**28 Queens Drive Ashburton**
**Protected Tilia tomentosa-Silver Lime**
**Property of Mr. E. Drewitt**

**Comments in regard to Treetech Arboricultural Assessment Report (Review 2015)**

In response to a request from David Askin, Ashburton District Council's Open Space Manager I provide the following comments in regard to the above report authored by Treetech arborists Mr Ed Sard and Mr Martin Gohns.

Firstly I will deal with the particular numbered statements in which my opinion differs from the views of Mr. Sard and Mr. Gohns.

**2.2**
I am not an employee of the Asburton District Council but have been engaged as a private independent arboricultural consultant.

I did not carry out the initial survey to evaluate trees listed as worthy of protection under the ADC district plan.

**5.1**
I consider the crown canopy of the tree to be generally symmetrical, any asymmetry being less than minor. The photographs included in the Treetech report (taken from the road boundary) show this.

**5.4**
I consider the development of the buttress flares was such that the lime had good lateral root development and gave a clear indication that soil levels had not been raised around the base which is often the cause of decay and failure in trees.

If in fact roots have traveled to the driveway and foundations of Mr. Drewitts house this would provide a good indication of the lateral extent of the root system.

At the time of my inspection (in January) I found no evidence of saturated ground or prolonged ponding around the lime. In my initial pre-inspection discussion with Mr. Drewitt, upon learning of the heavy clay soil, I specifically asked him if water ponding occurred and persisted around the tree he said that it didn't (see the statement in my report relating to *Ground conditions and root stability*.

**5.6 and 5.8**
Excessive pruning to raise the canopy or to thin out branch growth to leave branches only on the ends of limbs will result in an increased swaying motion along the axis of the stem or main scaffold limbs affected. It may be this increased swaying motion or bending of the limbs under end-weight loading that is contributing to the problems experienced with a satisfactory installation of the Cobra bracing system.

**5.9**
According to Mr. Drewitt the original installation of the Cobra bracing system by Citycare took place in 1997/8 The latest installation would have been some time after I inspected the tree and prepared and forwarded the report on its condition to ADC on 21 January 2014.

**6.5**
I agree that relying on smaller diameter secondary branches higher up the stem to support the full loaded weight of the stem leaning towards Mr. Drewit's property (or the other two stems) is insufficient to provide adequate support to the defective trunk unions.

I understand from Mr. David Askin that the cables were installed when the tree was in full leaf, the weight of the leaves bending the stems out from the axis of the crown and in Mr. Mr. Drewitts's case towards his house. The Cobra support rope at the time it was installed is likely to have been tight but would have slackened off as the weight of the foliage would have been lost in the autumn leaf fall and as the stems returned to a more upright position. The amount of stretch in the cables may not be sufficient to cater for the changes in the seasonal loadings and the degree of movement it causes.

**6.7**
There are well documented pros and cons involved in the use of the galvanized wire and eyebolt system of bracing trees. This operation involves drilling through the whole diameter of the stem inserting a galvanized eyebolt and attaching a galvanized multi-strand wire rope between the stems involved. While the drilling is invasive, the amount of live, cambium and conductive tissue (phloem and xylem) affected is very small, about the diameter of the bolt. The tissue of the heartwood in the centre of older stems (xylem) consists of mostly dead cells the main function of which is structural support. Wound repairing tissue will quickly occlude and seal around the bolts where they protrude from the stems.

In my opinion, the ill effects of drilling through stems to install bolts in trees is often overstated (anthropomorphic even). As with any operation involving wounding and removal of live bark including pruning and diagnostic drilling, there is always a risk of wounds becoming infected regardless of how the work is carried out. Ultimately we have to rely on a tree's natural disease defense mechanisms to create barriers against wound infection as they have to in the wild.

My principal reason for advocating eyebolts and wire rope in this particular situation is that provided they are of sufficient strength and installed properly they should last in a safe condition for many years, as in fact they do when used, say, for bridge construction which requires very high safety standards.. The galvanized wire ropes would be better positioned lower down the stems where they are of sufficient diameter and strength to adequately support each other.

Professor Claus Mattheck who has conducted perhaps the most exhaustive research into the structure of trees and bio-mechanics advocates installing rods or bolts through the suspect limbs at the point of union with he main trunk to restrict movement and prevent splitting in this crucial area.

