



Creating Green Space
Sustainability

The Far North District Council Tree Risk Review





Executive Summary

Fifty-eight from a total of 158 existing trees recorded within the Far North District Council's (FNDC) Appendix 1D Notable Tree list have been assessed during 2020 and 2021 using the Quantified Tree Risk Assessment (QTRA) method. From the 58 assessments, 53 trees have been assessed to be in the broadly acceptable range, using QTRA's risk range framework, and five trees have been found to be within the tolerable range, in which, management of the risk needs consideration. The trees in the tolerable range, using the existing FNDC's tree ID reference, are Site 21, 25, 49, 92 and 100. Trees 21 and 25 are privately owned and 49, 92 and 100 are located on Council land.



Contents

Executive Summary	2
1. Introduction	4
2. Reassessment Timeframes	5
3. Quantified Tree Risk Assessment.....	5
4. Second Opinion.....	7
5. Priority	7
6. Duty of care	7
7. Limitations	7
8. Reporting	9
9. Findings	9
10. Discussion	12
11. Recommendations	13
Appendix A – Trees Risk Assessed (Tolerable).....	15
Appendix B – Trees Risk Assessed (Broadly Acceptable).....	18
Appendix C – Photographs of Tolerable Trees	33



1. Introduction

- 1.1. The Far North District Council (FNDC) has engaged Arborlab Consultancy Services to undertake a tree risk assessment on 58 existing trees recorded in Appendix 1D (Notable Trees) of the District Plan.
- 1.2. The FNDC supplied Arborlab a list of 40 trees (or tree groups) identified with an associated risk¹ or reason that required periodic reassessment, which had been identified within a report by Mr Kent Thwaites in 2017. A number of the 40 trees have more than one tree associated with the single entry/listing, which increased the number of individual trees to 46. As part of the review, a further 12 trees were added to the list by Arborlab for reassessment due to various concerns noted in the previous reporting.
- 1.3. This report provides a risk rating of the identified trees expressed as an Annual Risk of Harm using the Quantified Tree Risk Assessment (QTRA) method. The assessments aim to provide a risk rating of trees expressed as an Annual Risk of Harm (ARoH), which are calculated from the following inputs.
 - Target occupancy / land-use
 - Size of the part
 - Probability of failure (PoF)
- 1.4. Using the QTRA guidelines, the ARoH is expressed as either unacceptable, tolerable or broadly acceptable. Generally, trees within the unacceptable category require remedial actions as soon as possible, trees within the tolerable range need to be managed appropriately and trees in the broadly acceptable category do not require risk remediation.
- 1.5. All information and data storage are through the Fulcrum data capture app. <https://www.fulcrumapp.com/>
- 1.6. When assessing tree risk, land-use and target occupation should be the first consideration, not the tree condition. Qualifying the land-use factors first, enables tree managers and/or assessors to determine the degree of the tree survey or inspection required.
- 1.7. Following the land-use determination, target value and occupation, the tree is then considered in terms of the size of part most likely to fail and the probability of failure. Values derived from the assessment of these three components (land-use (targets), size of part and probability of failure) are combined to calculate the risk of harm as a probability, which can then be compared to the owner/ tree manager's risk tolerance.

¹ Trees with a risk rating of 3 or more using Threats (Tree Hazard: Risk Evaluation and Treatment System), identified within the 2017 report by Kent Thwaites were reassessed. The Threats method uses a risk range of one to seven, one being insignificant and seven being extreme. A score of three in the Threats method is slight.



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- 1.8. By quantifying the annual risk of harm, the tree owner/manager can;
- establish their own risk thresholds or use the predetermined risk thresholds
 - manage the risk from tree failure
 - balance safety, benefits and environmental and amenity values.
- 1.9. All trees assessment in this review retained their FNDC identification number.

2. Reassessment Timeframes

- 2.1. Trees are dynamic organisms that are exposed to varying weather conditions that can be occasionally severe. In general, tree risk assessments are undertaken with consideration to typical weather conditions that could be experienced over a 12-month period.
- 2.2. In general, given the dynamic nature of trees, tree reassessment will default to 36-months with the exception of the following.
- Trees identified through the tree risk survey, which have an ARoH of Unacceptable or Tolerable and the risk has not been mitigated as recommended, will be reassessed on an annual basis.
 - Areas where the tree owner or manager consider that the consequence of failure is unacceptable will be reassessed as determined. As an example: a public viewing area associated with a highly valued tree or a tree in other ownership.

3. Quantified Tree Risk Assessment

- 3.1. Quantified Tree Risk Assessment (QTRA) is an internationally recognised model, which enables registered users to determine an Annual Risk of Harm (ARoH) because of an identified tree and/or 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.
 - An assessment 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).
- 2.2 QTRA's advisory thresholds are based on the principles of ToR².

² Tolerability of Risk Framework (ToR). ToR is a conceptual model developed by the United Kingdom's Health and Safety Executive. By considering the magnitude of a risk and the level of societal concern that this risk is likely to engender, ToR enables risks to be categorised into one of three defined 'tolerability regions'; that being, Unacceptable, Tolerable or Broadly



- 3.2. QTRA expresses the annual risk of harm from tree or branch failure as a probability. Advisory thresholds contained within the QTRA framework enable tree owners to determine their tolerance of a given risk and decide what, if any, action is needed to manage the risk.
- 3.3. Some risks will be of such magnitude they are simply unacceptable regardless of the benefits provided. Other risks are considered to be so insignificant they are regarded as being broadly acceptable in the context of the land-use. Some risks will generally be tolerated as long as the risk is managed and measured in a way that it is as low as reasonably practical (a concept referred to as ALARP).
- 3.4. Figure 1 below outlines QTRA’s tolerability ranges. In general terms, any risk between 1/1 and 1/10,000 is unacceptable, between 1/10,000 and 1/1,000,000 is tolerable and 1/1,000,000 or greater is broadly acceptable.

