

**BEFORE AN INDEPENDENT HEARINGS PANEL
IN CHRISTCHURCH**

TE MAHERE Ā-ROHE I TŪTOHUA MŌ TE TĀONE O ŌTAUTAHI

UNDER the Resource Management Act 1991 (the **RMA**)

AND

IN THE MATTER OF the hearing of submissions on Plan Change 14 (Housing and Business Choice) to the Christchurch District Plan

**STATEMENT OF REBUTTAL EVIDENCE OF JOHN DAVID THORNTON ON
BEHALF OF CHRISTCHURCH CITY COUNCIL**

**Significant Horizontal Elm (*Ulmus glabra* 'Horizontalis') District Plan Tree ID
Number T1118 (300 Stanmore Street)**

Dated: 9 October 2023

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INTRODUCTION AND SCOPE

1. My full name is **John David Thornton**. I am employed as the Arborist – Environmental Consents for Christchurch City Council (the **Council**). My role in preparing this rebuttal is that of an expert in arboriculture. I note that this is my first statement of evidence in the PC14 proceedings.
2. I have prepared this statement of rebuttal evidence on behalf of the Council in respect of matters arising from the Statement of Evidence of Rebecca Jayne Parish on behalf of Foodstuffs South Island (Submitter 705) dated 20 September 2023, regarding Plan Change 14 to the Christchurch District Plan (the **District Plan; PC14**).
3. In particular, I respond to Ms Parish's evidence on the Horizontal Elm (*Ulmus glabra* 'Horizontalis') (District Plan Tree ID Number T1118) at the Stanmore Street New World site (300 Stanmore Street).¹ Ms Parish and Foodstuffs opposes the continued protection of the tree, based on its status and on public health and safety and property risk grounds.
4. I assessed the condition of the tree in terms of its health and structure, and provided my views in an email to Council City Arborist Toby Chapman dated 19 September 2023.
5. I am authorised to provide this evidence on behalf of the Council.

QUALIFICATIONS AND EXPERIENCE

6. I have 24 years of experience working for the Christchurch City Council dealing with and managing protected trees, largely being located in the Parks Unit over this period. Currently I am the only Arborist employed full time in this area. I surveyed approximately 1000 trees for addition to the former City Plan as Scheduled Notable Trees from 1998 to 2000, when first employed by the City Council. I have also surveyed and assessed approximately 1500 trees on subdivision sites from 2001 to 2015, as well as dealing with and assessing many hundreds of the Scheduled Significant trees, most of which I have first hand knowledge of.
7. My qualifications are:

¹ Paragraphs [19] – [22] of Ms Parish's evidence.

- (a) Bachelor of Arts majoring in Political Science from Victoria University (1990).
 - (b) Certificate in PC Hardware & Maintenance from Wellington Polytechnic Institute (1996).
 - (c) Post Graduate Diploma in Parks, Outdoor Recreation and Tourism Management from Lincoln University (1997).
 - (d) I have completed WINTEC Arboricultural Courses in: Amenity Tree Evaluation; Tree Inspection (Twice); Amenity Tree Valuation I; Amenity Tree Valuation II; Hazard Tree Analysis (Twice); Advanced Tree Biology and Mechanics; Professional Arboricultural Practice II; Trees & Development; Designing Treed Landscapes; Contract Procurement & Monitoring; Entomology & Plant Pathology; Notable Trees.
8. Through the Council I am a member of the New Zealand Arboricultural Association.
9. I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023, and that my evidence has been prepared in compliance with that Code.

ASSESSMENTS OF THE TREE

10. The condition and values of T118 have been considered a number of times over the last ten years.
11. The 2012 report referred to by Ms Parish was carried out by Treotech as part of a Resource Consent application for work proposed within the 10 metre setback area of the Elm that applied under the City Plan rules at the time. Since the report being written in 2012, it has proved to be overly pessimistic about the projected outcome for the tree. No large limb failures have occurred to my knowledge and after a period of 11 years the tree is still standing, and shows no sign of suffering any imminent structural failure of a serious nature.
12. The report that I wrote at the time for the council resource consent planners, regarding the proposed work around the Elm and findings of the Treotech report, did not concur with the rather pessimistic conclusions about the Elm. I

commented that in the future it may be necessary to remove the tree if it continues to decline, but it is not conclusive yet that the tree will definitely need removal within the next 5-10 years.

13. The December 2016 Treetech assessment of the Elm for the District Plan Review of 2014 to 2017 using the Council's CTEM (Christchurch Tree Evaluation Method) system, rated the tree as Fair (50 points) in respect of both its health and structural state. The comment by the assessing Arborist that there was apical dieback present in the tree was not in itself any reason to not include the tree in the District Plan Schedule of Significant trees. The total score initially for the tree was a reasonably high 870, when 770 was the required points threshold. As the review process progressed the tree was reassessed along with others that had not had any potential Exceptional values included in the earlier 2014 assessment. It was then given a further 50 points under the Exceptional Heritage section, as it was over 100 years old. The amended core of 920 placed it into roughly the top 10% of the trees assessed for inclusion by total score.
14. Attached to my evidence as **Appendix One** are a further four Consultant Arborist Reports and Comments regarding the state of the Horizontal Elm T1118, as well as comments from Landscape Architect Di Lucas. These range over a time period from November 2015 to February 2021. One of these includes a Treetech Report by Owen Meeks undertaken for Foodstuffs in November 2020. Several comment on the recovery of the tree from its earlier state of decline. I note that none of these consultant experts recommends that the Horizontal Elm tree needs to be removed for health and safety reasons or that the protection be removed from it for health and safety reasons.

CURRENT STATE OF THE HORIZONTAL ELM T1118 REGARDING HEALTH AND SAFETY CONCERNS

15. The current risk posed by the tree from any dead material dropping from the crown can be minimised by removal of this material periodically, which is entirely normal for very mature trees such as the Elm which is over 150 years old. The Council Arborists recommend pruning maintenance of such mature trees be undertaken every 2 to 3 years for health and safety, to remove any broken, diseased or dead material from the canopy.

