Realignment of access road, Racecourse/Bowl of Brooklands

Observations on the findings of Bruce MacDonald (BM), senior consulting arborist for Asplundh in letters dated 21 April and 20 May 2009

The subject centres around the possible relative impact on native trees caught up in two alternative proposals (Options 1 & 2) to reinstate a road link that existed until recently between the Racecourse and the Bowl of Brooklands. The letters conclude suggesting that No. 1 should be the chosen route.

My response is as a former Curator of the Park with a background of pioneering in the use of chainsaws in canopy control in established trees and joint authorship of technical publications on notable trees throughout Taranaki.

Based on experience I agree with BM's suggestion that in general, disturbance of the root zone and more importantly compaction of fill added could be severely detrimental but we have to face the fact that this puriri beside the existent road has already survived such treatment without obvious harm when the road was originally formed. The question of why this could be so has to be raised.

I have pondered deeply over this matter but only recently discovered what may be the explanation. The head of the dell on the shoulder of which this tree germinated is 'blind' in that it is a near-vertical curved embankment several metres high. Tracing the radius of this bank by studying the contours up the road about 25m from the tree where the cutting for the road becomes obvious, reveals that the shoulder of the bank tapers in across the road towards the tree which would originally have perched almost on its sharp edge.

This suggests that the primary roots on the dell (road) side of the tree could only be vertical. In this orientation exposed on the edge of a vertical bank they could never function as anchorage roots and therefore remained only rudimentary. In response the tree established its massive anchorage roots and matrix of feeding roots on the up-side of the bank where the angle of recline is about 45 degrees. These are very obvious radiating outward through about 180 degrees.

When abnormal physical/mechanical stress is imposed on any part of a tree there is triggered a positive growth response called 'self-optimization' which results in specialised cell division of a nature that will add strength to compensate. In my opinion the root system of this tree has responded to unbalanced loadings imposed by its location by proliferating throughout its life more large, strong and vital roots in the upper slopes relative to those of the lower. This is possibly why the dumping of fill to form the road originally seems to have had little

detrimental effect – it was fortuitously pre-conditioned to be able to tolerate this threat by the unusual topography of its location. It is indeed already a venerable survivor.

This leads me to conclude that perceived threats to this tree if option number two was chosen may not be fully justified and overcoming them not as complicated or expensive as thought.

I do, however, have to agree with BM's insistence that "... *Removing the unstable fill under the Puriri drip line and replacing with spec fill to be compacted would be severely detrimental to the Puriri. The damage to the existing root structure of the tree would be huge and I doubt the tree would survive such treatment*", but I have to question whether that operation would really have to happen in the light of advances in modern technology if for every other reason this route was the most desirable option.

For the reasons I have given above, I do not believe that the portion of the root system of this specimen which lies below the road surface is as vital to its survival as would be the case if it was growing on level ground. The absence of unfavourable reaction to the original construction of the road and its subsequent use support this reasoning. I further believe that as a consequence, it should be possible to lay a bridged free-bearing construction for a distance of only ten to perhaps 15m in the vicinity of the tree to both ensure safe bearing capacity of the carriageway and avoid damage to the roots of the tree. It would also introduce greater load bearing capacity to the carriageway.

Concerning the option 2, BM continues "…*This option may only be feasible if the ground level remains unaltered,* (with which I agree) *and the road is re-routed beyond the drip line of the puriri, this would take significant engineering at very high cost which may be impractical…"* (with which I don't agree.)

Following on from my earlier conclusions about the minimal negative response of this tree to earlier roadwork, I cannot see justification for re-routing out beyond the drip line. Certainly the bridging of the immediate vicinity of the tree would be extra cost but that must be seen in context with the costs etc. of the massive excavations and destruction of trees involved in proposal number one, plus its other inherent potentially tree-threatening factors to be described later.

Mention is made of the need to remove a stand of tall kamahi (Wienmannia racemosa) in order to accommodate a 15m wide batter in the dell below the large puriri if option two is chosen. A threatened 'kamahi canopy' is illustrated silhouetted against the old stable building.

I have two problems with this, the first of little consequence in this context. Kamahi is not common in the Park and I know of none in this area. The stand depicted is a complex of mainly six other native tree species common in this area.

The second is based on the potentially misleading and presumably unintended impression gained from the illustration. It could be deduced that the entire stand of trees depicted must be removed. The dell in which they nestle is 120x60m in area. The furthermost trees defined with a line are well over 50m from any portion of Option 2. The only area compromised if indeed any trees need to be sacrificed at all for Option 2 is a group just above the two tree ferns in the centre foreground immediately to the lower right of the very broad spread of the giant puriri.

BM makes several references to the adverse effect of high winds and the potential danger of collateral damage from increased wind loading and sculpturing by wind shear as the result of removing mature trees whichever of the two options is chosen.

Following his logic it is not difficult to understand that in a situation such as this where prevailing winds are from south-west through west to north, easterly winds could be disproportionately destructive but in the case of the puriri I have reason to believe that the problem is very complex and perhaps not just associated with loading.

New Plymouth is the southern limit of natural distribution yet they grow exceedingly well her and are common throughout Brooklands. They are frost-tender in the seedling/sapling stage but thrive under the protection of canopy trees, flourishing when an opening occurs above.