Thresholds	Description	Action
1/1 000	Unacceptable Risks will not ordinarily be tolerated	* Control the risk
	Unacceptable (where imposed on others) Risks will not ordinarily be tolerated	* Control the risk * Review the risk
	Tolerable (by agreement) Risks may be tolerated if those exposed to the risk accept it, or the tree has exceptional value	* Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value * Review the risk
1/10 000	Tolerable (where imposed on others) Risks are tolerable if ALARP	* Assess costs and benefits of risk control * Control the risk only where a significant benefit might be achieved at reasonable cost * Review the risk
	Broadly Acceptable Risk is already ALARP	* No action currently required * Review the risk

Figure 1: QTRA Advisory Thresholds

Acceptable



4. Second Opinion

- 4.1. Any tree assessed to be less than 1/10,000 will be reassessed by a licenced QTRA assessor. This allows a second opinion of 'high' risk trees. The assessor's second opinion will be noted within the main findings.

5. Priority

- 5.1. A recommended works/scheduling priority rating system will be provided to allow resources to be apportioned appropriately – table shown below. This table provides a rating for risk remediation and also general tree maintenance. For ease of use the priority ratings have been colour coded to QTRA's advisory threshold.

Table 1: Priority Table

Rating	Management type	Timeframe	QTRA Risk Thresholds
1	Risk Management	Immediate	Unacceptable 1/1 – 1/1,000
2	Risk Management	As soon as possible	Unacceptable 1/1,000 – 1/10,000
3	Risk Management	As soon as practical	Tolerable 10,000 – 1/1,000,000
4	Risk Management	Schedule	<1/1,000,000

6. Duty of care

- 6.1. Although tree owners and managers have a duty of care to manage the risk of harm from their trees, this duty only requires that actions to control these risks are reasonable, proportionate and reasonably practicable. By using the QTRA advisory thresholds, tree owners are able to satisfy these requirements and use finite resources efficiently.
- 6.2. Although it is generally recommended that tree owners base their risk management decisions on the principles of ToR³, it is important that the thresholds used, reflect local circumstances, objectives and priorities at any given time.

7. Limitations

- 7.1. Assessments are undertaken from ground level.
- 7.2. No internal decay detecting equipment are used as part of the initial inspection process.
- 7.3. No soil analysis, tissue sampling and/or geological investigations are carried out during the initial

³ Tolerability of Risk Framework (ToR). ToR is a conceptual model developed by the United Kingdom's Health and Safety Executive. By considering the magnitude of a risk and the level of societal concern that this risk is likely to engender, ToR enables risks to be categorised into one of three defined 'tolerability regions'; that being, Unacceptable, Tolerable or Broadly Acceptable



inspection process. All data is collected without the use of any invasive and/or diagnostic tools. If necessary, a nylon hammer, tapped against the tree's outer wall (trunk), is used to identify acoustic anomalies that could indicate areas of decayed wood.

- 7.4. The locations of the trees are recorded with hand held devices, using a combination of GPS and overhead mapping. This method, although generally accurate, can be imprecise when isolating trees in a bush or tree group.
- 7.5. The tree girths and canopy dimensions are measured conventionally or estimated based on the arborist's experience. Where possible the tree heights have been measured using a Nixon Forestry Pro laser range finder. The laser range finder will be used when distance from a particular tree and a structure needed to be measured. Although considered to be acceptable for the tree surveys, all measurements should be considered an approximation.
- 7.6. Where trees have been assessed as broadly acceptable, the reassessment timeframe typically defaults to 36-months. This 36-month timeframe is not to be considered a 'guarantee period' for risk assessment. Given the dynamic nature of trees unseasonal changes noted through casual observations in the tree's overall appearance, leaf colour, shape or rapid dieback should be documented and conveyed to the tree assessor.
- 7.7. 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 adapt to their environment to meet normal conditions. Weather that departs significantly from 'normal' conditions may produce a different failure rate.
- 7.8. 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.
- 7.9. The purpose of QTRA is not necessarily to provide high degrees of accuracy, but to provide for the quantification of risks from falling trees in a way that a risk can be assessed within broad ranges where this is sufficient and with greater rigour when required.
- 7.10. Not all trees require a QTRA assessment. This is due to the fact that the QTRA method can allow an assessor to calculate an ARoH using values such as a low target occupation.



8. Reporting

- 8.1. High risks identified during the risk assessment will be notified to the tree owner or manager at the earliest opportunity.

9. Findings

- 9.1. As discussed, 58 trees have been reassessed using the QTRA method, with 53 trees assessed to be broadly acceptable and five trees to be tolerable.
- 9.2. Trees assessed to be within the broadly acceptable range do not require risk remediation works and should be reassessed on a 36 month timeframe. For a list of these trees please see Appendix B of this report.
- 9.3. Five trees have been assessed to be in the tolerable range – using the QTRA guidance framework. The trees and mitigation measures are outlined below. Further assessments of these trees can be found in Appendix A and photographs in Appendix C of this report:

9.3.1. FNDC ID 21: *Cedrus Libani*

Summary

1. Single stem develops multiple leaders at 3m.
2. Tree in poor declining health shown by foliage distribution and density. Lichen throughout canopy indicating very slow growth.
3. Deadwood throughout. No indications of a history of branch failure over 80mm in diameter.
4. Decay visually evident on three buttress roots on north, west and southern sides. Using sounding hammer, decay can be traced up western portion of trunk from root flare. Annotated drawing tracing decay area undertaken and available. Minimal reaction wood occurring on some northern portions of trunk, though this is likely to be less than what is required for support. An internal assessment of wood properties will be able to determine ingress of decay.
5. Weight and growth orientation is towards north, away from building.

Risk Summary

6. Whole tree failure onto adjacent road.
7. ARoH 1/50,000 (QTRA guideline = tolerable).

Risk Discussion

8. Given the weight distribution and that the affected buttress roots are generally on the west of the tree, whole tree failure will be in a northerly direction, away from the main



dwelling. The direction of whole tree failure due to root decay will likely fall towards the road. The road is approximately 25m from base of trunk, though confirmation is required. If so, failure is unlikely to result in contact with the road.