16. The landscaping of largely very dense flax surrounding the tree effectively forms a barrier to public egress under the canopy of the tree, and the canopy has steadily been reduced over time as more material has been removed from the canopy.
17. Any limb failures from the tree are almost certainly going to land under the tree canopy, or very close to it. These are unlikely to be limbs that would cause serious injury, as the deadwood is mainly reasonably small in diameter, not of a size that will cause serious injury. However, currently very few people normally venture into this area unless performing specific maintenance tasks, or assessing the tree.
18. Currently the canopy of the Elm only slightly overhangs the shopping trolley bay area at the north end of the car park, the rest of the canopy is confined to the landscaped area around it. Therefore, the risk of any member of the public or New World Staff suffering any physical harm from the tree due to limb failure is quite low as far as I can ascertain based on my Arboricultural experience. In my opinion there is no reasonable Arboricultural argument to be made that the tree needs to be removed on grounds of health and safety at this time.
19. The tree may continue to decline in the future, but in my opinion it is too early to know yet whether it will require removal in the near future, or in fact may recover to some extent. When I viewed the Elm tree recently to assess its Health and Structure as requested by the City Arborist, using the criteria of the Council's tree assessment system CTEM, I rated its Health as being Fair, and the Structure as being Fair as well. Noting that some limbs are effectively largely deadwood and need removing, and once they were removed I would rate the Structure as being Fair to Good.
20. Its condition will need to be monitored though in the future years, to enable an intelligent and considered decision to be made about its viability.

John Thornton

9 October 2023

APPENDIX ONE: REPORTS / COMMENTARY ON T118

- Liz Warner note dated 17 November 2015
- Treotech Preliminary Arboricultural Report dated 2 November 2020
- Di Lucas note dated 16 December 2020
- Craig Taylor email dated 22 December 2020
- Caldwellader report dated 3 February 2021

The Hadfield Elm – 300 Stanmore Road

In relation to the Hadfield Elm a mature Weeping Elm Tree (*Ulmus glabra Horizontalis*) located at 300 Stanmore Road, Christchurch.

I visited the tree on Friday 13th November 2015 and have since reviewed two arboricultural reports written about the tree. One written by Mr Walsh of Treetech Specialised Treecare Ltd dated 23rd November 2012 and the other written by Mr James of David James Tree Services Limited dated 11th February 2015. I do not agree with Mr Walsh's conclusion that the tree is hazardous and a risk to public safety. I do however agree with Mr James's conclusion that although the tree may have been showing signs of decline at the time of the Treetech report being written (which is noted as being three years ago), the tree appears to have recovered well and has put on new growth.

In my professional opinion the tree has improved in overall health since the Treetech report was written. The large competing ground cover has been removed and an irrigation system added all of which appears to have had a positive effect on the health of the tree. In my opinion the tree is not hazardous and has a very low risk to public safety. The tree has been pruned heavily in the past and although the tree appears to have recovered well from this, it has irrevocably altered the shape of the tree.

The assessment carried out by Martin Gohns on the 16th December 2014 appears to be incomplete, as the Exceptional Evaluation part of the assessment has not been completed. Although it is noted this has been completed for other similar trees assessed by the same person. It is also noted that multiple other trees that received scores similar to the elm and that did not meet the criteria for inclusion in the listing of significant trees schedule, have in fact been included in the listing.

After reviewing assessment results on other trees of the same species for this survey, it is clear that the Hadfield Elm is significantly larger in diameter than any other trees recorded in Christchurch. The New Zealand Notable Trees Trust also note the following information about the tree.

'The largest known specimen of this species in NZ was recorded in the Christchurch Botanic Garden^[1] (see tree [CR/1255](#)). The Hadfield Elm surpasses this tree by a considerable margin and is now the largest known specimen in the country (Cadwallader, B.G., 2015).'

In view of this information I believe that the Hadfield Elm should be retained as a Heritage Listed Tree and included in Appendix 9.4.5.1.1 Schedule of Individual Trees of the proposed Christchurch Replacement District Plan (Replacement Plan).

Liz Warner - BSc (Hons) Arboriculture

Consultant Arborist

Warner Tree Care Ltd

17th November 2015

Preliminary Arboricultural Report (Visual Tree Assessment)

Client:	Foodstuffs South Island
Contact:	Rebecca Parish
Email:	Rebecca.Parish@foodstuffs-si.co.nz
Project	New World Supermarket - Significant tree assessment
Location	300 Stanmore Road, Richmond.
Author	Owen Meekins Grad Cert of Arb (AQF Level 8), LLB.
Date	02/11/2020
Version	Final



Photo 1: Stanmore Road New World: Ulmus glabra 'Horizontalis'

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1 Introduction

- i. Treetech Specialist Treecare Limited (Treetech) has been engaged by Rebecca Parish from Foodstuffs South Island to prepare a Preliminary Arboricultural Report ('Report') with regards to the Phyto-morphological condition of one (1) *Ulmus glabra* 'Horizontalis' (Weeping Wych Elm) located in a formed garden bed at the New World Supermarket, Stanmore Road, Richmond. Of additional dendrological interest with regards to this tree is the intentionally planted understory of flax species (*Phormium cookianum* 'Green Dwarf'), and as to whether this planting is having any significant adverse impacts on the abovementioned tree.
- ii. Please note that this tree is afforded protection status pursuant to *the Christchurch City Council District Plan, s9.4 Significant and Other Trees*.
- iii. On the 30th October 2020, a Visual Tree Assessment (VTA) was conducted by a suitably qualified Technician Arborist from Treetech. The following Report and its arboricultural reasonings are based on the trees' site specific Phyto - morphological condition which include the trees age, vitality, soil porosity, form, structure, and general biomechanics.

2 Brief

Information to be provided:

Questions	Answers
Overall Health of the tree	<i>Ulmus glabra</i> 'Horizontalis' (Burnley Plant Guide, University of Melbourne). Phyto-morphology; the subject tree's vitality can be adjudged 'fair' per both the Urban Visual Vitality Index (Callow et al. 2018) & (Mattheck & Breloer, 1994).
Flax variety	<i>Phormium cookianum</i> 'Green Dwarf' (Flora of New Zealand Volume 2).
Statement as to what may occur if the flaxes were all removed.	Please refer Conclusion & Recommendations.
Statement as to the flaxes and their affect if they were to remain in situ.	Please refer Conclusion & Recommendations.

- i. The purpose of the Report is to provide Christchurch City Council with an objective and unbiased arboricultural evaluation of the subject trees' Phyto-morphological condition; and any dendrological adverse impacts with regards to the understory planting.
- ii. This Report has been prepared by a Christchurch City Council (CCC) approved Technician Arborist which is a requirement listed in Christchurch City Council's *Construction Standard Specifications Part One 2019, Chapter 22: Protection of Natural Assets and Habitats, Section 22.5 Protection of Trees and Vegetation.*

3 Limitations

- i. All arboricultural reasonings that have been discussed and provided are based on the combination of extensive empirical arboricultural knowledge and the internationally recognised Visual Tree Assessment methodology ((Mattheck & Breloer, 1994).
- ii. However, whilst this arboricultural assessment is thorough it should be noted that trees are dynamic living organisms exposed to both unforeseeable biotic and abiotic variables which on occasion can be harsh and severe. Thereby, this arboricultural assessment will consider on the balance of probabilities the most likely dendrological outcomes as opposed to those which could, may or fancifully occur.

