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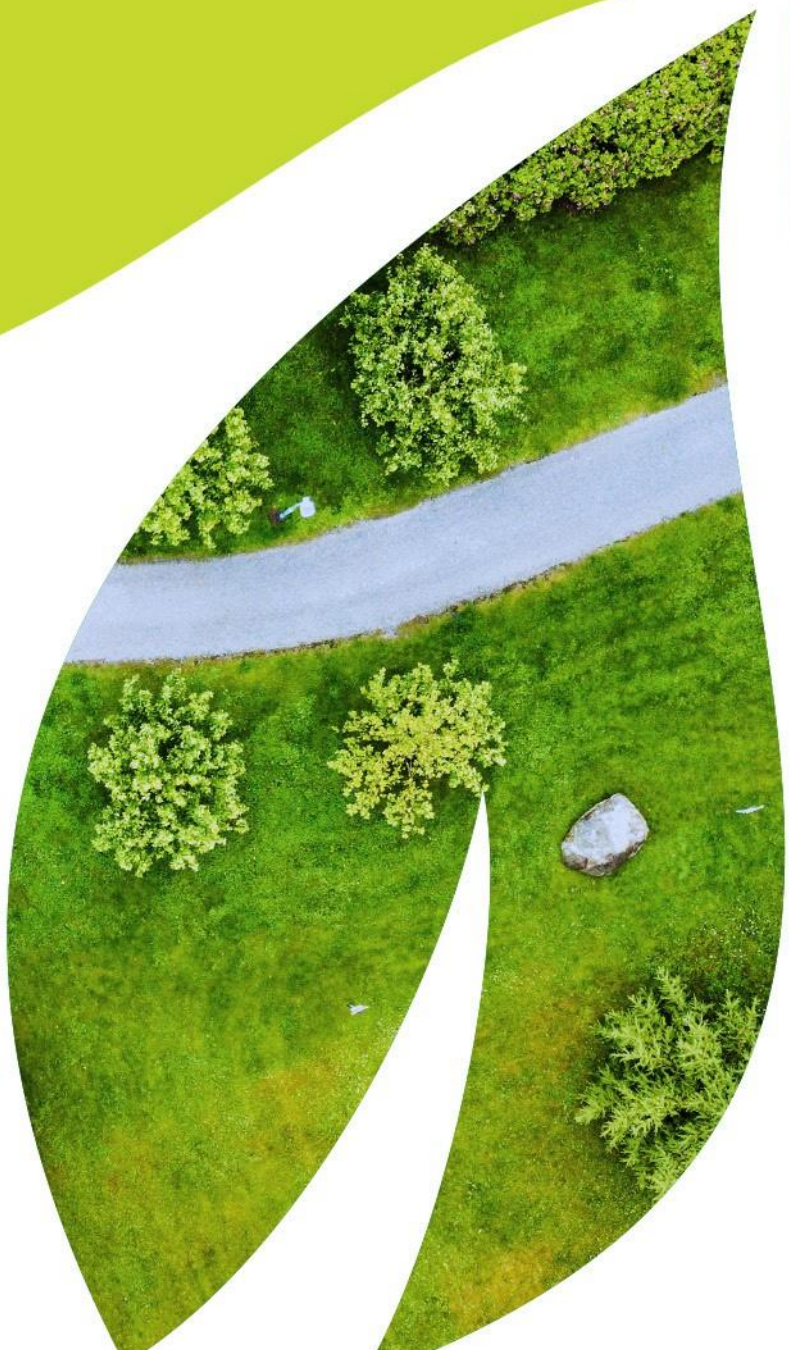
Arboricultural Report

Moreton Bay Fig

The Strand, Russell



Arboricultural Report

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Date: **8 April 2021**

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Executive Summary

Arborlab has been engaged to assess the health and structure of the notable Moreton Bay fig tree (*Ficus macrophylla*) growing within Council land adjacent to The Strand, Russell. The assessment includes a risk assessment.

The vigour and vitality of the tree is assessed to be low, with a notably thin foliar coverage.