Risk mitigation measures

9. The health and condition of the tree (along with species characteristics) limits reduction pruning as a mitigation measure, as any pruning is likely to increase the tree's rate of decline.
10. The health of the tree can be improved by introducing soil improvement measures. Improving the health of the tree will allow it to add reaction wood near the wound.
11. Undertake an internal decay assessment. This can be undertaken using specialised equipment such as a Picus tomography application. Using an internal assessment of decay, can establish the extent of decay and possible likelihood of failure.
12. Install bracing / guideline/s from the ground to the tree, effectively controlling its failure direction or holding in place, which will be done concurrently with health improvements.
13. Removal the tree and replace as a final option.

Work Priority

14. As soon as practical.

9.3.2. FNDC ID:25a – *Quercus robur*

Summary

1. Large tree at road frontage of church grounds. Trunk angle leans towards road.
2. Noteworthy cavity at base of tree facing road. Reaction wood forming at margins of cavity and shown on opposite side of trunk with tension wood.
3. Tree assessed of fair health however review when the tree is in leaf would be required. A healthy tree is better equipped to produce reaction wood around the cavity.

Risk Summary

4. Whole tree failure to road.
5. ARoH 1/400,000 (QTRA guideline = tolerable).

Risk Mitigation Measures

6. Monitor tree health and cavity.

Work Priority

7. As soon as practical.



9.3.3. FNDC 49: *Ficus macrophylla*

Summary

1. Large wide spreading tree. Single stem develops four large secondary stems at 3m above ground level.
2. Noteworthy wounds from previous branch loss. First of which is mid stem. Two further wounds at first union. Significant reaction wood forming at wound margins.
3. Two of the main stems, contribute to the majority of the tree's eastern canopy. These stems are very long and densely foliated – approximately 15m in length. Potential overloading on structure. Trimming could minimise loading.
4. Road to west and park bench beneath eastern canopy.

Risk Summary

5. Lateral branch failure onto park bench.
6. ARoH 1/100,000 (QTRA guideline = tolerable).

Risk Discussion

7. The extended, heavily weighted laterals are overhanging a park bench. Given the loading of the laterals and that the tree has shown a propensity of lateral branch failure, risk mitigation could be undertaken.

Risk Mitigation Measures

8. Reduce lateral growth from the tree's canopy that is overhanging the park bench.
9. Remove the park bench from the target area of the tree.

Work Priority

10. As soon as practical.

FNDC ID 92: Grove of *Metrosideros excelsa*

Summary

11. Approximately 15 trees growing adjacent carriageway.
12. Generally, branch growth and weight above road. Canopy has been raised. Deadwood in excess of 50mm in diameter above road.
13. Trees are assessed to be generally healthy.

Risk Summary

14. Deadwood failure above carriageway.
15. ARoH 1/50,000 (QTRA guideline = tolerable).



Risk Mitigation Measures

16. Remove deadwood in excess of 50mm in diameter from above carriageway.

Work Priority

17. As soon as practical.

FNDC ID 100a: *Taxodium distichum*

Summary

1. Extensive decay from ground level up tension side of tree's trunk. Potentially 1/3 circumference effected.
2. Some dead branches in canopy above deck area. Canopy health may or may not be reflective of root and base decay issues.
3. Stem and tree failure away from seating area, which equates to a low target rating for whole tree failure as the fall / target area for whole tree failure is onto the foreshore.
4. Highest risk of harm from dead branch failure to person located on deck.
5. Centre of trunk approx. 4m to edge of Seawall – check ownership.
6. Deck generally of poor condition. Seating area under the tree is, in my opinion, undesirable in its current condition (therefore human occupation likely to be limited).

Risk summary

7. Dead branch failure and contact to persons on deck.
8. ARoH 1/500,000 (QTRA guideline = tolerable).

Risk Mitigation Measures

9. Remove deadwood from tree.
10. Remove tree (as a final option).
11. Monitor tree health

Work Priority

12. As soon as practical

10. Discussion

10.1. Five of the 58 trees reassessed for risk or previous concern have been assessed to be in the tolerable range using the QTRA guidelines.

10.2. The highest risk of the five trees has been assessed to be 1/50,000 (Trees 21 and 92). To put this in another term, a risk of 1/50,000 can also be expressed of having a 0.002% chance of the



identified failure causing harm within a calendar year.

- 1.1. Another tool that can be used in determining whether mitigation measures should be undertaken is calculating ALARP (As Low as Reasonably Practicable). ALARP is a cost benefit analysis based on the Value of a Statistical Life (VOSL), which is then multiplied by the Annual Risk of Harm (ARoH). The current New Zealand VOSL is \$4,000,000. For example, a tree with an ARoH of 1/3,000 (0.00033) has an ALARP figure of \$1,320 = \$4,000,000 x 0.00033. If the cost of risk mitigation exceeds the ALARP value the work is not considered to be justified solely to mitigate risk. However, work may be recommended in the wider context of managing the trees on site.

10.3. The following table outlines the ALARP Analysis:

Table 3: ALARP

FNDC ID	Description of failure	ARoH	ALARP value
21	Whole tree failure onto adjacent road	1/50,000	\$80.00
25a	Whole tree failure to road	1/400,000	\$10.00
49	Lateral branch failure onto park bench	1/100,000	\$40.00
92	Deadwood failure above carriageway	1/50,000	\$80.00
100a	Dead branch failure and contact to persons on deck	1/500,000	\$8.00

- 10.4. There are significant health and vitality issues associated with tree ID 21. This can have an effect on wood production capability, which in-turn effects risk. The tree is identified as one of the first planted Cedrus trees in the district and potentially New Zealand. Given the status of this tree, further investigation could be warranted to determine the decay extent within the tree and its structural integrity, which could also provide insight on whether further mitigation measures are warranted or whether the tree needs to be removed.