4 Tree Protection Status and Vegetation Controls

Tree Species	Protection Status	Christchurch City Council Tree Id
<i>Ulmus glabra</i> 'Horizontalis' (Weeping Wych Elm)	Christchurch District Plan s9.4 Scheduled - Significant Tree	T1118 4595

5 Site Location & Observations

- i. The subject tree *Ulmus glabra* 'Horizontalis' is located in a formed garden bed at the Stanmore Road, New World Supermarket. The tree's rooting environment is adjudged 'good', with adequate soil porosity or void fraction and organic material availed. The trees growth footprint is relatively unfettered and no obvious lean and/or stability issues are visible (Mattheck and Breloer, 1994).

- ii. The subject trees form, shape and structure is atypical of its species due to archaic pruning techniques ('pollarding'), with its natural decurrent form being altered due to this incorrect pruning.
- iii. The subject trees crown and main scaffolds show signs of limited vigour through a combination of biotic factors and senescence. The tree is slightly asymmetrically to the south-west with the canopy spread being marginally phototropic. This is accentuated due to the lineal pruning over the roofline.

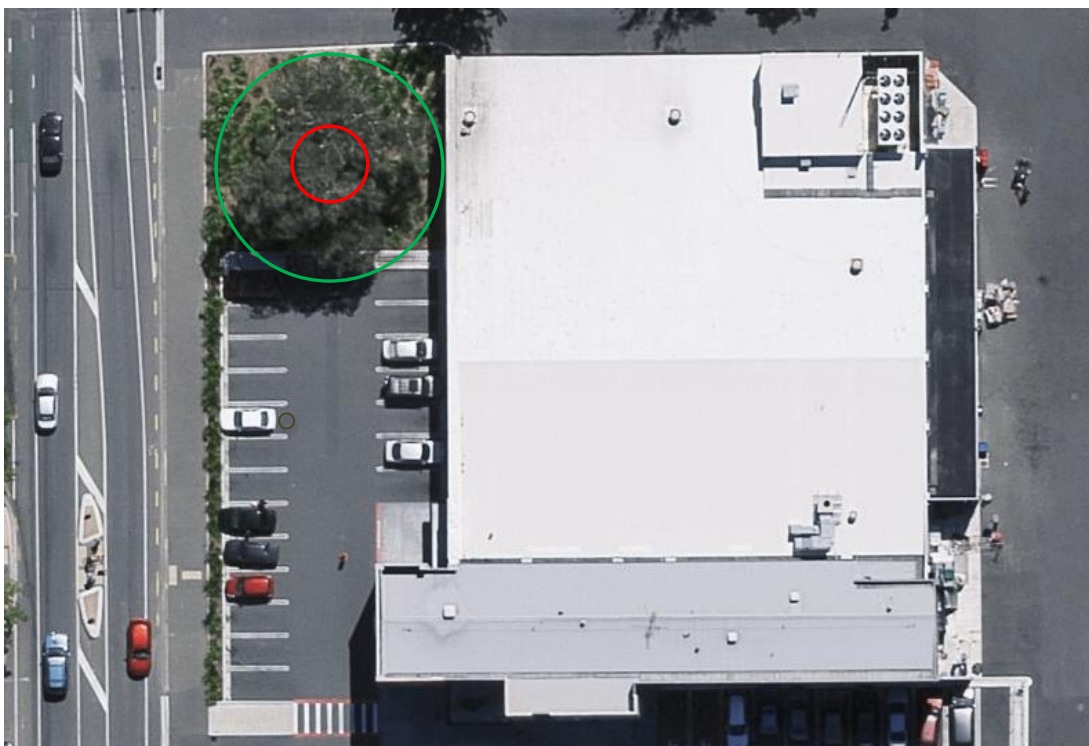


Photo Image 1: Stanmore Road New World: Ulmus glabra 'Horizontalis'. (Green: TPZ) (Red: SRZ).

6 Methodology: Visual Tree Assessment

- i. On the 20th October 2020, a Visual Tree Assessment (V.T.A) consistent with modern arboricultural practices (Mattheck & Breloer, 1994) was conducted by a Christchurch City Council (CCC) approved Technician Arborist from Treetech on the subject tree. The assessment was carried out at ground level and therefore classified as 'Level 2' Assessments (Dunster et al., 2013).

- ii. This abovementioned biomechanically based system (VTA) forms the fundamental basis of which to identify the symptoms produced by a tree in reaction to a weak spot, or area of mechanical stress. A VTA is a non-invasive method of examining the vitality and structural condition of individual trees. It has become the standard approach for surveying trees internationally. By visually examining a tree, a suitably qualified/experienced arborist can gather information on the condition of its roots, trunk, main branch structure, crown, buds and leaves to make an assessment and draw conclusions about general condition and vitality. It is a systematic approach, which directs the arborist through a procedure from biological and routine observations to analysis, using their understanding of failure criteria.
- iii. In any inspection regarding tree health or safety, an arborist will look for biological signs, such as undersized leaves, discoloured foliage, dead branches, large or numerous cankers and fungal fruiting bodies. They will be able to recognize the significance of these observations by comparing them with the typical growth patterns and appearance of the tree involved. They will also look at the tree for signs of structural weakness or for a change in growth patterns that may indicate defects. If mechanical weakness is suspected, there may be a need for more investigation using specialist decay detection and measuring equipment such as the Resistograph and/or Sonic Tomograph.
- iv. A nylon percussion hammer was used to take soundings on the stems of the selected tree. Unexpected tonal changes from hammer sounding on the subject tree's stems can indicate that wood decay may be present. No other decay detecting equipment was used as part of the inspection process.
- v. Other tools used onsite to gather the necessary dendrological data were a measuring tape, mobile phone and I-pad. Total tree height and canopy spread was recorded using a digital laser range finder (Nikon Forestry Pro). The trunk diameter and DBH height measurements were made by using a conventional measuring tape. No soil analysis, tissue sampling and/or geological investigations were carried out at that time.

- vi. All arboricultural reasonings that have been discussed and provided are based on the hammer soundings recorded during the site visit and the Visual Tree Assessment methodology ((Mattheck & Breloer, 1994).

7 Arboricultural Findings

Phyto-morphology; the subject tree’s vitality can be adjudged ‘fair’ per both the Urban Visual Vitality Index (Callow et al. 2018) and The Body Language of Trees (Mattheck & Breloer, 1994).