It has been assessed that, using the Quantified Tree Risk Assessment (QTRA) framework, the most likely failure event within the identified risk analysis timeframe, has an Annual Risk of Harm (ARoH) of 'Broadly Acceptable'

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Abstract

Trees can provide a wide variety of benefits, as well as potential risks. Tree safety management is a matter of balancing the two. Tree failures can have significant consequences to health and safety, and result in property damage. Risk assessments are often applied to guide decisions regarding the safety of trees and to mitigate the potential impacts of full or partial failure. Understanding and being able to manage risk may help reduce preventable tree failures and unnecessary removals.

Risk is often defined as the probability of some specified adverse event occurring within a specified time interval, using a combination of the likelihood of an event occurring and the severity of its potential consequences. Typically, risk considers the likelihood that all or part of the tree will fail, the likelihood of the target being present/struck and the consequences of failure. Also considered as part of the assessment are environmental factors, such as soil, precipitation, pests, etc, which might cause failure, species-specific failure profiles, and site history.

Introduction

1. Arborlab Consultancy Services Limited has been engaged to undertake an arboricultural assessment of the notable Moreton Bay fig tree growing on the Russell foreshore and an adjacent dwelling at 39 The Strand, Russell.

2. The tree was inspected on 28 October 2020 and again on the 22January 2021. The findings and recommendations contained herein are based on the visual assessment undertaken on this date.

3. The purpose of this report is to identify risk posed by the trees, provide a baseline condition for any future tree assessments and recommend management recommendations to mitigate and minimise risk.

4. The risk assessments were carried out using the Quantified Tree Risk Assessment (QTRA) method. Occupation rates on the use of the site and the adjacent public land were estimated. For further information on tree risk methodology and limitations please refer to Appendix A.

Site Description

1. The subject tree is growing within the road reserve, adjacent to 33 and 37 The Strand, Russell. The trunk is located immediately adjacent to the carriageway of The Strand. The carriageway appears to be a layer of asphalt over grade – sections of the carriageway would suggest that asphalt is laid on top of previous asphalt layers. There are no kerbs associated with the carriageway and the edge has been altered to allow for the tree's rootflare. The other side of the carriageway adjoins a gently sloping grass bank leading down to the beach. The grass bank varies but is generally approximately 2-4m wide.

2. There are two buildings within the dripline of the tree, including the Duke of Marlborough Hotel to its south-west and the historic Police Station to its north-west. The Duke of Marlborough Hotel also has an outdoor seating area within the dripline the tree. The seating area is a flat, grassed area with tables and bench seats. An inground channel drain (approximately 150mm wide x 150mm deep) runs along the front boundary of The Duke of Marlborough Hotel between the outdoor seating area and the road carriageway. Before this area became outdoor seating, anecdotal evidence suggests the area was a vehicle access (as recently as 2012 – as assessed via *Google Streetview*). The seating area is composed of a plastic, load bearing grid with a grass surface on top.

Figure 1: The lower trunk of the subject Moreton Bay fig tree viewed from the south. Channel drain visible in foreground. (Google Streetview image)

3. The subject Moreton Bay fig tree is a notable tree, listed in the Far North District Council, schedule of notable trees.

44	York St, Russell	*Ficus macrophylla* (Moreton Bay Fig)	12288	Allot 18 – Sec 5 Town of Russell Rec. Reserve - Russell Police Station	89 & HP4

Figure 2 – Listing from the Far North District Council, schedule of notable trees