11. Recommendations

- 11.1. Trees assessed to be broadly acceptable are reassessed within a 36-month timeframe.
- 11.2. Trees assessed to be within the tolerable range between 1/100,000 and 1/1,000,000 are reassessed within a 24-month timeframe and for trees below 1/100,000 are to be reassessed within a 12-month timeframe. If mitigation measures are undertaken as outlined in this report, the residual risk will move to broadly acceptable and the trees will need to be reassessed within 36-months.



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- 11.3. Trees assessed to have an ARoH of below 1/100,000 need to be reassessed within a 12-month timeframe, unless mitigation measures are undertaken. If mitigation measures are undertaken, the residual risk will be broadly acceptable.
- 11.4. Further internal assessment (tomograph or resistograph assessments) of decay on Tree 21 and 25a should be undertaken. Results of this assessment will determine ongoing management of this tree.



Appendix A – Trees Risk Assessed (Tolerable)

FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
21	<i>Cedrus Libani</i> , Cedar of Lebanon	1	This is a truly magnificent specimen of this species and one of the oldest & largest Lebanese Cedars in New Zealand. Large dead limb in lower canopy. Monitor die back	3	Tolerable	<p>Single stem develops multiple leaders at 3m.</p> <p>Tree in poor declining health shown by foliage distribution and density. Lichen throughout canopy indicating very slow growth.</p> <p>Deadwood throughout. No indications of a history of branch failure over 80mm in diameter.</p> <p>Decay visually evident on three buttress roots on north, west and southern sides. Using sounding hammer, decay can be traced up western portion of trunk from root flare. Annotated drawing tracing decay area undertaken and available. Minimal reaction wood occurring on some northern portions of trunk, though this is likely to be less than what is required for support. An internal assessment of wood properties will be able to determine ingress of decay.</p> <p>Weight and growth orientation is towards north, away from building.</p> <p>Given the weight distribution and that the affected buttress roots are on the west of the tree, whole tree failure will be in a northerly direction, away from the main dwelling. The direction of whole tree failure due to root decay will likely fall towards the road. The road is approximately 25m from base of trunk, confirmation is required. If so, failure is unlikely to contact road.</p>



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
						Risk rating assessed whole tree failure.
25a	1 x <i>Quercus robur</i> , English Oak	3	Tree has large basal cavity and suspected root rot, no root flare on road side. Fence is hard against trunk. Pronounced lean towards road. Cambium delamination approx 6m up main stem. Stem rot. Structural test	4	Tolerable	<p>Large tree at road frontage of church grounds. Trunk angle leans towards road. Large cavity at base of tree facing road. Reaction wood forming at margins of cavity and shown on opposite side of trunk with tension wood. Further internal analysis of cavity recommended.</p> <p>Tree assessed of fair health however review when the tree is in leaf would be required. A healthy tree is better equipped to produce reaction wood around the cavity.</p>
49	<i>Ficus macrophylla</i> , Morton Bay Fig	2	Wide spreading, landmark tree . Welcomed shade. Fenced off from vehicles. Possible reduction of weight at limb extremities. Bark delimitation in branch above bench seat. Photos at Russell Museum	3	Tolerable	<p>Large wide spreading tree. Single stem develops four large secondary stems at 3m. Noteworthy wounds from previous branch loss. First of which is mid stem. Two further wounds at first union. Significant reaction wood forming at wound margins.</p> <p>Two of the main stems, contribute to the majority of the tree's eastern canopy. These stems are very long and densely foliated - ~15m. Potential overloading on structure. Trimming could minimise loading.</p> <p>Road to west and park bench beneath eastern canopy.</p>



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
92	Grove of <i>Metrosideros excelsa</i> , Pohutukawa	3	Trees have been maintained and kept clear of road way. Lots of deadwood over road. Some stems have decay cavities and pronounced lean over road. . Recovered from past root damage in 2007. Fert	3	Tolerable	<p>Approx. 15 trees growing adjacent carriageway. Generally branch growth and weight above road. Canopy has been raised. Deadwood up to 50mm in diameter above road. Generally healthy.</p> <p>Assessment considers average tree of group for below condition and dimension details.</p>
100a	Cypress <i>sempervirens</i> , Cypress <i>swamp cyprss</i> , <i>Taxodium distichum</i>	4	Growing through deck, trunk rubs against structure, under the deck the trunk is rotten on one side, may need to adjust decking, strong lean towards water, wind damaged branches. Lots of rot, surprised that tree still alive <i>monitor decay</i>	2	Tolerable	<p>Swamp cypress.</p> <p>Extensive decay from ground level up tension side of tree. Potentially 1/3 circumference effected. Deck around tree is in very poor condition.</p> <p>Some dead branches in canopy. Above deck area. Canopy health may not be reflective of root and base decay issues.</p> <p>Probability of failure 4. Stem and tree failure away from seating area, hence low target rating for tree failure.</p> <p>Highest risk of harm from dead branch failure to person located on deck.</p> <p>Centre of trunk approx. 4m to edge of seawall.</p> <p>Deck generally of poor condition. Seating area under the tree is undesirable in current condition.</p>



Appendix B – Trees Risk Assessed (Broadly Acceptable)

FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
2	<i>Magnolia grandiflora</i> , Evergreen Magnolia	1	tree split apart in the 1970s and had some remedial work done which allowed the tree to recover and is now a fine looking specimen, Previous assessment found mushrooms soft rot present and fungus, Concern over decay at base and in upper branches dense canopy	3	Broadly Acceptable	Healthy tree with large cavity at base. Notable reaction wood forming at cavity margins. Cavity likely to have been a result of leader failure that occurred many years ago. Loss of the associated canopy and growing orientation has meant that weight is away from lawn area and buildings.
5	<i>Vitex lucens</i> , Puriri	3	Puriri moth larvae infestation, branches overhanging house, 2 included stems, MONITOR	3	Broadly Acceptable	Healthy tree. Twin stem from ground level. Union formation indicates included bark though stable. No new loading on canopy. Minimal wind loading.
8	3x <i>Araucaria heterophylla</i> , Norfolk Pine	4	All trees have damage to surface roots 1 tree has multiple leaders, Fencing off or exclusion of machinery/sprays advised around drip lines, 2 Trees are receding possible fungal root issues, suggest soil remedies MONITOR . Air spade	3	Broadly Acceptable	Two dominant and one semi-mature Norfolk Island Pine. Easternmost slight thinning of canopy. No visual evidence of root issues.
9	2x <i>Vitex lucens</i> , Puriri	2,4	one tree in good health, 2nd tree has pronounced lean over ROW and hollow trunk, residents claim tree has moved and lifted the ground since 2007 floods, MONITOR, also has rotting branches, reduce weight		Broadly Acceptable	Two mature trees. One with lean that has cavity on side. Reaction wood is good at margins of the cavity, wind loading considered to be minimal.
14	2x <i>Podocarpus totara</i> , Totara	2	Co-dominant canopy, multi leader very tight crown. Crown lift from road and driveway. May become an issue in urban environment.	2	Broadly Acceptable	Very healthy. No issues.