Table 1: Tree Inventory

Tree Owner Id.	Botanical Name	Common Name	Age Class	Height (m)	Canopy Spread (m)	Structure	Health	Shape	Retention Values ULE & Tree AZ	D.B.H (m)	TPZ & SRZ (m)
4595	<i>Ulmus glabra</i> 'Horizontalis'	Weeping Wych Elm	Mature	12	N/S: 15 E/W: 15	fair	Fair	fair	Medium A3 / A4	2.1	15 4.7

KEY:

***Structure & Health** per Christchurch City Council - Tree Condition Rating System (2015) descriptors.

***Canopy Spread** = estimation of canopy spread to the four (4) distal points.

***Retention Value; ULE & Tree AZ** per (Barrell, J. 1996) & (Barrell, J. 2000).

***DBH, TPZ, SRZ** calculated per QAA & ProofSafe Calculators.

7.1 Tree Condition: Root Zone

- i. The root zone is covered with an under-planting of *Phormium cookianum* ‘Green Dwarf’, This is an intentional and successful ‘soft landscaping’ solution to prevent foot traffic and subsequent detrimental soil compaction within the Tree Protection Zone.
- ii. Good quality topsoil containing humus and moisture is apparent (Bassuk & Day. 1994). This topsoil contains necessary organic material and nutrients, whilst compaction of subsoil destroys the soil structure that is important for soil porosity, aeration, correct drainage, and

root growth/extension (Unger and Kasper, 1994).

7.2 Tree Condition: Trunk

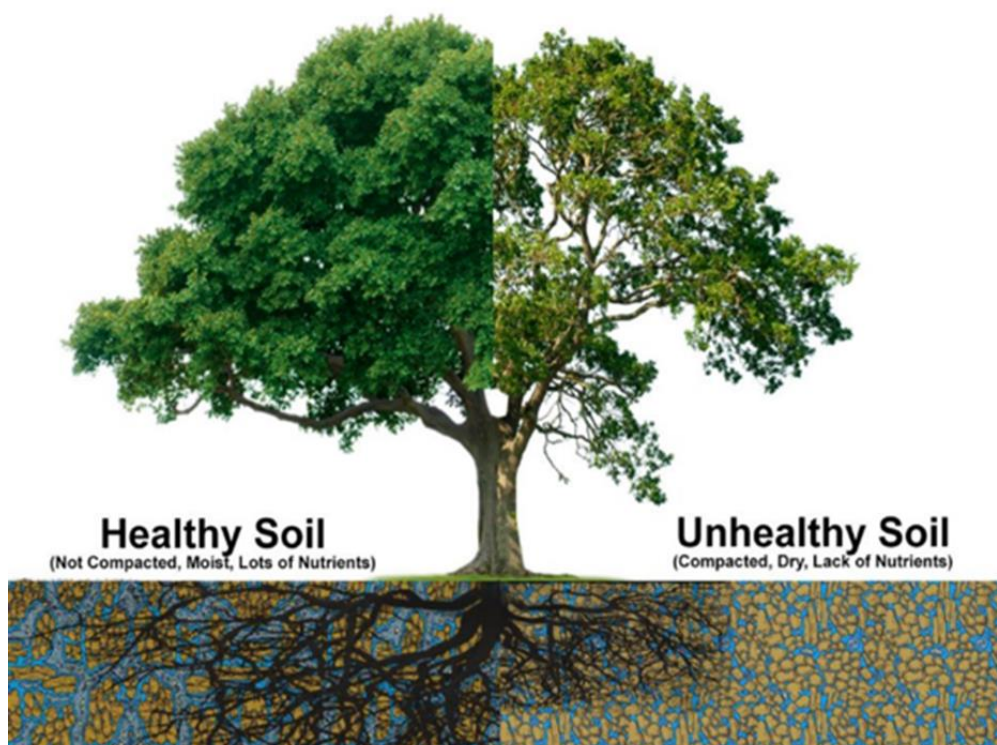
- i. Noticeably several branches have been removed where the tree has been previously 'lift pruned' to facilitate the building. These pruning wounds are showing reasonable signs of compartmentalisation (callus or 'rams horn') with no visible signs of secondary infection (Shigo 1991).
- ii. The root collar is in good condition with no visible basal damage.
- iii. As a desirable trait of this species, the trunk is relatively straight with no visible adverse discoloration, bark peeling or codominant leaders (Gilman 2003).

7.3 Tree Condition: Branches, Crown and Canopy

- i. From the ground the branch attachments appear to be strong and well formed. There appears to be no major weak points in their attachment such as bark inclusions, branch codominance, cracking, cankers or decay (Shigo.1991).
- ii. Noticeably the tree has been pollarded. This (yester-year) incorrect pruning has affected both the trees aesthetic and biological value to its detriment with the canopy being noticeably atypical for a specimen of this size and maturity.
- iii. The tree is showing typical signs of a senescent tree which include distal 'tip-dieback', minimal growth increments and a thinning canopy.

8 Arboricultural Discussion

- i. With regards to the pre-existing flax plantings beneath the subject tree there is no dendrological evidence or otherwise to indicate that these plants are adversely impacting significantly on the subject trees vitality and/or longevity.
- ii. Soil compaction: it is foreseeable that if the existing understory plantings beneath the subject tree are removed an impromptu unwanted thoroughfare will be created within the subject trees Tree Protection Zone and thus cause detrimental soil compaction. It has been shown that pedestrian traffic can create soil compaction levels over the critical threshold level of 2.3 MPa per (Bassuk,N & Day,S.1994). Topsoil contains necessary organic material and nutrients, whilst the compaction of subsoil destroys the soil structure that is important for soil porosity, aeration, correct drainage and root growth/extension (Unger and Kasper, 1994). This compaction having a direct impact on an already stressed trees growth, vigour, form and consequently longevity (Watson,G.W 1994) and (Coder,K. 1998).



Picture 1: Indicative tree root growth

9 Conclusion

Due to the tree showing signs of senescence it is strongly recommended that no unwarranted biotic and/or abiotic stress factors are introduced to further stress this tree. These include excavations, compaction and/or general disturbances within the TPZ. More so as Aged 'stressed' trees such as this tree are more susceptible to pest and pathogen attacks due to their already weakened defence mechanisms (Shigo,A. 1991).

10 Recommendations

- i. It is foreseeable that the removal of the understory plantings could potentially adversely impact upon the subject trees TPZ and consequently its longevity. Therefore, from an arboricultural perspective it is recommended that the status quo be maintained with regards to the subject tree and the intentionally planted understory. Especially as the understory is acting as a necessary and successful TPZ protectant/pedestrian barrier from likely soil compaction.
- ii. Trees are sophisticated organisms, with complex biology, effective integrative systems and efficient biological defence mechanisms. The tree's defence mechanisms are usually the strongest and most effective defences available. Therefore, a non or minimal interventionist approach should be followed especially when it comes to mature and/or senescent trees. Arboricultural intervention in the natural growth of a tree should only ever occur where the biology and the physiology of the organism are understood to such a level that intervention will have clear and predictably beneficial outcomes.