The Cobra ropes could be used to good advantage on the secondary branches higher in the crown providing good support yet allowing them a higher degree of movement to streamline themselves and relieve wind forces. Wire rope cables can still be installed at a tension that will allow a stem to move a little to relieve wind forces.

**6.8**
On the Tree Hazard Evaluation Form I attached to my report I recorded that there was excessive end-weight on the scaffolds (main limbs) but in terms of severity I gave it a *low* rating. There are some 115 fields on the form specifying tree/site condition factors that I have to asses, record and comment on this document. Therefore only the more important of these are included in the main report. It is important that arborists or other professionals involved in situations such as this receive the *Tree Hazard Hazard Evaluation Form* in addition to the over-view report, and that they read it properly.

In my opinion the lime has already received excessive pruning to raise its canopy to its present height.. The pruning has also led to branches being concentrated mainly on the ends of limbs which cause them to sway excessively in the winds. Any future pruning should therefore be aimed at progressively shortening the length of branches to achieve an overall reduction in crown size and a more compact crown. Heavy pruning particularly in older trees can result in stress, reduction in stored energy and lowered resistance to disease. Therefore such work should be carried progressively over a period of time encouraging branch growth towards the centre of the crown.

In Mr. Gohns and Mr Sard's comments they state that end-weight reduction would be beneficial in mitigating. I welcome such positive statements and have expanded this idea in my main report.

**With regard to the statement that I *"failed to specify re-inspection of the bracing system",* under the section of my report headed Hazard abatement/remedial tree work" on page 5 I included a whole section on synthetic rope systems including recommendations for yearly inspection times and recommended replacement times of seven to ten years.**

Furthermore, on the Tree Hazard Evaluation Form attached to my report, following the cable/brace field in the following Hazard Abatement section field, *Inspect further I have* ticked the *aerial and monitor box* statements to show that further aerial inspection and monitoring is required. Professional arborists need to read the Tree Hazard Evaluation Forms as well as the associated report properly.

**9.3**
Mr. Sard has stated that "*no qualified arborist can categorically state this tree will not fail and that no parts of the tree will not fail within the next forty years"*. This evaluation which forms parts of most arborist's assessments is there to give an indication or guide to the potential of the tree to live to a given age in known, or circumstances that can reasonably assumed within that time. Had the lime been suffering from crown die-back for example I would have given the *future safe useful life expectancy* as, say, five (5) years and not recommended cable bracing which is an expensive operation. It is essential that my clients should be aware of this in order to make informed decisions.

Should Councils or the general public stop planting trees in places where they may either now or in the future be situated within falling radius of, say, houses, roads, high public use areas or other such urban situations, I don't think so. There are some bad examples of urban planting in terms of position and tree species but nothing I think that would warrant a total ban.

**9.4**
The tree has been extensively pruned to raise the canopy to its current height this would have reduced some of the loading on the weak points.

**9.8**
Has either Mr. Gohns or Mr Sard confirmed my identification of the tree as a silver lime and not a common lime as originally stated in the District Plan? I recommend that the gentlemen confirm the species before determining possible legal consequences.

In regard to my assessment of the lime using the ADC Heritage Tree Criteria Evaluation System Mr. Sard commented that "*There is no indication that Mr. Fielding-Cotterell's evaluation was incorrect".* This is not reflected in the statements made in his report.

Under the factor *Form and condition* in the evaluation system I gave the "lime a two (2) point score relating to the factor statement *"Any hazardous and other conditions can be rectified".* The reason for this was that I considered cable bracing the lime to be a viable proposition or at the very least worthy of serious consideration.

**N.b**.In the C.C.C and SDC criteria/evaluation systems which formed the basis of the Ashburton system; under the factors relating to *form and condition* trees that are assessed as *dying, dead, diseased, unbalanced, bad structural defects or dangerous and cannot be rectified* are declared to be *invalid* for protection. The *invalid* qualification was not included in the ADC.system for some reason.

**Discussion/General comments/Legal considerations**

For many years prior to the lime being protected, Mr Drewitt appears to have valued and lived reasonably harmoniously with the lime tree. An example of this is the fact that seventeen (17) years ago he was prepared to bear the considerable costs of pruning work and cable bracing in order to prevent stem failure that would have required the removal of the whole tree. At this time there were no restrictions on the lime. He could just as easily have decided to remove the tree at this point although the public would have lost a very attractive landscape feature.

Seventeen years on and Mr. Drewitt is now an elderly man in his eighties who is finding the maintenance of his property increasingly challenging, not helped of course by the presence of the large tree that has also been declared a safety risk. Apparently neighbours have also complained about the tree.