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
16	<i>Quercus robur</i> , English Oak	4	Tree in advanced decline, and has deteriorated since last visit. Large dead wood and rotten. located next to septic tank, structural limbs covered with water sprouts, cracks in canopy branches, large areas of cambium delamination. Consider major canopy	2	Broadly Acceptable	Collapsed / failed at base recently. Two stems lying on ground. No further risk issues.
17	2x <i>Araucaria heterophylla</i> , Norfolk Pine	3	Trees have multi leaders. Trees located in a paddock but branches are low enough to restrict animal damage to roots, possible fencing of driplines.	1	Broadly Acceptable	Low risk as occupancy target rates are rare to minimal as trees are growing within large grazing area.
18	<i>Castanea sativa</i> , Chestnut	2	Large tree, recently lost companion tree. Lots of sucker growth. Some storm damage.	2	Broadly Acceptable	Minimal targets. No visual issues.
18e	<i>Pinus radiata</i> ??, not Maritime Pine	2	Huge tree with extended crown, has had large limbs remove since last assessment. Declining	3	Broadly Acceptable	Large tree on front lawn. Veteran tree of fair health for age. Minimal target occupation.
18b	<i>Magnolia grandiflora</i> , Evergreen Magnolia	3	Tree has lost some supporting co - dominant canopy due to storms. One leader has snapped. Heavy weight loading and likely to snap in storms. Heaving root plate. Hollow cavity at base down to roots	4	Broadly Acceptable	Lost twin stem. No indications of decline. Any potential risk failure have reduced, as tree will have added reaction wood where required. Weight and orientation way from dwelling.
18d	<i>Cinnamomum camphora</i> , Camphor laurel	4	Tree has been severally damaged since last assessment from storm. (dbl leader snapped as predicted in last assessment.) now has one large limb canterlevered over trunk, needs to be reduced to epicormic growth at ground level and a new tree will grow.	4	Broadly Acceptable	Previous stem failures. Remaining stem in decline. Upper portion die back. New lower canopy. Stem failure would only brush house. Shelter from predominant wind by adjacent trees



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
25	20x <i>Ulmus procera</i> , Elm DP: 9 elms Glebe fence road front, 2 oak church fence road front, 2 elm east fence church, 1 oak back fence church, 10 elm carrigeway	3	This is for 9 elms in old carrigeway lots of rotten cavities, various trees have lost limbs on an ongoing basis. No sign of Dutch elm disease. Various deadwood and old stubs and hanging branches. Trees are possibly oldest and biggest elms in Northland.	4	Broadly Acceptable	Group of trees growing within paddock/ grassed area. Very minimal/ rare target occupation.
25b	2 x <i>Quercus robur</i> , English Oak	3	2 oak on bac fence. Largest tree has large basal rot and suspected root rot. Both trees lean towards chuch and headstones. Large ganiderma brack in canopy.	3	Broadly Acceptable	This assessment is on easternmost oak, with cavity. Decay extends up trunk from base. Good reaction wood forming at margins. Building approx. 21m from base. Tree would not reach building through failure. Pof 5
25c	<i>Ulmus procera</i>	2	1 tree on ea.st fence in back corner. Largest of all elms on property. Branches over head stones and water tanks. Signs of snapped branches as per species . Possible ground heaving.	3	Broadly Acceptable	Tree of fair health. Risk assessment on contact with grave headstones through branch failure.
26b	2 x <i>Pyrus communis</i> , Pear tree	4	Only 1 tree remaining. Stump of other tree still there. (see past recommendations) looks as if it blow over. Remaining tree has lots of rot in stems, and sucker growth. Consider remaoval from list or crown reduction	1	Broadly Acceptable	Tree growing within unmanaged grass field. Veteran tree with fair health for that age class. Target occupation assessed to be very low.



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
29	<i>Fagus sylvatica</i> purpurea, Copper Beech	2	Multi leader/included stems @GL, targets buildings & carpark, branches have fused together, broken branches and large deadwood. Phone line crossing through tree. Basal rot and fungi spores present. Suggest structural assessment.	3	Broadly Acceptable	No change from previous report comments. Some small dead hanging branches Possible brace to minimise stem failure potential.
35	<i>Ficus macrophylla</i> , Morton Bay Fig, Only 1 tree remains from the original 3	2	Only 1 tree remains, according to neighbours 2 other trees were cut down in approx 2000. Remaining tree has double leader & included stem. Historic photos available at Russell museum. Slight THREATS rating regarding safety. Monitor tree annually and con	3	Broadly Acceptable	Develops twin stem at 2m. Eastern stem removed. Remainder of canopy is of fair structure. Some damage to parking bay evident, which is likely to be caused by root growth. One 200mm root located approx. 15m from base of tree - likely damage to concrete is from root conflict. Portion of driveway abutting buttress roots repaired as likely to have been affected.
37	<i>Metrosideros excelsa</i> , Pohutukawa	2	Tree canopy has been well maintained in recent years however in the last 6months a swimming pool and concrete pad has been established within the drip line unsure if consent was applied for??. Recommend monitoring tree health over the next 2-3 years.	1	Broadly Acceptable	Tree growing near road frontage. Multiple stems at ground level. Southern stem growing on flat angle. No indication, such as canopy separation, showing stem lowering. No indication of adverse health effects from works outlined in previous comments.