"A society grows great when old men plant trees whose shade they know they shall never sit in".

- Greek proverb

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12 APPENDIX

12.1 Safe Useful Life Expectancy (S.U.L.E)

SULE is the safe 'with an acceptable level of risk' life expectancy of a tree modified by economic considerations (Barrell, J. 1996). The objective of a SULE assessment is to determine the relative value of individual trees for the purpose of informing future management options.

Safe Useful Life Expectancy – Assessment Criteria			
Dead	Short	Medium	Long
<p>Trees with a high level of risk that would need removing within the next 5 years.</p> <p>Dead trees.</p> <p>Trees that should be removed within the next 5 years.</p> <p>Dying or suppressed or declining trees through disease or inhospitable conditions.</p> <p>Dangerous trees through instability or recent loss of adjacent trees.</p> <p>Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.</p> <p>Damaged trees that considered unsafe to retain.</p> <p>Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.</p> <p>Trees that will become dangerous after removal of other trees for the reasons.</p>	<p>Trees that appear to be retainable with an acceptable level of risk for 5-15 years.</p> <p>Trees that may only live between 5 and 15 more years.</p> <p>Trees that may live for more than 15 years but would be removed to allow the safe development of more suitable individuals.</p> <p>Trees that may live for more than 15 years but would be removed during the course of normal management for safety or nuisance reasons.</p> <p>Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.</p>	<p>Trees that appear to be retainable with an acceptable level of risk for 15-40 years.</p> <p>Trees that may only live between 15 and 40 more years.</p> <p>Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals.</p> <p>Trees that may live for more than 40 years but would be removed during the course of normal management for safety or nuisance reasons.</p> <p>Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.</p>	<p>Trees that appear to be retainable with an acceptable level of risk for more than 40 years.</p> <p>Structurally sound trees located in positions that can accommodate future growth.</p> <p>Storm damaged or defective trees that could be made suitable for retention in the long term by remedial tree surgery.</p> <p>Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention</p>

12.2 Tree AZ Categories (Version 10.10 ANZ)

Category Z: Unimportant trees not worthy of being a material constraint.

Local Policy Exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection.
Z2	Too close to a building, i.e. exempt from legal protection because of proximity.
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance.
High Risk Of Death Or Failure: Trees that are likely to be removed within 10 years because of acute health issues or severe	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions.
Z6	Instability, i.e. poor anchorage and increased exposure ...
Excessive Nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris and interference.

Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings.
Good Management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions.
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings and poor architectural framework.
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference and suppression.
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance.
<p>NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.</p>	

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint.

A1	No significant defects and could be retained with minimal remedial care
A2	Minor defects that could be addressed by remedial care and/or work to adjacent trees
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
A4	Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)
<p>NOTE: Category A1 trees that are already large and exceptional or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.</p>	

**Please note: The U.L.E or Tree AZ matrix is a tree vitality indicator and not a schedule for removal (<http://melbourneurbanforestvisual.com.au/>)*

12.3 Encroachment Descriptors

Tree protection zone (TPZ):

The TPZ is the optimal combination of crown and root area (as defined by AS 4970-2009) that requires protection during the construction process so that the tree can remain viable. The TPZ is an area that is isolated from the work zone to ensure no disturbance or encroachment occurs into this zone. Tree sensitive construction measures must be implemented if work is to proceed within the Tree Protection Zone.

Diameter at Breast Height (DBH) measured at 1.4m above ground level. DBH is the circumference divided by π . * Measurement taken by Standard issue DBH Tape.

Tree Protection Zone (TPZ) = DBH x 12 (The radius of the TPZ is calculated for each tree by multiplying its DBH x 12) Note: TPZ - minimum area is 2.0m / maximum area is 15m.

Please Note: The TPZ figure is expressed as a radius measurement which is to be taken from the centre of the stem at ground level and applied in an outwards direction towards the extremities of the branches for the entire circumference of the tree/s.

Structural root zone (SRZ):

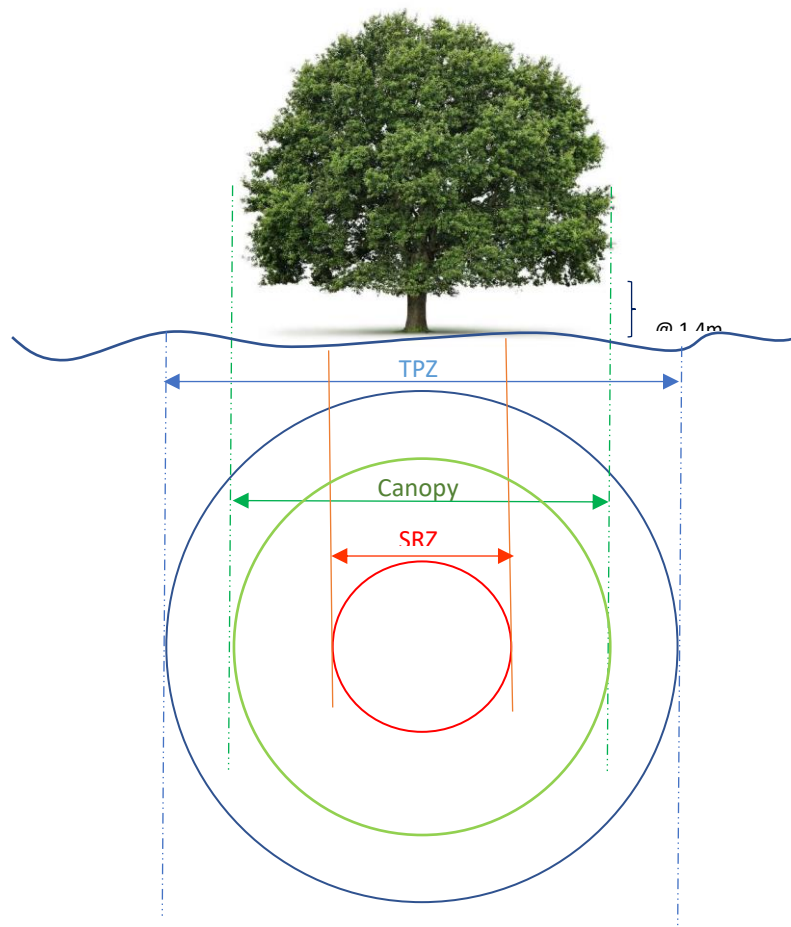
The SRZ is the area of the root system (as defined by AS 4970-2009) used for stability, mechanical support and anchorage of the tree. Severance of structural roots (>50 mm in diameter) within the SRZ is not recommended as it may lead to the destabilisation and/or serious decline of the tree.