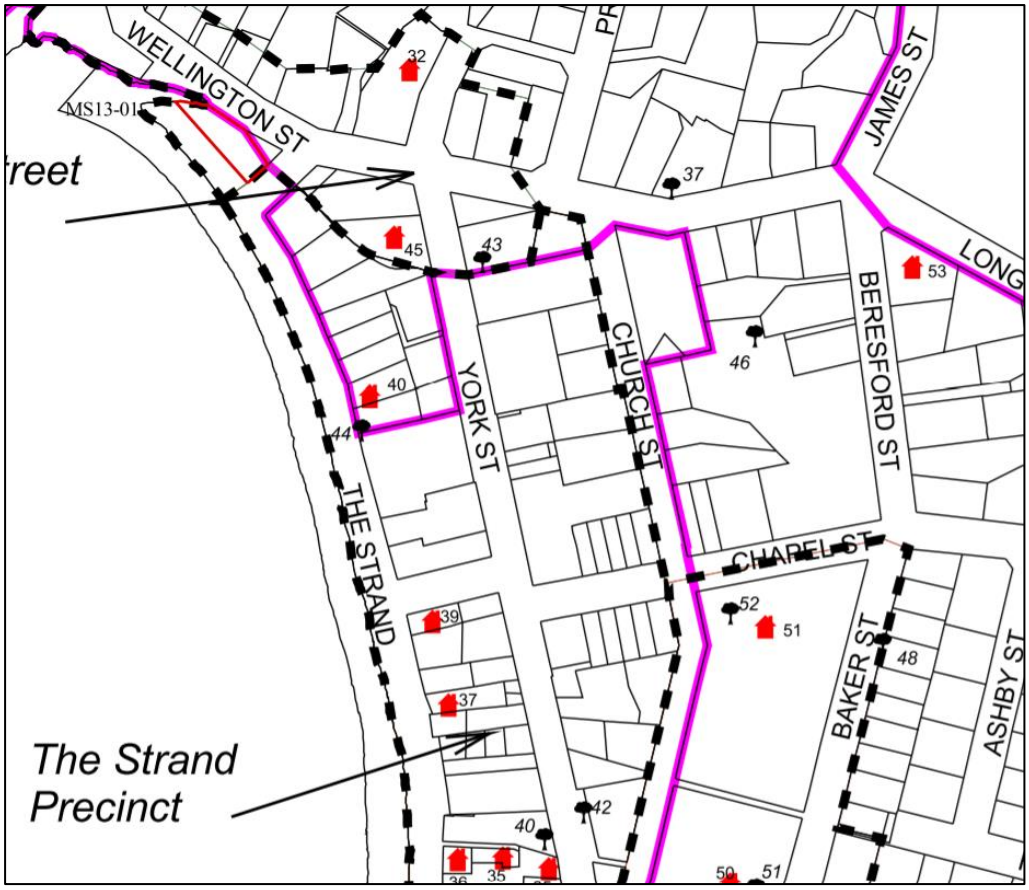

Figure 3 – Excerpt of Far North District Council Planning maps identifying the subject Moreton Bay fig tree (Tree 44)

Findings

Table 1: Tree Inventory

Botanical Name	Common Name	Height (m)	Girth at 1.8m above ground level (m)	Crown Spread (m)	Form	Structure	Vitality	Age Class
Ficus macrophylla	Moreton Bay Fig	25	9.6	30	Good	Fair	Poor	Mature

Visual Tree Assessment

4. The tree has one main stem from ground level, dividing to multiple stems at approximately 5 metres above ground level. The trunk base has fluted buttress roots and many aerial roots extending from higher up the tree, down to ground level, giving the visual appearance of more of a 'mass of stems and roots'.

5. Bark damage is present on a large percentage of buttress roots, with cambial necrosis evident at many locations where the roots interface with ground level. This is likely through contact damage from foot traffic and vehicle tyres.

6. There is an area of decay on the eastern aspect of the trunk, which extends approximately 2m horizontally from the tree's base and approximately 2 metres circumferentially. In front of the decayed area are a number of live aerial roots, with the area immediately above covered by a 'stag-horn' epiphyte.

7. The area of decay covers approximately 20% of the trunk circumference, at the level of the decay. Selected areas of the decay were probed with a thin steel rod in an attempt to determine a depth of the decay. As a result, the decay did not appear to extend beyond the surface area of the trunk. Given the ratio unaffected wood to decayed wood, it is considered that it is unlikely that the tree will be structurally compromised by the identify decayed area.

8. The tree exhibits low vitality, as indicated by its sparse and irregular foliar cover. The low vitality could be the result of a number of factors including, such as; pests such as fig psyllid (a small number of which were noted on fallen leaves), long-term changes to rooting environment and recurring droughts over recent years or a combination of factors. The low vitality reduces the tree's ability to lay down additional wood in locations of stress due to reduced resources. However, the sparse foliar cover subsequently results in reduced loading on lateral branches and branch unions. It is considered that the most typical mode of failure for this type of species and age bracket is to be a lateral branch during adverse weather.