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
39	<i>2x Araucaria heterophylla</i> , Norfolk Pine	3	Both trees have pronounced lean towards beach, possible root damage. Basal rot evident on one tree as shown in photo. 1 tree has lost crown. Losing vigor probably due to soil compaction. Tree that has lost its top seems the most vigorous . Photos at Rus	2	Broadly Acceptable	<p>For purposes of this assessment the trees have been identified as the northern tree and southern tree.</p> <p>North tree thinning at top. Health otherwise good. 34m height. Canopy spread 10m. 3.6m girth.</p> <p>Decay pocket at base of southern tree. Good reaction wood forming at margins.</p>
42	<i>Magnolia grandiflora</i> , Evergreen Magnolia	3	Russell Museum has DSIR report from 1970s regarding this tree and current carpark. Needs minor clearing from buildings. Starting to show upper canopy dieback, suggesting root related issues. minor removal of receding branches. Very confined planting	2	Broadly Acceptable	<p>Prominent tree on road frontage. Growing in small garden with shrubs. Garden abuts footpath and carparks.</p> <p>Some slight upper canopy thinning. Notable surface roots within planter. Multiple stems at ground level. Previous stem removal from cluster union. Some decay noted though reasonable reaction wood forming.</p>
43	<i>Erythrina crista-galli</i>	1	Nice specimen, loses lots of small tip branches. Root and trunk rot on the NW base of tree. Not presenting signs of decline. Very damp ground. Monitor root rot, decay mapping??	3	Broadly Acceptable	<p>Observations limited to the road. Potential issues on eastern side of trunk unable to be observed.</p> <p>Tree growing on flat ground between dwelling and stream, approx. 25m from road.</p> <p>Single stem develops twin stem at 1.5m above ground level. Broad canopy with good amenity value.</p>



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
44	<i>Ficus macrophylla</i> , Morton Bay Fig	4	This tree would appear in thousands of photos, landmark on Russell waterfront. Tree was badly burnt in fire in 1931. Info at Russell Museum MONITOR large limbs over historic building. Townside of tree is losing foliage. Dead wood over car parks and her	5	Broadly Acceptable	Very thin canopy, which also acts as less loading on structure. Further safety assessments have been undertaken parallel to this project.
45	<i>Cypress sp.</i>	1	Planted as a memorial peace tree to celebrate VJ day in 1945. Photos at Russell Museum. Barch/mulch piled around base area, potential trunk rot	1	Broadly Acceptable	Growing within traffic island. Good amenity value entering shopping area. Canopy raised. Likely that ground has been raised around the base due to lack of root flare. No indications within canopy health of issues as a result.



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
50	2 x <i>Morus sp.</i> Mulberry,	3,4	Could only find 2 trees, Largest has major splits in lateral limbs, has previously lost a large branch, heavily weighted and over extended branches. Recommend end weight reduction of branches, installation of supports and removal of co dominant weed tree	3	Broadly Acceptable	<p>Two trees identified within area. However, it's suspected that one tree is a cherry. No leaves so ID needs confirmation in summer. Large tree on edge of bush has recently been felled. Possible it was other mulberry.</p> <p>Regarding tree closer to boat club is twin stemmed. One stem has failed and folded back into crown - no issue with targets. Overall, tree has reduced vigour and likely not producing sustainable wood growth. Further failure expected. The tree's weight and growth extend away from the path. Only limited grass area as target.</p> <p>Assessment undertaken on tree near boat club.</p> <p>To reduce likelihood of branch and stem failure which could also limited the trees safe useful life, lateral branch and weight reduction should be undertaken.</p>
51	<i>Podocarpus totara</i> , Totara	4	Multi stemmed tree from ground level, Stem that was noted in the last assessment has now died. Deadwood present. Lots of exposed and damaged roots. Suggest this is cause canopy dieback. Girdling roots. Not the healthiest specimen. Ficus seedling spr	2	Broadly Acceptable	<p>Multi stems from ground level. Pronounced surface roots. Deadwood within canopy - some up to 100mm dia. Central canopy has died / retrenched. Not outstanding example of species.</p> <p>Further historical research required.</p>



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
51b	2x <i>Alectryon excelsa</i> , Titoki	2	Big trees for their species, internal rot but good cambium, 1 tree is enveloping some stone work at its base, 1 tree has included stems, monitor, poss brace. Both are doing well since last assessment, but need maintainance	2	Broadly Acceptable	Trees found in rear of church and grave sites. Veteran titoki. Fair health for age class. No visual issues with structure. Target occupation rare. Small pump station building within fall zone of easternmost tree.
54	3x <i>Araucaria heterophylla</i> , Norfolk Pine	2	3 trees at Matauwhi Bay. Good form however all trees are struggling to grow. Middle tree is the one showing most decline.	1	Broadly Acceptable	Middle and eastern tree have been topped. Both these trees have thinning upper canopies. Western tree of fair health and vitality. Decay pocket at base of western tree however good reaction wood growing at margin. All approx. 30m height. Girths 4.5.
59	<i>Quercus palustris</i> , Pin oak	3	Tree has had crown removed/ pollard, in approx 2000, new growth vigorous, MONITOR, multi leaders getting bigger and within falling distance of house. Rot at site of pollard.	3	Broadly Acceptable	Continued growth as healthy canopy. House 10m from tree. Epicormic growth starts at 4m and extends 10m. Failure could contact however only tips would touch. Stem failure at PoF 6.
63	<i>Pyrus communis</i> , Pear tree	2	Tall tree with large sail area at the top, spring 2007 approx 1/3 of canopy fell out of tree. Healthy vigor but recommend decay inspection and potential canopy reduction. Very nice tree and worth maintaining .	4	Broadly Acceptable	Veteran tree that exhibits natural canopy retrenchment. Single stem divides to twin stems at 2.5m. Western stem removed. Remaining stem grows towards dwelling. Tree on front lawn set back from beach. Failure would not contact house. Visible canker on upper portions of stem and branches. Good vigour.