Root investigation:

When assessing the potential impacts of encroachment within the TPZ, consideration will need to be given to the location and distribution of the roots, including above or below ground restrictions affecting root growth. Location and distribution of roots may be determined through non-destructive excavation (NDE) methods such as hydro-vacuum excavation (sucker truck), air spade and manual excavation. Root investigation is used to determine the extent and location of roots within the zone of conflict. Root investigation does not guarantee the retention of the tree.

12.4 Tree Protection Zone Calculations

The Australian Standard *AS 4970-2009 - Protection of trees on development sites* is used for the allocation of tree protection zones. This method provides a TPZ that addresses both tree stability and growth requirements. TPZ distances are measured as a radius from the centre of the trunk at ground level.



AS4970-2009, s3: The radius of the TPZ is calculated for each tree by multiplying its Diameter @ Breast Height measured @ 1.4m from ground level ($DBH \times 12 = TPZ$). ($DBH = \text{Trunk Girth @ 1.4m} \div \pi$).

To calculate the SRZ: Radius SRZ = Diameter Above Root Crown ($DRC \times 50$) $^{\wedge} 0.42 \times 0.64$. If the DRC is less than 0.15m the SRZ will be 1.5m.

Note: A TPZ should not be less than 2m or more than 15m from the tree stem.

You do not need to calculate the TPZ of palms, cycads and tree ferns. For these plants, the TPZ should not be less than 1m outside the crown.

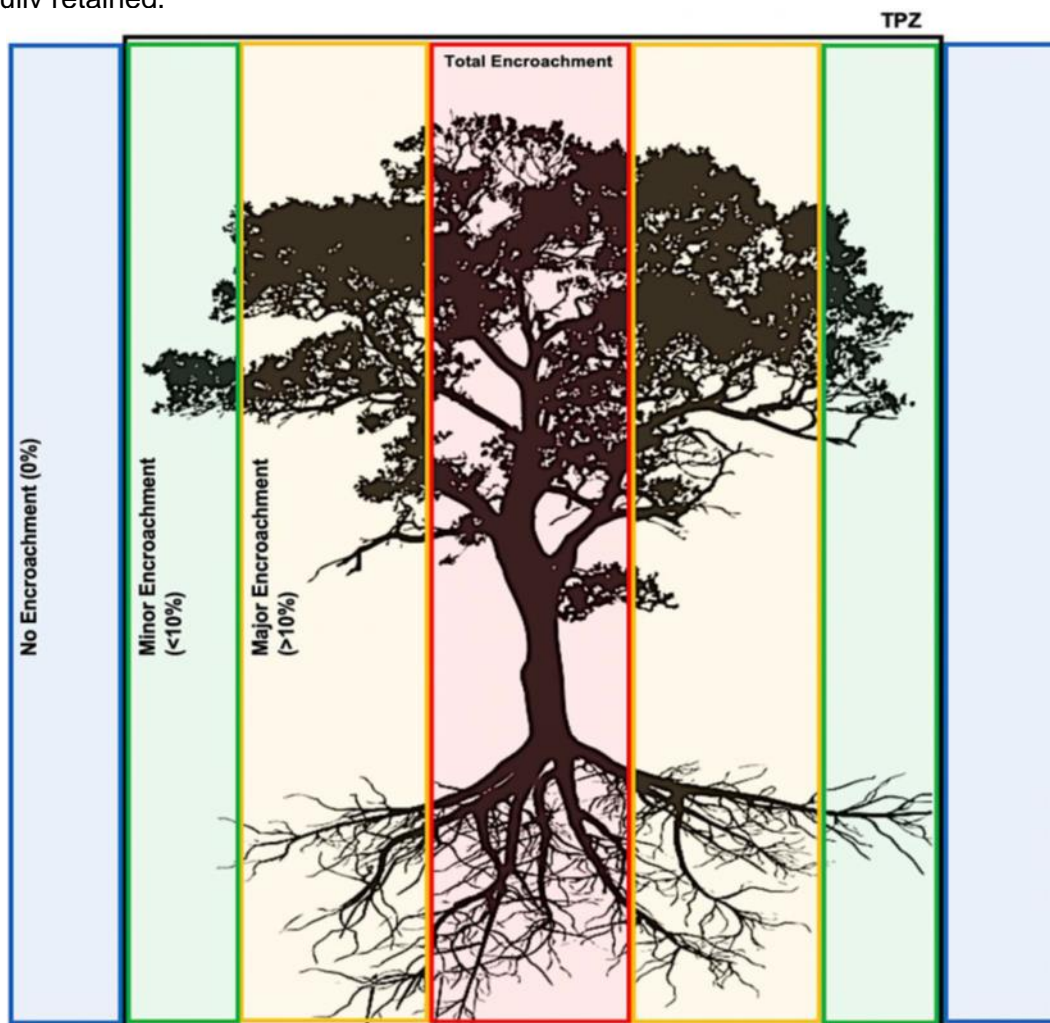
12.5 Indicative Encroachments within the Tree Protection Zone (TPZ)

No encroachment (0%): No likely or foreseeable encroachment within the TPZ.

Minor encroachment (<10%): If the proposed encroachment is less than 10% (total area) of the TPZ, and outside of the SRZ, detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and be contiguous with the TPZ.

Major encroachment (>10%): If the proposed encroachment is greater than 10% (total area) of the TPZ, the project arborist must demonstrate that the tree(s) remain viable. The area lost to this encroachment should be compensated for elsewhere and be contiguous with the TPZ. Tree sensitive construction techniques may be used for minor works within this area providing no structural roots are likely to be impacted, and the project arborist can demonstrate that the tree(s) remain viable. Root investigation by non-destructive methods may be required for proposed works within this area. All work within the TPZ must be carried out under the supervision of the project arborist.

Total encroachment: Subject trees located wholly within the construction footprint cannot be successfully retained.



Stanmore (Hadfield) Elm (Tree ID 4595)

Ulmus glabra “Horizontalis”

Location: 300 Stanmore Road

I inspected the Hadfield Elm and provided a statement in 2015. I assessed then that the tree is an important landmark in Richmond, that it exhibits exceptional Heritage and Landscape value. I note that these provisions are recognised in the City Plan Schedule of Individual Trees.