Figure 4 – Subject tree viewed from the east. LS – October 2020.

QTRA Analysis

9. Three scenarios with the most likely potential of failure were identified and assessed. – Scenario1, failure of the southern main stem onto the Duke of Marlborough Hotel building causing property damage; Scenario 2, failure of a lateral branch onto a person within the outdoor seating area of the Duke of Marlborough Hotel. Table 2 details the QTRA risk calculations of these potential failures.

Table 2: QTRA Analysis

Potential Risk	Target	Size	Probability of Failure	Annual Risk of Harm
Scenario 1 (Main stem failure onto Duke of Marlborough building)	3 (Property)	Property (size is accounted for in the Target assessment)	6	Broadly Acceptable (<1/1M)
Scenario 2 (Lateral branch onto a patron in the outdoor seating area of the Duke of Marlborough)	2	1	6	Broadly Acceptable (<1/1M)

10. The annual risk of harm from both scenarios were calculated to fall within the Broadly Acceptable range (Risks less than 1/1M), within the QTRA framework.

Discussion and Conclusions

11. The tree has a low level of vigour and vitality, likely due to a variety of biotic and abiotic factors over a long period of time. The construction of adjacent structures was likely carried out at a time when there was little understanding about tree protection measures. Through such actions, there is the potential that root damage and functional disruption has contributed to the trees poor condition. Other factors which could be affecting tree health are alterations to stormwater treatment within the wider area. The tree is likely to have a wide-ranging root system, seeking water supply at distances far beyond its crown spread. Alterations to the stormwater treatment within the wider area could have had an impact on tree health.

12. Fig psyllid (*Mycopsilla fici*) is a pest which has been noted in the Far North area in recent years and has the potential to severely defoliate a tree. The extent of infestation is seasonal, and while only a small number were noted during the site visits, previous seasons could potentially have been worse.

13. Droughts in recent years are likely to have further reduced the tree's vitality.

14. It is unclear what turf management is undertaken within the outdoor seating area at the Duke of Marlborough Hotel but care should be taken to avoid the use of lawn improvement sprays such as 'weed and feed' which often contain chemicals harmful to mature dichotomous trees.

15. From a risk remediation perspective, the tree's sparse foliar cover, will reduce the loading to lateral branches and branch unions.

16. It has been assessed that most likely failure event has an ARoH in the Broadly Acceptable range.

Recommendations

17. The tree is reassessed annually by a suitably qualified arborist.

18. Monitor for infestations of Fig psyllid. If infestations become severe, consider the use of injected systemic insecticide.

19. Monitor for deadwood and remove as required.

20. Continue to discourage the use of chemical sprays within the vicinity of the tree.

21. Continue to improve soil health within the root zone of the tree by; adding high fungal content compost, humates and aged tree mulch to as much of the root zone areas as possible.

Appendix A – Assessment Methodology, Limitations, Summary of QTRA and Duty of Care

Limitations

1. This assessment of the tree has been undertaken to determine the risk posed and provide measures to mitigate the risk; no assessment on the tree's attributes, values and benefits have been evaluated.

2. All observations were made from ground level only.

3. Hand-held devices have been used to record data onsite. Tree height was recorded using a digital laser range finder (Nikon Forestry Pro). Trunk girth, crown spread and the open cavity and decayed buttress roots measurements were made using conventional measuring tapes.

4. A risk assessment was carried out using the Quantified Tree Risk Assessment (QTRA) method. Occupation rates on the use of the site and the adjacent public land were estimated.

5. No decay detecting equipment, such as a Picus tomograph or Resitograph was used as part of the inspection process.

6. No soil analysis, tissue sampling and/or geological investigations were carried out and all data was collected without the use of any invasive and/or diagnostic tools.

7. It should be noted that trees are dynamic organisms by nature and are exposed to varying weather conditions, which on occasion can be severe. In general, risk assessments are undertaken with consideration to normal weather conditions experienced over a 12-month period. While the QTRA model is a very useful tool, there are necessary limits to its ability to predict tree failure. The QTRA method looks for what is most likely to happen as a probability, not a prediction. Importantly, probability of failure (PoF) is expressed as an annual probability under normal weather conditions across the year. This is because trees can generally be expected to have adapted to their environment to meet these normal conditions. Weather that departs significantly from 'normal' conditions may produce a different failure rate.