Within a 100m radius of this large specimen of just over 2m in diameter (about the same as the famous Brooklands tree with its bold kauri-like trunk) there are five others with diameters over one metre. Two to the west just below the Scanlan Lookout, like this one are located just below the shoulder of the escarpment where the plateau upon which the Racecourse is located falls away into the Maranui/Bowl valley about 20 – 25m below. Two others of exceptional character are closer in the dell below the road; another is beside the Bowl on what was once ‘The Woodland Stage.’

All six have one striking feature in common relative to the classic forest-grown puriri such as the Brooklands tree. They branch at a low level and their canopy spread is greater than their height – they are squat.

Puriri timber was precious for beams such as for bridges (the first bridge over the Whanganui River came from New Plymouth) and strainer posts in fencing. It is feasible that all tall puriri in the area was felled for this reason but there may be another explanation.

I am concerned that in the past decade the identical twins near the lookout have both degenerated very seriously and may not recover. Death seems to migrate from the tips as evident even from aerial photographs. Only one major environmental factor has changed. In the early 1990's a stand of pines planted above them on the Racecourse land for milling material and was felled. Tip death became evident, partly I suspect because protective tough native understory vegetation was removed to tidy the site for replanting. The twins were exposed to a north-easterly orientated wind tunnel.

When I learned that replanting with pines was proposed I took the liberty of suggesting to administrators that for the sake of the puriris, the same native species that were chopped out should be used to form an intervening protective belt.

The young pines were planted even closer-up to the puriris than the original stand! Fortuitously their rapid growth stayed the execution date.

Relatively recently they received their mandatory 'short back and sides' for premium knot-free timber production. The Main Entrance to Brooklands/the Zoo is a perfect vantage point to view the inevitable consequences across the valley. Wind tunnels to dying puriris.

I have laboured the plight of these two hapless puriris and the curious Lilliputian specimens at the bottom and along the Racecourse edge of the dell because I think I can now identify a common link with a phenomenon known to every New Plymouth resident but not normally associated specifically with damage to puriri.

South-easterly winds are not very common but when large anticyclones are stalled in the southern Tasman we experience spasms of about three days direct from the Antarctic. They shed their moisture over the Wairarapa and Ruahines and by the time they reach here they are still boisterous but days invariably sunny. In autumn, winter and spring they can be bitterly cold and desiccating but I believe that especially in relation to the puriri it is the wind-chill factor that is most damaging.

When the six dwarf specimens were young I presume that the plateau was covered with tall forest uniformly sheared to about 30m higher than current

ground level by these winds approaching from what is now Maranui St. At the edge of the escarpment they would drop with violent turbulence into the valley, the wind-chill factor effectively 'pruning' the puriri only. This is over hundreds of years.

Regarding the degeneration of the twin puriris which would at first seem to be protected from winds from the south-east, I believe that when a gap was created by the felling of the original block of pines the winds, perhaps even triggered by the tractor shed, swirled into the gap and through to the unguarded puriris. This scenario has recently been repeated as a consequence of the limbing-up of the lower branches of the young pines.

These plausible scenarios provide a sense of how capricious the environmental conditions can be in relation to the vegetation of this area and I must confess further elevate the large puriri to enigma status. Remarkably it has survived Cyclone Bola's arrival from the southeast as well as earthworks around its roots but on the basis of BM's observation about vulnerability to winds from the least prevalent quarter and mine on the capricious nature of wind in gaps along this reach, Option 1 becomes less attractive.

There is however, another significant environmental factor associated with Option 1 and its relationship to the large puriri. Availability of groundwater would be compromised in two ways.

It has already been explained why I believe that the major anchorage and feeding roots are located in the sloping ground above (northward) of the tree. Currently practically every drop of average rainfall that falls there is absorbed into this catchment.

The outer edge of the left (eastern) batter of Option 1 comes within the drip line of the puriri, therefore the critical reservoir of groundwater from above, on which this and the trees which would be avoided by the batter are dependant, would be drained into the cutting and lost.

Furthermore, the batter would expose an expansive area of north-facing slope close to the trees to both direct radiation and increased wind evaporation, raising the moisture deficiency potential.

Based on the caprices of winds across this plateau which I have covered earlier in relation to puriri, I dare not make predictions over possible patterns of wind damage, especially as the present ten guardian mature kohekohe will no longer be there.

I cannot close this survey without expressing disappointment over how the scale maps that have been made available detailing both options tend to denigrate the presence of vegetation as if it was scrub to be cleared at the flick of a pen.

Caption copied from the plan: '*Significant trees shown only. Remainder is covered in light tree cover'*. I beg your pardon?

It is true that I have a very personal bias since by coincidence I played a major part in the planting of most of the younger trees threatened by Option 1. Ironically the intention was 'to form a shelter belt for the puriri'. I could therefore be expected to mount an enhanced level of protective stance.

The kauri that I handled as saplings, are now handsome rikkers 50cm in diameter. Already I could barely circle them with my arms if I was that type of person. I am therefore aggrieved to see them symbolised as neat little hydrangea-type bushes randomly scattered like confetti over what could be a Maggie Barry garden makeover plan. I realise that these are technical scale drawings relating to infrastructure but used as they are as guidance for non-technical decision-makers, they are positively misleading and alien.

I wish to make it clear that the foregoing are my personal observations and opinions and must not be regarded as in any way representing those of the Friends of Pukekura Park organisation.

Compiled for Friends of Pukekura Park by George Fuller MBE, NDH, Kew C, FRIH May 2009