When I inspected the tree in 2015 there had been an underplanting which according to the Rough & Milne landscape plan for the supermarket involved *Phormium cookianum* “Dwarf Green”. Whilst introducing a different character than the lawn and garden beds traditionally associated with this specimen, due to this dwarf flax cultivar typically having a low stature less than 80cm, I found it acceptable as it would allow a green-clothed ground plane to continue beneath and separate from the tree canopy.

I recently re-visited the site to inspect any change in the intervening 5 years and was encouraged seeing the health of the specimen tree. However it was very disappointing to see that the planting undertaken had not been *P.cookianum* “Green Dwarf” as specified by Rough & Milne. Instead the entire area is dominated by the species *P.cookianum*, the mountain flax. The tall flax mass some 1.5 m high significantly disrupts the Landscape and Heritage value of the tree it surrounds. The previously evident ground plane has been lost. The character of the tree is devalued. The flax mass character that has emerged is in conflict with the heritage garden aesthetic that is important to the Hadfield Elm.

Due to the adverse effects of the mis-planting that has occurred, I recommend the *P.cookianum* be removed entirely. A green-foliaged ground cover planting complementary to the tree should then be established (e.g. Renga Renga) or some of the ground surface merely clothed in a wood mulch.

Di Lucas
BSc, MLA, Life member NZILA

16 December 2020

di@lucas-associates.co.nz



From: Craig Taylor <craigtaylor@simplyarb.co.nz>
Sent: Tuesday, 22 December 2020 2:48 pm
To: Brad Cadwallader <brad.cadwallader@cropp-place.nz>
Subject: Re: Stanmore elm

Hi Brad

Hope I find you well and geared up for the Christmas break?

I inspected the Stanmore Elm this morning and it is looking somewhat better than it has done. There appears to be no spraying being done immediately around the base and further afield. The flax clumps are suppressing anything that may want to grow (plus the flax makes life difficult to get in amongst so is keeping the dreaded sprayers away I suspect as they won't want to venture in.....)

Current Measurements are:

Height = 12.1m (this was difficult to take due to the flax around the base but was taken from multiple points around the tree to get a consistent reading). Measured using a Nikon Forestry Pro
Trunk circumference (measured below the burl) = 3.7m (measured using a Komelon flexy tape measure)

DBH (measured below the burl) = 1.3m (measured using a Komelon flexy tape measure)

Canopy spread east to west = 17.9m (measured using a Komelon flexy tape measure)

There is deadwood in the tree canopy (less than 30%) with the largest section being approx. 75-100mm in diameter, but the tree has certainly recovered somewhat from the last time I saw it, it was not looking too good and the deadwood would have been in excess of 30% but that was about 12-18 months ago.

I hope you and the family have a wonderful Christmas Brad and if there are any other measurements or information you need just let me know.

Kind regards

*Craig Taylor
Consultant Arborist*

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CADWALLADER

TREE CONSULTANCY

03 February 2021

Hadfield Elm (CCC Protected Tree ID 4595)

Species: *Ulmus glabra* 'Horizontalis'

Location: New World Supermarket, 300 Stanmore Road, Christchurch.

Introduction

I have been asked by Errol Hadfield to provide a statement on the current health and condition of the CCC protected horizontal elm located at 300 Stanmore Road. Also sought, is my opinion on the planted flax growing beneath the tree and whether the presence of this flax is having a negative impact on the tree. I have also been asked if negative effects may be caused to the tree from the removal of the flax.

The following documents and information have been provided for reference and comment:

- Craig Taylor (Simply Arb Ltd) updated observations/measurements December 22, 2020.
- Di Lucas (Lucas Associates) statement dated December 16, 2020.
- Owen Meekins (Treetech Specialist Treecare Ltd) report dated November 2, 2020.
- Liz Warner (Warner Tree Care Ltd) report dated November 17, 2015.
- David James (David James Tree Service) report dated February 11, 2015.
- Chris Walsh (Treetech Specialist Treecare Ltd) report dated November 23, 2012.

Background

I have known the Hadfield elm for many years, more recently through my involvement in the Christchurch City Council Replacement District Plan in 2015/16.

According to the Hadfield family, the elm was historically situated in a lawn area with flower beds over the past 120 years or so. The area around the elm was re-landscaped when the supermarket was established at the site in 1995/96. A pedestrian walkway was installed through the landscaped area and the tree was heavily 'lifted' (high pruned) at the time. The path was subsequently removed because it breached the 2013 consent conditions (David James, 2015).

The health of the elm dramatically declined following this change to its environment. One writer (Walsh) recommended its removal in 2012 however both James and Warner

considered the tree to have improved in health by 2015 and recommended retention. Meekins (2020) more recently suggests the elm is showing signs of 'stress' and 'senescence' (old age).

I measured the tree on November 9th, 2015 and can make comparative observations of measurements more recently taken by Taylor on December 22nd, 2020.

I visited the tree on December 17th, 2017 and documented the use of herbicides beneath the tree to control weeds. My conclusion at the time was that acid-based, broadleaved herbicides were being used under the tree. I visited the tree again on January 17, 2020.

The history of the elm along with images taken of it over the years is recorded on the New Zealand Tree Register (see record CR/1344).

Commentary

It is clear that the elm has been significantly affected by the development that has taken place around it over the past 25 years. While the high pruning has dramatically altered its shape, restoration may improve over time with careful management. Meekins (2020) suggests that the tree has been pollarded at some stage, but this is incorrect. The remaining canopy of the tree is the natural shape of a horizontal elm and the Hadfield family report that no such pollarding has occurred over the life of the tree.

The health of the elm has much improved in recent years. Taylor (2020) recently observes that the tree is looking better than it has done in the past. The elm has grown in girth from 284 cm in 2015 to 370 cm currently, despite what it has looked like over that period. This growth is consistent with other elms of this age and suggests good vitality rather than the senescence Meekins opines. It is worth noting that all but Taylor observed the tree when it is not in full leaf.

Not recorded in previous reporting on the tree has been the use of herbicide around the base of the elm that I personally observed in 2017 (see following images). It may not have been obvious to other arborist that have inspected the tree but the use of herbicides to manage weeds in landscaped areas such as this is now common practice. Their infrequent use makes them hard to detect and the symptoms of their use can mimic other tree conditions. Some herbicides such as glyphosate have little effect on established trees, but broadleaf herbicides can cause serious damage.

It is possible that what has been observed as 'decline' over the past 25 years has in fact been the intermittent use of broadleaf herbicides rather than solely the disturbance to the rooting environment. In my opinion the symptoms of periodic dieback in the tops of the elm are entirely consistent with effects of an acid-based herbicide.

If the use of broadleaf herbicides to control weeds is discontinued then the elm can be expected to recover, however full recovery can take many years.