8. This report provides an Annual Risk of Harm (ARoH) using the framework of QTRA. While QTRA provides advisory thresholds to assist risk decision making, it is for the tree manager/owner to adopt these or other thresholds, having taken account of their own management priorities, objectives and resources, and the potential impact on third parties. In some occasions, the ARoH may not reflect arboricultural best practice, in as such, the management of the tree needs to be considered in regards to best practice, albeit this will be led by target prioritisation.

Methodology

1. A Visual Tree Assessment (VTA) consistent with modern arboricultural practices (Mattheck and Breloer, 1994) was conducted on 21 July 2020. The model is derived from the principles of biomechanics and uses the tree's growth response and form as a way of detecting and if necessary, investigating potential issues that can increase the likelihood of tree or branch failure. VTA involves observing all parts of the tree and looking for signs of structural weakness and assessing the response growth.

Quantified Tree Risk Assessment

1. Quantified Tree Risk Assessment (QTRA) is an internationally recognised model, which enables accredited users to determine the annual risk of harm (ARoH) from tree and branch failure. The assessment process involves:

    - An analysis of the land use adjacent to the tree in terms of its vulnerability to an impact and its likely occupation
    - A consideration of the likely consequences of an impact based on the size of the tree/branch
    - An estimate of the probability that the tree or branch will fail within the coming 12 months (based on prevailing weather conditions for the geographical location)

2. QTRA expresses the annual risk of harm from tree or branch failure as a probability. Advisory thresholds contained within the QTRA model enable tree owners to determine their 'tolerability' of a given risk and decide what, if any, action is needed to manage the risk.

3. QTRA's advisory thresholds are based on the Tolerability of Risk Framework (ToR). ToR is a conceptual model developed by the UK's Health and Safety Executive. By taking into account the magnitude of a risk and the level of societal concern it is likely to engender, ToR enables risks to be categorised into one of three defined 'tolerability regions'.

4. Some risks will be of such magnitude they are simply unacceptable to society regardless of the benefits that might be derived. Others risks are considered to be so insignificant they are regarded as being broadly acceptable in the context of daily life. Other risks will generally be tolerated by society so that the associated benefits can be secured as long as the risk is managed in a way that it is as low as reasonably practical (a concept referred to as ALARP).

5. Table 2 is an abridged version of the 'tolerability regions' incorporated into QTRA's advisory thresholds.

Table 1: QTRA Advisory thresholds

Tolerability region	Annual of risk of harm
Unacceptable risk	Risks >1/10,000
Tolerable risk	Risks between 1/10,000 and 1/1,000,000
Broadly acceptable risk	Risks <1/1,000,000

6. Even though QTRA's advisory thresholds provide a robust, proportionate and defendable framework for managing the risk of harm from tree and branch failure the factors and processes which ultimately determine the tolerability of a given risk are dynamic in nature, and can vary, depending on a multitude of factors. This makes it important that tree owners ultimately decide, based on their local circumstances, objectives and priorities what constitutes an acceptable, tolerable and unacceptable level of risk.

Duty of care

1. The owner of the land on which a tree stands, together with any party who has control over the tree(s) owes a duty of care to ensure:

   - that insofar as is reasonably practical that people and property are not exposed to unreasonable levels of risk from tree failure.
   - reasonable care is taken to avoid acts or omissions that cause a reasonably foreseeable risk of injury/harm to persons or property.

2. The concept of 'a reasonably foreseeable risk of harm' reflects the potential for healthy and structurally sound trees to occasionally fail and the practical limitations associated with identifying any asymptomatic degradation in roots, stems and branches.

Appendix B – Bibliography

- Fig psyllid Disease Profile – Mark Hartley 2009
- https://www.validtreerisk.com/tree-risk-assessment-&-tree-risk-management-news
- https://www.yates.co.nz/products/lawn-care/lawn-weed-control/yates-weed-n-feed-double-action-hose-on/