Not mentioned in the Treetech report but certainly emphasized in my pre inspection discussion with Mr Drewitt is that in a recent valuation of his house and section and the adjacent section he owns, they had been dramatically devalued due to the presence of the lime. He believes there would be considerable buyer resistance because of the presence of the tree particularly as it was protected. He also thinks the tree is also likely to inhibit the development of the site to its full potential.

Given Mr. Drewitts time of life, I believe he may be thinking of realizing the full financial value of his properties in the knowledge that his future accommodation requirements will be different from now on. Although not stated in the Treetech report, I believe this to be a major factor in the moves for the tree to be removed even though the main thrust of the application is to seek the removal of the lime on grounds of safety.

Notwithstanding the above, in its present state the lime has been considered a safety risk by three qualified arborists. The question now is can the tree be made safe by any means or is removal the only safe option?

There is no doubt there is a high risk of injury to persons and property should any of the lime’s main stems or the whole tree fail. This risk will increase proportionately when the vacant section on Mr. Drewitt’s land near the lime is also developed.

Cable bracing using the Cobra type synthetic rope material was initially installed to support the lime but at tha time of my inspection on 11/1/14 one of the ropes was found to be broken. due to overload and likely deterioration of the synthetic fibres from the effects of ultra violet light.

A recent cabling operation arranged by ADC using the same materials but with a higher four (4) tonne load rating, was found to be providing insufficient support (at least during the winter months) due to one rope being slack and another being so tight that the

branches intended to provide support were being pulled forward into a adjacent branch. Such a situation cannot be relied on to secure the reasonable safety of the lime or the residents nearby.

I reiterate my earlier comments relating to the use of galvanized eyebolts and multi-strand wire in the situation being dealt with here. Further consideration needs to be given to the positioning and configuration of the cables in this tree should it be decided to retain it. Synthetic ropes can be installed higher up the crown where movement is greatest and their strength and flexibility characteristics can be used to the best advantage.

Full crown reduction is another option that would reduce the wind loads on the tree and make it safer in terms of stem failure and wind-throw. However, this silver lime is a mature tree and such an operation will reduce vigour and energy reserves also making it more susceptible to disease.

Unlike with the common lime (the species it was originally mistaken for) the silver lime does not have the ability to produce prodigious new shoot growth after pruning that can provide the basis of developing a more compact crown form.

Even if the crown reduction work is carried out to industry standards, the current attractive natural appearance of the tree will be lost, diminishing the values for which the tree was originally protected.

No matter what efforts ADC make to improve the safety of the lime the questions of the risks of tree failure, the protection of the public and property and accountability for injury in the event of failure will remain and continue to be used as leverage for the removal of the tree.

In this regard Mr. Sard's comments in sections 9.5 and 9.10 of the Treetech report are relevant.

It is true that there is no way that any remedial work can guarantee absolutely the safety of a tree. If it did fail, having regard to three inspectors that found the tree to be structurally defective, a claim is likely to be made on the basis of negligence together with a claim made for damages.

This would be made on the basis that a duty of care was owed by the defendant/s to the plaintiff (say, Mr. Drewitt or his neighbours) on the grounds that:

The defendants failed to discharge that duty.

There is injury to persons or property.

The injury is caused by the defendant's failure to discharge a *duty of care.*

Whether the work carried out on the lime would be deemed to have been a reasonable discharge of their *duty*.

Because of their resources, in the event of any failure, the council may be held to a higher *duty of care* than the average citizen.

Acts of God

In the United States of America, (that most litigious of countries) this is generally defined as *"an occurrence due to natural causes* ***that could not have been prevented by ordinary skill and foresight****"*.

In the past the law relating "acts of god" was often used as a defense when trees caused injury to persons or property. This is less likely to prove affective nowadays particularly if a council is involved.

If the lime tree failed and caused injury to persons or property the Act of God defense may not be applicable if it can be shown that the lime tree was structurally unsound (which it has been) and should have been remedied or removed (which is still subject to debate and decision).

Given the current focus and emphasis on safety in all sections of the public, commercial and political domains, being found guilty of charges relating to failing to discharge a duty of care or negligence are far more likely than in the past.

In view of the ramifications, I think qualified legal advice should be a major part of this debate and decision.

Report by: W. Fielding-Cotterell Date: 21 August 2015