10.2.1 It is possible that he drilled holes in the base of the tree because (as described on page 3) four trees of the same species that were similar age and stature in the general area had recently failed. But the suggestion that these four trees were similar to the one at number 27 King Street is not correct.

The oak at number 27 King Street does not have girdling roots. The oak at number 27 King Street does not have horizontal cracks. And based on Mr Waymouth's assessment of vigour and vitality it was unlikely to have root rot. But he still drilled holes into the base of the tree and "*all drilled holes produced healthy white wood 'frass' as expected*".

10.3 Looking at Mr Waymouth's use of TRAQ

- 10.3.1 Mr Waymouth has said that it is probable that branches 150mm in diameter will fall from the tree during high winds within the next 4 years. One of these branches will fall 4m onto pedestrians passing beneath the tree's canopy,

and the branch will cause significant harm. Using TRAQ Mr Waymouth has said that there is a Moderate risk of this occurring.

To achieve a Moderate risk Mr Waymouth has assigned the occupancy rate as frequent. The more time something is under the tree (the greater the occupancy rate) the greater the chances are of that thing being hit by something falling from the tree. According to TRAQ, frequent occupancy is an area that is occupied for a large portion of the day or week. Car parks for facilities that are open during the daytime only, sidewalks in shopping areas, and busy delivery areas are examples given to indicate frequent occupancy.

Queen Street, Auckland would have a frequent occupancy. King Street, Mosgiel is a quiet suburban street with a low-use footpath. The correct occupancy should be Occasional.

At Occasional the likelihood of impact is reduced, and when added into the TRAQ system the risk rating generated is Low.

- 10.3.2 Mr Waymouth has said that it is probable that branches 150mm in diameter will fall from the tree during high winds within the next 4 years. One of these branches will fall 4m onto the powerlines and that the branch the result will cause significant a disruption. Using TRAQ Mr Waymouth has said that there is a Moderate risk of this occurring.

To achieve a Moderate risk Mr Waymouth has said that the likelihood of impact is High. According to TRAQ, a High impact rating is given where the failed tree or tree part is likely to impact the target. There are no 150mm in diameter branches growing over the powerlines, let alone 4m above the powerlines. The likelihood of impact should actually be low. When low is correctly assigned the likelihood of failure and impact is reduced to unlikely.

When unlikely is added into the TRAQ system the risk rating generated is Low.

- 10.3.3 Mr Waymouth has said that it is probable that branches 150mm in diameter will fall from the tree during high winds within the next 4 years. That one of these branches will fall 4m onto the house and that the branch will cause significant damage. Using TRAQ Mr Waymouth has said that there is a Moderate risk of this occurring.

In the same way that there are no 150mm in diameter branches growing over the powerlines, there are no 150mm in diameter branches growing directly above the house. The house is approximately 6m from the base of the tree. If a branch were to fail it would be the narrower tips that would impact the roof of the house.

Mr Waymouth has said that the consequences of the branch landing on the roof will be significant. According to TRAQ significant equates to serious damage. In my experience where branch tips the size of those over the roof at number 27 King Street have failed onto tile roofs similar to the roof at number 27 King Street, the damage has not been significant. I have seen broken tiles, but nothing more. Branches have not gone through the roof or damaged any of the structures below.

When the likelihood of impact and the consequences of failure are correctly assigned the risk rating generated is Low.

- 10.3.4 Mr Waymouth has also indicated that the species failure profile for *Quercus palustris* is that '*branches shear in gales over house & electric street wires*'. That is not a tree species failure profile, but a generic

statement about any tree, building, or exposed engineered structure during a gale wind event.

Oaks are generally considered to be incredibly robust, where not structurally compromised they do not tend to fail or suffer large limb breakage. They tend to retain their deadwood and be disease-free. The most common term used when describing the failure profile of oaks is bombproof.

10.4 Looking at Mr Waymouth's use of STEM

- 10.4.1 As noted in 9.6 above Mr Waymouth has created his own personal methodology and scored the tree with it. Any points or score resulting from that methodology cannot be considered as a STEM score.

Mr Waymouth has also valued the tree. The calculations used in his valuation system are not consistent with the calculations used in STEM, therefore any monetary amount resulting from his methodology cannot be considered a STEM value.

10.5 Looking at Mr Waymouth's discussion on page 5

- 10.5.1 Mr Waymouth has used US Forest Service information to make lifespan predictions of an oak tree growing in Mosgiel, New Zealand. He cites USDA data to say that pin oaks have a life expectancy of between 100 to 120 years. There is a pin oak in the Dunedin Botanic Gardens that is approaching 150 years old and growing well.

The truth is we do not know what the average life expectancy of a pin oak growing in New Zealand might be. We cannot say with any certainty what stage of life this tree is in, when it may enter senescence, and how long the state of senescence may last.

I am unsure what to make of this report.

- end of document -



Image one: Image showing branch structure of the main unions. Even rings of callus wood can also be seen around the old pruning cuts



Image two: Image showing the base of the trunk and root plate.