Image shows 2017 herbicide application to weeds beneath elm. Inset shows distortion of growth consistent with an acid-based broadleaf herbicide commonly used for weed control.

The flax underplanting beneath the tree is has now become well-established. I concur with Lucas (2020) that the flax present is the species *Phormium cookianum* rather than the lower growing cultivar *Phormium cookianum* 'Dwarf Green'.

Given the complexities of historical site disturbance and herbicide use it would be difficult to conclusively state that the presence of the flax planting beneath the tree is having a negative effect on the elm. It has been well documented in literature that grasses can aggressively out compete with trees for resources¹. While flaxes are not grasses, they are also perennial monocots, have extensive root systems, are very tough and form pure dense clumps. No direct research could be found examining the relationship between flax and tree growth, but one study identified that *P. tenax* accumulates significant quantities of potassium². As an essential macronutrient in higher plants, potassium plays a decisive physiological role in plant development and function³. Given this, it is my view that it is quite possible that the flax could be having a deleterious effect on the elm.

¹ Messenger, S. 1976. Root Competition: Grass Effects on Trees. *Journal of Arboriculture*

² McGruddy E, 2006. Integrating NZ flax into land management systems. Sustainable Farming Fund: project 03/15

³ Fromm, J. 2010. Wood formation of trees in relation to potassium and calcium nutrition. *Tree Physiology*, Volume 30, Issue 9, Pages 1140–1147

Meekins opines that the flax is not having a negative effect on the elm yet does not identify what is causing the tree's lack of vigour and vitality, other than assuming the tree is getting old. He considers that the removal of the flax will result in soil compaction as the area beneath the tree will become a thoroughfare. As a counterpoint to this argument, it is worth noting that the tree was in fine health prior to the installation of the new landscape and when foot traffic beneath the tree was at a high level.

A further argument for the retention of the flax is made that the removal of it will cause root disturbance within the 'Tree Protection Zone' of the elm. While I agree that excavations, compaction and/or general disturbances within the TPZ should be avoided, Meekins appears to omit any discussion on how the flax may be removed without root disturbance. In my view, the removal of the flax by manual means, utilizing cutting tools such as a flax knife is quite achievable without soil disturbance.

Conclusion

In my view the elm is maintaining a high level of vitality despite periods of low vigour caused by a change in environmental conditions and the periodic use of broadleaf herbicides. I agree with Di Lucas that the flax planted beneath the tree is not the dwarf cultivar but the taller growing species *Phormium cookianum*. In my opinion, the presence of the substantial planting of flax is likely to have a negative effect on the tree. My recommendation is that the flax is removed and that the area beneath the tree is kept mulched. Future weed control within the landscaped area should be by physical manual means however glyphosate may be used. No further use of broadleaf sprays should be used within the root zone of the tree.

The Hadfield elm is an important tree with a strong historical connection to the site. Every effort should be made to ensure that it is well cared for.

I trust that this information is helpful.

Yours sincerely,



Brad Cadwallader Dip.A.Hort, Cert (Arb), Cert.Den, FRIH, Life Member NZ Arb

Tree Consultant

Bradley Graham Cadwallader Dip.A.Hort, Cert.Arb, Cert.Den, FRIH, Life Member NZ Arb

Summary of Qualifications & Experience

- 1.0 I hold the following qualifications:
 - 1.1 Diploma in Amenity Horticulture (Massey);
 - 1.2 A National Certificate in Horticulture (Arboriculture) Adv. L4 (NZ);
 - 1.3 Arborist Certificates I and II – the Tree Care Industry Association (USA);
 - 1.4 Arborist Certificate – British Columbia Institute of Technology (Canada); and
 - 1.5 Three Papers in Dendrology – University of British Columbia (Canada).
- 2.0 I have worked in the field of Arboriculture and Amenity Horticulture for 35 years. Cadwallader Tree Consultancy has been established since 2005.
- 3.0 I am a professional member of the NZ Arboricultural Association (NZ Arb) and the Royal New Zealand Institute of Horticulture. The following awards have been received from NZ Arb; Life Membership for services to the association (2008) & The Ronald Flook Award for excellence and contributions in the field of arboriculture (2014). In 2016 I was made a Fellow of the Royal New Zealand Institute of Horticulture.
- 4.0 I have 35 years of practical experience working as an arborist in the following fields of practice; district plan tree surveys for various Local Authorities, State Highway hazard tree surveys, consent monitoring, general tree report writing, tree inspection, hazard tree management, management of trees on development sites, heritage tree management, tree valuation and evaluation using variety of tree appraisal methodologies.
- 5.0 I am well versed in the application of STEM – the Standard Tree Evaluation Method and have carried out a considerable number of STEM evaluations for Tasman District Council, Nelson City Council, Wellington City Council and am currently undertaking a review of Heritage trees for Gore District Council.
- 6.0 To supplement this field based experience and my formal education I have attended numerous courses, seminars and conferences in order to maintain a high level of professional knowledge within the field of Arboriculture.
- 7.0 I also manage the NZ Tree Register (a national register of notable and historic trees for the New Zealand Notable Tree Trust).
- 8.0 Since 2009 I have been the appointed Tree Arbitrator for the Ministry of Economic Development - Energy Safety Service (pursuant to the Electricity (Hazards from Trees) Regulations 2003).

Arborist's Disclosure Statement

Arborists are tree specialists who use their education, knowledge, training and experience to examine trees, recommend measures to enhance the appearance and health of trees and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of the arborist, or to seek additional advice.

Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like any medicine, cannot be guaranteed.

Treatment, pruning and removal of trees may involve considerations beyond the scope of the arborist's services such as property boundaries, property ownership, site lines and other issues. Arborists cannot take such considerations into account unless complete and accurate information is disclosed to the arborist. An arborist should then be expected to reasonably rely upon the completeness and accuracy of the information provided.

Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees, is to eliminate all trees. Trees that are regularly inspected by competent, knowledgeable arborists and maintained in accordance with modern arboricultural practices are far less likely to experience unexpected failures than unmanaged trees.

In the preparation of any report that may be used as expert testimony, the consultant acknowledges and will abide by the Code of Conduct for Expert Witnesses.

Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character, nor is any opinion rendered as to the quality of any title. Any and all existing liens and encumbrances have been disregarded, and any and all property is appraised/evaluated as though free and clear, under responsible ownership, and competent management.
2. It is assumed that any property is not in violation of any applicable codes, acts of Parliament, ordinances, statutes, or other governmental regulations.
3. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.
4. The consultant shall not be required to give testimony or attend court by reason of this report unless subsequent contractual arrangements are made.
5. Loss or alteration of any part of this report invalidates the entire report.
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8. This report and any values expressed herein represent the opinion of the consultant and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
9. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.
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