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
64	<i>Araucaria heterophylla</i> , Norfolk Pine	2	Tree forks into 6 leaders at 6m from the ground, each leader is a big tree within falling distance of buildings and public tracks. Starting to lose vigor in the upper canopy. the tree was cut in the 1870s to replace the mast of HMS Nelson, more info avai	2	Broadly Acceptable	Single stem develops multiple stems. Upper canopy thin though no tip dieback.
65	<i>Vitex lucens</i> , Puriri, "Governors Tree"	2	Nice tree, has been braced in canopy by using truck tie down. This has done a good job but it looks like it needs replacing. Double leader approx 4m up trunk with rot pockets that sound hollow. Decay mapping would be a good suggestion. And selected w	3	Broadly Acceptable	<p>Single stem developing primarily into two stems at 4m. Decay column present on trunk extending into main union, this is due to the loss of another significant stem. Decay also visible at base. Plenty of reaction wood forming at root flare.</p> <p>Strapping within mid-upper canopy likely installed to mitigate perceived risk from decay within main union. Unsure if this was necessary given the sail area and loading on defect. As the tree has grown and established with the strap it needs to be maintained in tree.</p> <p>Tree assessed to be of very good health and vitality which means that reaction wood will be sufficiently being produced for any stress points.</p> <p>Strap within tree needs to be replaced with correct arboricultural system and maintained to manufacture's requirements.</p>
69	<i>Stenocarpus sinuatus</i> , Firewheel tree	3	Unique tree, many crossing branches, deadwood, included stems from ground level separation of stems, rot, targets-carpark, buildings, bracing advised. Lots of fallen debris at base of tree.	3	Broadly Acceptable	No change in comments. No visible structural anomalies present.



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
70	<i>Podocarpus totara</i> , Totara		Lower branches have been snapped off, Crown lifting of lower branches to avoid further damage from vehicles. Now would be a good time to adjust the concrete edging at base of tree. And to renew previously install permeable surface and soil. Also needs	2	Broadly Acceptable	Declining canopy
71	<i>Phoenix canariensis</i> , Phoenix palms x 14.	2	Avenue of palms on the entrance to Kingston house, mixed height, needs crown lifting. Dead fronds on driveway	1	Broadly Acceptable	Dead fronds can detach from time to time, however, the target occupation and frequency of dead frond release make this broadly acceptable. Regular maintenance will eliminate dead frond release.
76	<i>Aleurites fordii</i> , Tung oil tree	2	only 1 tree left. It is resting against a cabbage tree and that is all that is keeping it up right. Lots of Fruit. Take cuttings? Caution of removing surrounding trees and of cabbage tree. If removed tung oil tree will collapse	3	Broadly Acceptable	No change. Tree being partially supported by cabbage tree. If cabbage were to collapse, there's no indication that this tree will fail. If it was to fail, only small diameter branches would contact road.
94	<i>Metrosideros excelsa</i> , Pohutukawa	2	Nice tree, 2007 had earthworks around root pan to allow for carpark, Some canopy die back. Mass of arial roots. MONITOR	2	Broadly Acceptable	Adjacent road and car park. Aerial roots forming on most parts of tree. Some minor deadwood which may have been a result of the works observed in last assessment, however remaining canopy dense and healthy.
92a	<i>Araucaria heterophylla</i> , Norfolk Pine	3	Trees have not declined from root damage in 2007. but also have not grown much. Low vigor.	3	Broadly Acceptable	At entrance to car park. Likely to have been canopy raised, which is now regenerating. Upper canopy thinning. Low vitality and poor health.



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
92b	<i>Araucaria heterophylla</i> , Norfolk Pine	3	Trees have not declined from root damage in 2007. but also have not grown much. Low vigor, Fert	3	Broadly Acceptable	Four N. island pines within general vicinity. Tree in question is of fair health though could be somewhat low on vitality.
99	2x <i>Quercus robur</i> , English Oak	2	Large trees, both have had structural limb failure previously, no new ones since 2007. public tennis courts below, over extended limbs, MONITOR	1	Broadly Acceptable	Branch failure unlikely to contact court as branch extremities at edge of court. Upper stem weight away from tennis courts.
100	<i>Olea europaea</i> , Olive	2	Growing through deck, regularly height reduced. Poor shape and form.	2	Broadly Acceptable	Small tree. No risk issues.
101a	Grove of 2x <i>Cypress sempervirens</i> , 1x <i>Plantus x hispanica</i> , London plane, 1x <i>Araucaria bidwilli</i> , Bunya-bunya Pine, 1x <i>Olea Europea</i> , Olive <i>Metrosideros excelsa</i> , Pohutukawa	3	Assessed as a grove due to spacing, unique stand of mature trees, lots of root damage, probable soil pathogens, other trees on the original list have died, would benefit from being fenced off MONITOR	1	Broadly Acceptable	Observations undertaken from road. Trees generally of fair health. Unchanged quality of previous assessment. STEM assessment unchanged.
102	2x <i>Araucaria heterophylla</i> , Norfolk Pine	4	1 Tree has deteriorated considerably since 2007 visit. Inspection, leader almost dead, MONITOR, no targets, other tree in good health with obvious lean	2	Broadly Acceptable	No change to condition. No access so no risk of harm.



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
105	6x <i>Metrosideros excelsa</i> , Pohutukawa	2	Recently had soil aeration treatment to remediate soil compaction. Also introduced organic fert. The 2nd tree from the north is the tree that has continually been struggling. Suggest leaving any pruning work for another year. 2nd tree from wharf has I	3	Broadly Acceptable	<p>Six pōhutukawa. Fair to good interior growth. Indicated that recent soil improvements have been carried out if so, the trees are recovering nicely. Unsure of tree health prior however.</p> <p>Multiple stems from ground level. Typical for pōhutukawa. No indication of stem subsidence. Car park beneath canopies and close to buttress/out flare.</p> <p>Probability of failure regarding STEM evaluation is 5. This is due to the propensity of stem failure, in conjunction with the reduced health. This does not equate to sudden failure of this feature that can happen from time to time.</p>
107	<i>Ficus macrophylla</i> , Morton Bay Fig . Not sure why Norfolk pine is not included?	1	Massive tree, very healthy, situated in old garden with many other large trees, has had lower branches removed. has lost a large limb from snapping out. Mower damage to exposed roots on grass surface but doesn't appear to be effecting canopy. Several s	3	Broadly Acceptable	Large wide spreading tree. Targets predominantly outside drip line.
108	7x <i>Metrosideros excelsa</i> , Pohutukawa	1	Trees under power lines, currently good clearance, lots of epicormic growth, deadwood developing over property and carparks. trees need general tidy up MONITOR	3	Broadly Acceptable	Healthy trees. Clear of powerlines.



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
114	<i>Jacaranda mimosafolia</i> , Jacaranda	1	less within MADs for 11Kv powerlines, branches rubbing on buildings, ivy starting to grow up tree	7	Broadly Acceptable	Wide spreading crown. Moderately large for species. Canopy within growth limit zone for overhead power conductors. Some rubbing branches though unlikely to adversely affect tree. Canopy touching garage roof. Unable to access base of tree to do assessment however no issues observed from road.
116	Stand of <i>Podocarpus totara</i> , Totara	4	Trees close to 11kv powerlines. Trees are heavily covered in Lichen which will be adding to weight of branches near powerlines and supressing growing buds. MONITOR for powerline clearance	1	Broadly Acceptable	Outer branch tips within growth limit zone of overhead power conductor. Some visual form issues throughout stand of trees, though unlikely to be a structural threat. Tree centre of stand has noteworthy cavity likely to extend most of trunk. No excessive loading on tree so unlikely to fail.
117	<i>Metrosideros excelsa</i> , Pohutukawa	1	Massive co dominant canopy, huge buttress on main trunk, complete eco-system many juvenile trees under canopy, epiphytes, unique, MONITOR	1	Broadly Acceptable	No change to previous comments.
119	<i>Ginko biloba</i> , ginko	1	A graceful, large specimen of this species in Northland, Double leader with heavily included stems, cable bracing so as not to lose magnificent canopy? Almost touching 11Kv powerlines	7	Broadly Acceptable	As outlined, twin leader at 2.5m. Poorly formed union, with no indication of failure. Branches are crossing / rubbing which could be providing some natural bracing. No recent environmental load increase to the tree which could contribute to failure probability increase. Bracing the two stems would ensure harm reduction through avoiding stem collapse, however, qtra assessment concludes broadly acceptable risk.



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
122	<i>2x Araucaria heterophylla</i> , Norfolk Pine	3	2 large Norfolk pine trees. 1 is in good form and positioned back from waters edge. 2nd which is close to waters edge has double stems and seems in poor health... apical die back, 1 tree could be considered for removal from list. Other tree is very ni	3	Broadly Acceptable	<p>Three N. pines in vicinity. This assessment focuses on two larger trees. For purposes of this assessment they have been attributed numbers Tree 1&2.</p> <p>Tree 1 - further away from waters edge. 35m high. Girth 6.5m Canopy spread 30m dia. Excellent form. Good health and vitality.</p> <p>Tree 2 - adjacent to water edge. 32m high. 5.7m girth. Canopy spread 22m dia. Develops twin stems at 3m. Tight formed union. Health poor. Vitality poor. Thinning foliage and density. Broken branch within canopy, unlikely to dislodge. At edge of road. Possible that the construction of road led to health issues.</p> <p>QTRA and below details undertaken on Tree 2.</p> <p>STEM assessment carried out on Tree 2</p>
125	<i>Metrosideros excelsa</i> , Pohutukawa	2	Tree planted on site of one of the first european houses. Multi stemmed tree in car turn around. Damaged roots from mower hitting them. Could do with a minor crown lift to avoid truck damage	3	Broadly Acceptable	<p>Tree of fair health growing in traffic island. Typical multiple stemmed pōhutukawa with multiple stems developing at ground level. No indication of stem subsidence or union failure. Small compact canopy unlikely to overload unions.</p> <p>Root damage unlikely to affect integrity.</p>
133	Liquidambar styraciflua, Liquidambar	3	1 tree has died due to bad pruning other Tree has had severe crown removal , poorly done and now re sprout very vigourosly. Needs re pruning and thinning.	2	Broadly Acceptable	No change



FNDC existing tree no	species (2017)	condition (2017)	comments (2017)	Threats rating (2017)	risk of harm (qtra) (2020)	Comments (2021)
134	<i>Metrosideros excelsa</i> , Pohutukawa	2	Old tree hanging over carriage way, previous concern about tree falling onto road. Regular assessments have been done. MONITOR consider measuring distance from trunk to road.	3	Broadly Acceptable	<p>Low pōhutukawa over carriageway. Measured lowest limb above outer edge of footpath - see photos for visual indication of method. Measurement method - throw flexible fibreglass tape over limb and extend both ends at ground level, point of measurement directly above outside edge of footpath. Total measurement 5.8m - from ground up and over branch to top of path. Means that top of branch is 2.9m above path. Recheck annually. Best that measurements undertaken by topo survey or height stick.</p> <p>Further measurement taken from top of kerb perpendicular to stem = 1780mm however bark development and variances may vary results.</p> <p>Full assessment of potential lowering are best undertaken over multiple surveys.</p>



Appendix C – Photographs of Tolerable Trees

Photograph 1: Tree 21 – Whole tree



Photograph 2: Tree 21 – annotated photo of probable decay cavity behind bark





Photograph 3 – Tree 25a



Photograph 4 – Tree 25a. Cavity.





Photograph 5: Tree 49. Extended lateral branches over bench seat.



Photograph 6: Tree 92





Photograph 7: Tree 100a. Whole tree



Photograph 8: Tree 100a. Decay on tree trunk

